



***PROJECT-BASED LEARNING THROUGH DOE
ADVANCED VEHICLE TECHNOLOGY COMPETITIONS (AVTC)***

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Agenda

- Intro to Advanced Vehicle Technology Competitions
- EcoCAR 2: Plugging In to the Future
- What's Next?



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25 Year History of

AVTCs

DOE, Natural Resources Canada and the North American auto industry sponsor AVTCs to:

- educate the next generation of automotive engineers
- accelerate the development and demonstration of technologies of interest to the DOE and the automotive industry



1994 Hybrid Electric Vehicle Challenge



1989



1992



2011



2014



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Premier Training Ground for Auto Engineers

- AVTCs have seeded the auto industry with ~16,000 students who have graduated with:
 - Hands-on automotive engineering experience designing, building and optimizing advanced vehicle technologies that increase energy efficiency and minimize environment impact while retaining consumer acceptability
 - Intensive experience using the latest engineering tools and following a real-world vehicle development process

- 91 North American universities have participated since 1989
- 531 individual university teams have competed
- More than 16,000 students have participated
- 75% of graduates have entered the automotive industry



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What Makes AVTCs unique?

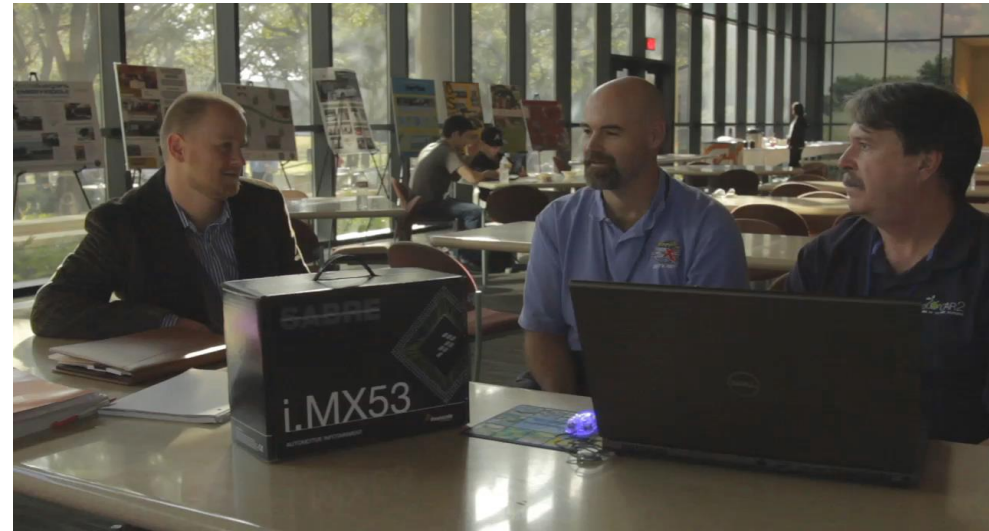
- High-profile collaboration between government, industry and academia
 - More than \$960M of industry support
 - GRA fellowships (engineering, business and communications students)
- Emphasis on Model-Based Design
- Holistic vehicle evaluation (environmental impact, performance, safety, consumer acceptability and other market factors)
- Access to industry-leading engineering tools, training and mentoring
- Access to top engineering jobs from leading employers
- Systems-level engineering emphasis + hands-on/experiential learning environment = premier training ground for automotive engineers



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Video Testimonials



Dr. Shawn Midlam-Mohler
The Ohio State University

Dr. Henning Lohse-Busch
Argonne National Laboratory



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EcoCAR 2: Plugging in to the Future

- Sponsored by DOE, General Motors and more than 31 other sponsors
- The current AVTC series (Fall 2011 – Summer 2014)
- Follows a three year vehicle development process (VDP) modeled after GM's Global VDP



Year 1
Modeling and simulation

Year 2
Sub system integration

Year 3
Refinement

Vehicles are dynamically and statically evaluated at a GM proving ground each year in the areas of Energy & Emissions Consumption, Performance, Consumer Acceptability, Business & Communications



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EcoCAR Sponsors provide more than \$960M of in-kind/cash support including:

Seed Money, Travel Support, Vehicle Shipping



Graduate Research Assistant Fellowships (Engineering, Business and Communications)



Unprecedented training, mentoring and education from industry SMEs



Industry-leading software tools (M&S, CAD, FEA, CFD)



Vehicles, Engines, Transmissions, e-machines, Production Parts, Battery Modules, tools and more!

Headline



Diamond



Platinum



Gold



Silver



Bronze



15 Participating Universities



University of Victoria



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EcoCAR 2 Highlights

- Strong multi-disciplinary emphasis from ME, ECE, SE, Business, and Communications
- 15 Plug In Hybrid Electric Vehicles (PHEVs) with various powertrain configurations
 - Colorado State is building a H2 PHEV Fuel Cell Vehicle
 - 10 teams are using E85
 - 4 teams are using B20
- Teams custom designed their own energy storage systems using A123 Systems Li-Ion battery modules
- Teams designing the interface to a custom Center Stack, donated by Freescale Semiconductor



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A V T C

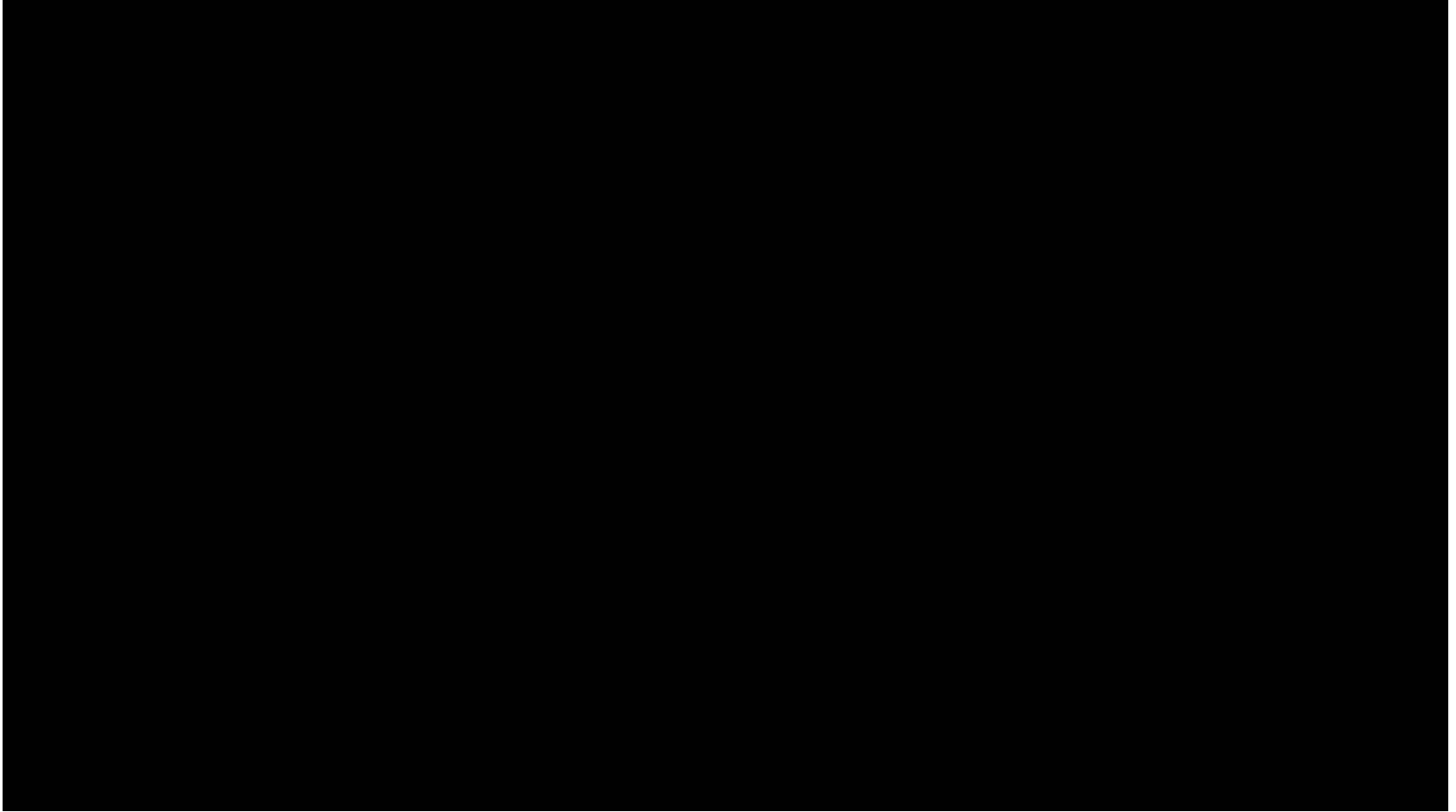
WHAT'S NEXT?



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EcoCAR 3Video



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Announcing EcoCAR 3!

- We are pleased to announce that DOE has joined with GM to launch the next AVTC, EcoCAR 3, starting in fall 2014
- EcoCAR 3 will follow the same VDP to design, build and refine advanced technology vehicles, but over four academic years

TECHNICAL GOALS:

In comparison to production gasoline vehicles, construct and demonstrate vehicles and powertrains that:

- Reduce energy consumption
- Reduce well-to-wheel greenhouse gas emissions
- Reduce criteria tailpipe emissions
- Maintain consumer acceptability in the areas of performance, utility, and safety
- Meet energy and environmental goals, while balancing tradeoffs between cost and innovation



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Who Should Apply?

- North American Universities with accredited ME departments
- Prior hands-on vehicle build experience (SAE Formula, Mini Baja, etc.) is essential
- Multi-disciplinary collaboration with ME, ECE, Communications and Business departments
- Strong support from the university administration and ties with local community, automotive industry
- On campus facilities – automotive shop with vehicle lifts, computer lab



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Timeline

May 2013 – RFP released electronically

December 2013 – Proposals due

March 2014 – Teams notified of selection

April 2014 – Launch Workshop

September 2014 – Kickoff

- Visit www.avtchistory.org to sign up to receive the Request for Proposals (RFP)
- Email avtc@anl.gov with any questions



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QUESTIONS?

Go to www.avtchistory.org to register for the EcoCAR 3 RFP Now!



“This is training the new cadre of automotive engineers. It’s real hands-on experience on a real project that really matters, where you have to eventually sit in it and drive, pass all the safety standards, and then be competitive, not only in gas mileage but also in performance.”

-- U.S. Secretary of Energy, Dr. Steven Chu, at the EcoCAR Competition Finals at the U.S. DOE HQ in Washington, DC . May 2011



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