

## *-Technology Integration Overview -*

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This presentation does not contain any proprietary, confidential or otherwise restricted information.

**Project ID: TI000**

# Technology Integration Overview

## Activities

- Clean Cities – A voluntary, locally based government/ industry partnership
- Legislative and Rulemaking
- Advanced Vehicle Competitions
- Education Programs
  - Graduate Automotive Technology Education
  - Partnership with Automotive X Prize
  - Advanced Electric Drive Vehicle Education Program



***Mission:*** To advance the energy, economic, and environmental security of the U.S. by supporting local decisions to adopt practices that contribute to the reduction of petroleum use in the transportation sector.

- Established in 1993 in response to the Energy Policy Act (EPAAct) of 1992
- Companion program to the EPACT mandates requiring certain fleets to acquire AFVs (Federal, State, and Fuel Provider Fleets)
- Deployment of alternative fuels and advanced vehicle technologies
- Funded and managed by DOE-HQ in Washington, DC. DOE Regional Project Management Centers (located in Pittsburgh, PA; Morgantown, VA, and Golden, CO) guide coalitions and manage projects.

**Deployment efforts accelerate market transformation** by increasing public awareness & consumer acceptance/adoption of new vehicle technologies that are being developed through VTP R&D activities.

**Deployment programs are essential when the success** of new technologies **depends on consumers changing** their driving and purchasing habits.

**Primary Focus – Achieve Petroleum Reduction ...**  
by Implementing Next-Steps when R&D is completed

Roughly 10% of VTP base budget supports Deployment (Technology Introduction) efforts

~100 coalitions Serving 78% of the population



> 5,700 stakeholders from businesses, city & state governments, transportation industry, community organizations, fuel providers

## **1) Consumer Information, Outreach, and Education:**

*Fuel Economy Guide, Alternative Fuel Data Center (AFDC), other web based consumer tools, targeted workforce and end-user education*

## **2) Local Community & Coalition Support:**

*Direct support for CC activities, public events, training for CC coalitions & key community decision makers, and deployment project coordination*

## **3) Partnership Development:**

*Targeted Industry, End-user, University, and Stakeholder Partnerships*

## **4) Technical & Problem Solving Assistance:**

*Addressing Market Barriers, Safety Issues, Technology shortfalls*

## **5) Financial Assistance:**

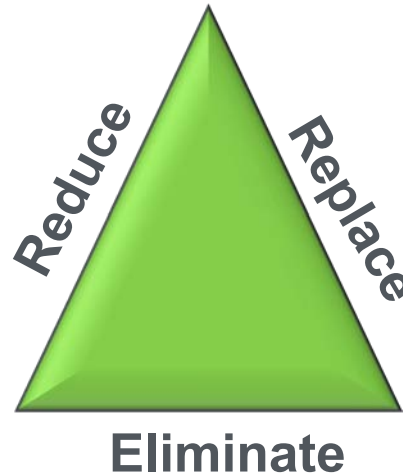
*Funding to Facilitate Infrastructure Development and Vehicle Deployment*

## Alternative Fuels

Biodiesel (B100)  
Electricity  
Ethanol  
Hydrogen  
Propane  
Natural Gas

## Idle Reduction

Heavy-Duty Trucks  
School & Transit Buses  
Light-Duty Vehicles



## Hybrids

Light- and heavy-duty  
Hydraulic hybrids  
Electric hybrids  
Plug-In hybrids

## Fuel Economy

More Fuel efficient vehicles,  
adopting smarter driving and  
vehicle purchasing habits

# Clean Cities Web Resources



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

**Clean Cities**

About the Program | Coalitions | Coordinator Toolbox | Financial Opportunities | Information Resources

Search Help | More Search Options | EERE Information Center | NEWS

Clean Cities strives to advance the nation's economic, environmental, and energy security by supporting local decisions to adopt practices that contribute to the reduction of petroleum consumption. Clean Cities has a network of approximately 90 volunteer coalitions, which develop public/private partnerships to promote alternative fuels and advanced vehicles, fuel blends, fuel economy, hybrid vehicles, and idle reduction.

Clean Cities is part of the Office of Energy Efficiency and Renewable Energy's [Vehicle Technologies Program](#).



- Select Coalition-Related Information**
- Starting Coalitions
  - Coalition Locations
  - Program Contacts
  - Coordinator Contacts

What is Clean Cities? Fact Sheet (PDF 2 MB) | Download Adobe Reader

Printable Version

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

**Alternative Fuels & Advanced Vehicles Data Center**

About the AFDC | Fuels | Vehicles | Fleets | Incentives & Laws | Data, Analysis & Trends | Information Resources

Search Help | More Search Options | Site Map | EERE Information Center

The Alternative Fuels and Advanced Vehicles Data Center (AFDC, formerly known as the Alternative Fuels Data Center) provides a wide range of information and resources to enable the use of alternative fuels (as defined by the [Energy Policy Act of 1992](#)), in addition to other petroleum reduction options such as advanced vehicles, fuel blends, idle reduction, and fuel economy.

This site is sponsored by the U.S. Department of Energy's [Clean Cities](#) initiative.



**Data, Analysis, and Trends**  
Our [Data, Analysis, and Trends](#) section provides industry trends and facts based on data analysis.

Printable Version

**www.fueleconomy.gov**

Links | FAQ | Site Map | Search | Contacts

United States Department of Energy  
Energy Efficiency and Renewable Energy

United States  
Environmental Protection Agency

**FIND AND COMPARE CARS...**



Gas mileage (MPG), greenhouse gas emissions, air pollution ratings, and safety information for new and used cars and trucks

- Compare Side-by-Side
- Advanced Search

**YOUR MPG ...**



**Why is fuel economy important?**  
Climate Change  
Strengthen National Security

**Diesel Vehicles**  
Tax Incentives  
Biodiesel

**Gas Mileage Tips**  
Driving More Efficiently  
Drive Smarter Challenge

**Hybrid Vehicles**  
How Hybrids Work  
Tax Incentives

**Videos**  
Extreme MPG  
Motorweek Videos

**Alternative Fuel Vehicles**  
Flex-Fuel Vehicles

**CARS**  
car allowance rebate system

Trade in your old, inefficient vehicle for a new, more efficient one.

Also known as the "Cash for Clunkers" Program

**In the News...**

Electric Cars' MPG Conundrum - BusinessWeek

More Are Hired to Speed Up the Clunker Reimbursements - The New York Times

Scion dealers say tiny iQ is coming in 2010 - AutoWeek

Disclaimer

More News



**Spanish Resources**  
Publications and Web tools available in Spanish

Clean Cities


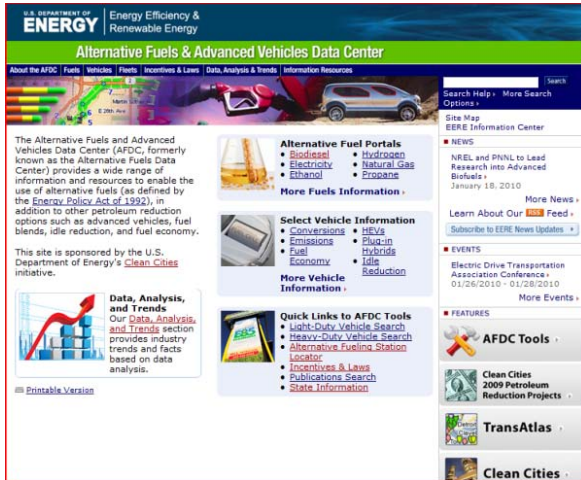
AFDC

FuelEconomy.gov


# Tools, Publications, Data, and much more !




## Web Based and Mobile Versions of Powerful Clean Cities Tools



**Alternative Fueling Station Locator** ▶  
Find alternative fueling station locations.




**State Information Search** ▶  
Find alternative fuel and advanced vehicle information by state.




**Mobile Alternative Fueling Station Locator** ▶  
Find alternative fueling stations on your mobile device.




**Incentives and Laws Search** ▶  
Search the U.S. incentives and laws database.




**Total Stations Count** ▶  
Find the number of fueling stations in the U.S. by fuel type.




**TransAtlas** ▶  
Explore an interactive map displaying alternative fuel and vehicle data.




**Publications Search** ▶  
Search alternative fuels and advanced vehicles publications database.




**Fleet Experiences Search** ▶  
Browse fleet experience stories by category.




**Petroleum Reduction Planning Tool** ▶  
Forecast fleet petroleum reduction.



**RSS Feed** ▶  
Subscribe to the AFDC news feed.



**Coalition Location Map** ▶  
Find coalition contact information by state.



**Related Links Search** ▶  
Generate a list of fuel and vehicle Web sites by category.

Access all of the tools and information at [http://www.afdc.energy.gov/afdc/info\\_resources.html](http://www.afdc.energy.gov/afdc/info_resources.html)

Develop your expertise on Clean Cities tools, alternative fuels, and advanced vehicle technologies



## **Courses of Interest**

FuelEconomy.gov Tools

Heavy-Duty Idle Reduction

GREET Fleet Footprint Calculator

Alternative Fueling Station Locator

TransAtlas Tool

Petroleum Reduction Planning Tool

**<http://ccu.westnetmlp.com/home>**

## DOE EERE Information Center and CC Technical Response Service

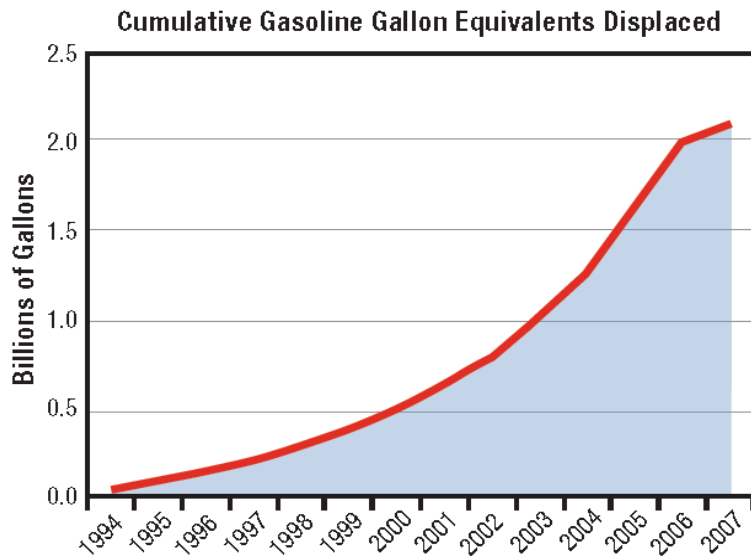
- Website: <http://www.eere.energy.gov/afdc/informationcenter.html>
- Phone: 1-800-EERE-INF (1-877-337-3463)
- E-mail: [technicalresponse@icfi.com](mailto:technicalresponse@icfi.com)
- Hours: 9:00 a.m. – 6:00 p.m. EST



# Clean Cities Gets Results !

## Displaced 2.4 Billion Gallons of Petroleum

- > 2.4 billion GGE displaced by coalitions since 1993
- 580,000 new AFVs on the road
- Over 6000 alternative fueling stations (CC helped build >70% of them)



**Bottom line:** > 2 billion GGE displaced, best is yet to come

## Partnered with National Media

- Collaboration with PBS-TV
- > 50 segments on alt fuels, advanced vehicles, fuel economy
- FuelEconomy.gov uses segments
- Enhanced CC legitimacy among automotive journalists

## Leveraged Funding 25:1

- \$43 million from Clean Cities
- Matched by \$214 million
- Resultant partnerships brought in additional \$845 million



Television's Original Automotive Magazine

MotorWeek segments provided by Maryland Public Television

	<b>NEW!</b> Car Keys - Fuel Sippers <a href="#">Flash Video</a> (14.7 MB) <a href="#">Quicktime Movie</a> (30.9 MB) <a href="#">Text Version</a> (pdf)
	<b>NEW!</b> Big Green SUVs <a href="#">Flash Video</a> (8.5 MB) <a href="#">Quicktime Movie</a> (17.9 MB) <a href="#">Text Version</a> (pdf)
	<b>NEW!</b> Best Eco-Friendly Award - GM Hybrid SUVs <a href="#">Flash Video</a> (3.4 MB) <a href="#">Quicktime Movie</a> (7.3 MB) <a href="#">Text Version</a> (pdf)

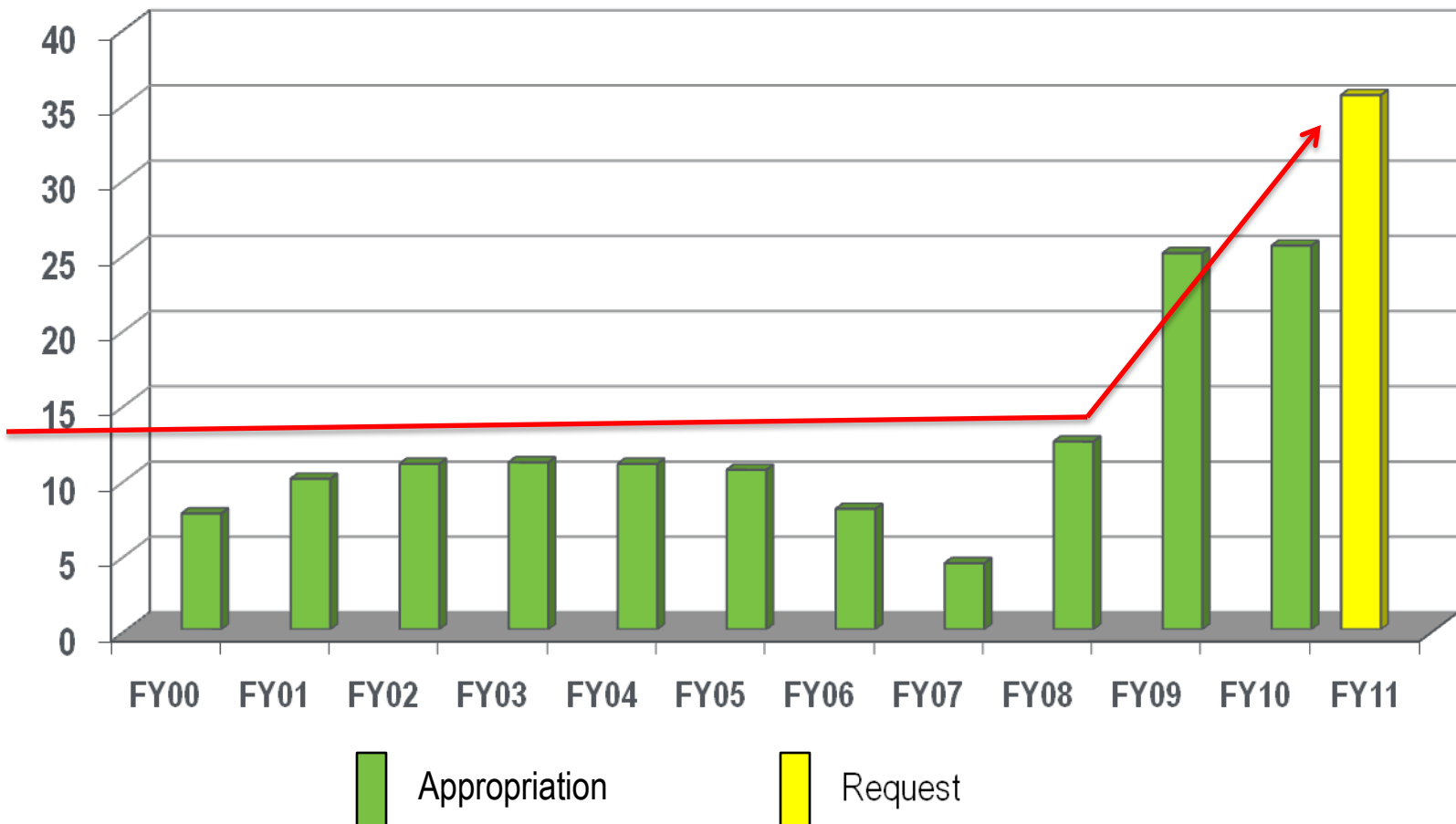
# Budget History

(CC only - not including \$300M funding from ARRA)



## Clean Cities Budget

\$ Millions



- Over 2000 Alternative Fuel and Electric Charging Stations to be built or upgraded (Infrastructure)
- 9000 Alternative Fuel and Advanced Technology Vehicles will be deployed
- ~ 40 Million gallons/yr of Petroleum Reduction
- Hundreds of workshops, educational events, workforce training and public outreach efforts
- Local Community & Economic Development

*These projects will be summarized in more detail in subsequent presentations and at the poster sessions this evening ...*

# Technology Integration Overview

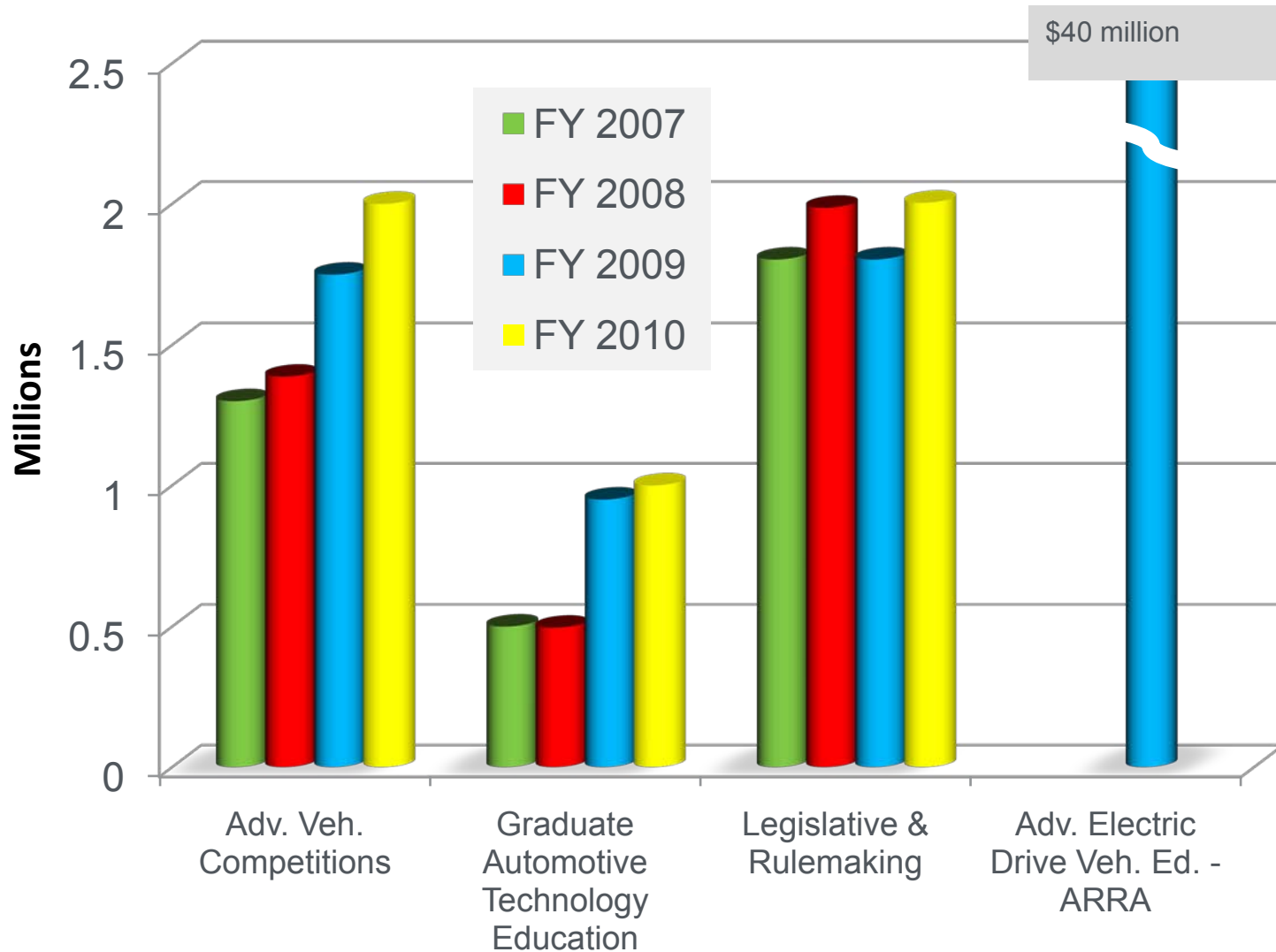
## Other Key Activities

- Advanced Vehicle Competitions
- Education Programs
  - Graduate Automotive Technology Education
  - Partnership with Automotive X Prize
  - Advanced Electric Drive Vehicle Education Program



# Budget History

*(continued – including other TI Activity areas)*



*Provide a new generation of engineers with knowledge and skills in developing and commercializing advanced automotive technologies.*

## Advanced Vehicle Competitions

- Since 1987, DOE has sponsored more than two dozen university-level advanced vehicle technology competitions.
- Provides college engineering students an opportunity to conduct hands-on research and development with leading-edge automotive propulsion, fuels, materials, and emissions control technologies.
- 16 North American universities are re-engineer a Saturn VUE to increase efficiency, reduce emissions and out perform its production counterpart while maintaining its consumer acceptability.
- Teams pursuing variety of advanced vehicle technologies
  - **Extended Range Electric Vehicle – 7**
  - **Plug-In Hybrid Electric Vehicles (PHEV) – 6**
  - **Full Function Electric Vehicle (FFEV) – 1**
  - **Fuel Cell Plug-in Hybrid Electric Vehicle (FCPHV) - 2**



## Graduate Automotive Technology Education

- Centers established in 1998, expanded in 2005.
- Receive DOE funding for student fellowships and curriculum development.
- Each center has established a graduate engineering education program that offers courses emphasizing that center's technology specialty.

## Eight Centers of Excellence Awarded in 2005

- University of California-Davis  
**(fuel cell hybrids)**
- Virginia Tech **(fuel cell hybrids)**
- Pennsylvania State University  
**(energy storage)**
- Ohio State University **(HEV systems)**
- University of Michigan-Dearborn  
**(advanced materials)**
- University of Tennessee **(HEV systems)**
- University of Illinois, Champaign-Urbana  
**(biofuels/combustion)**
- University of Alabama-Birmingham  
**(advanced materials)**

# Fuel our Future Now

- Partnered with the Automotive X Prize and Discovery Education
- Launched at the Washington DC Auto Show in February
- Curriculum available for K-12
  - Grades K-2: *Vroom! Vroom! What Makes Cars Go?*
  - Grades 3-5: *Designed for Efficiency*
  - Grades 6-8: *Designing a Vehicle for the Year 2020*
  - Grades 9-12: *Transport to the Future: Making a Plan for Positive Change*

**FUEL OUR FUTURE NOW**  
Igniting Imaginations to Empower the Next Generation

PROGRESSIVE AUTOMOTIVE X PRIZE  
Discovery EDUCATION

Home Elementary Middle School High School Teachers Parents News & Events

**HIGH SCHOOL**  
Teachers: Put your students behind the wheel! Discover factors that impact fuel efficiency and engineer vehicles that will transform where we're going and how we'll get there.  
**GO!**  
Fuel up on videos – watch now!

**MIDDLE SCHOOL**  
Go the extra mile with your students! Investigate alternative fuels and determine which vehicles exhibit ultimate energy efficiency.  
**GO!**  
What's your Speed IQ? Test your need for speed in a Virtual Lab!

**ELEMENTARY**  
Teachers: Get your classroom moving! Explore motion, forces, and sources of energy.  
**GO!**  
Students: Conduct your own race car experiment!

**About the Progressive Automotive X PRIZE Revolution Through Competition**  
Teams from around the globe are competing to design the first super-efficient vehicle that we could be driving one day. Get up to speed on the world's foremost engineering competition: the future of our planet and \$10 million are riding on it.  
**LEARN MORE!**

**News & Events**  
Sign up to receive updates and be the first to hear what's new! Keep checking back regularly for webinars, local race info and more coming soon!  
**LEARN MORE!**

**Parent Corner**  
Drive home the fun and energize students with activities, energy conservation tips and more!  
**LEARN MORE!**

Acknowledgment: This material is based upon work supported by the Department of Energy, National Energy Technology Laboratory under Award Number DE-FG02-08NT03077.

U.S. DEPARTMENT OF ENERGY

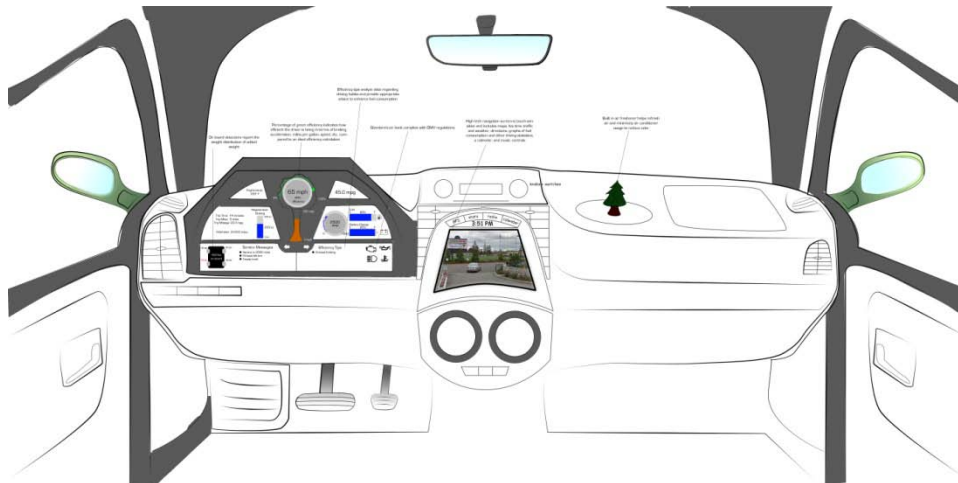
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# Dash Plus project



High School competition to design dashboard of the future

Partnered with the Automotive X Prize and Discovery Education



# Advanced Electric Drive Vehicle Education Program

*Accelerate the development and production of various electric drive vehicle systems through support of educational programs to substantially reduce petroleum consumption*

- Engineering Degree & Certificate Programs
- Emergency Responder and Safety Training
- Consumer & K-12 Educational Outreach
- Developing and Providing Teaching Materials
- Training Service Personnel, Vehicle Mechanics, and Supporting Infrastructure

# Advanced Electric Drive Vehicle Education Program

- Selections announced by President Obama on August 5, 2009.
- 10 projects receive \$39.1 million in ARRA funding.
  - National Fire Protection Association
  - Missouri University of Science and Technology
  - Wayne State University
  - West Virginia University
  - University of Michigan
  - J. Sergeant Reynolds Community College
  - Michigan Technical University
  - Purdue University
  - City College of San Francisco
  - Colorado State University

[www.vehicles.energy.gov](http://www.vehicles.energy.gov)



U. S. Department of Energy



Vehicle Education

Legislative &  
Rulemaking

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# Session Instructions

- This is a review, not a conference.
- Presentations will begin precisely at the scheduled times.
- Talks will be 20 minutes and Q&A 10 minutes.
- Reviewers have priority for questions over the general audience.
- Reviewers should be seated in front of the room for convenient access by the microphone attendants during the Q&A.
- Please mute cell phones, Blackberries, etc.

# Reviewer Reminders

- For Reviewers:
  - Please Observe Deadline for final submittal of review forms.
  - ORISE personnel are available on site for assistance and to answer questions.