-Technology Integration Overview –

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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

Deployment Rationale

Deployment efforts accelerate market transformation by increasing public awareness & consumer acceptance/adoption of new vehicle technologies that are being developed through the Vehicle Technology Program's (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

Clean Cities
Portfolio of Technologies

Alternative Fuels

Electric Vehicles
Biodiesel
Ethanol
Hydrogen
Propane
Natural Gas

Idle Reduction

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

Fuel Economy

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

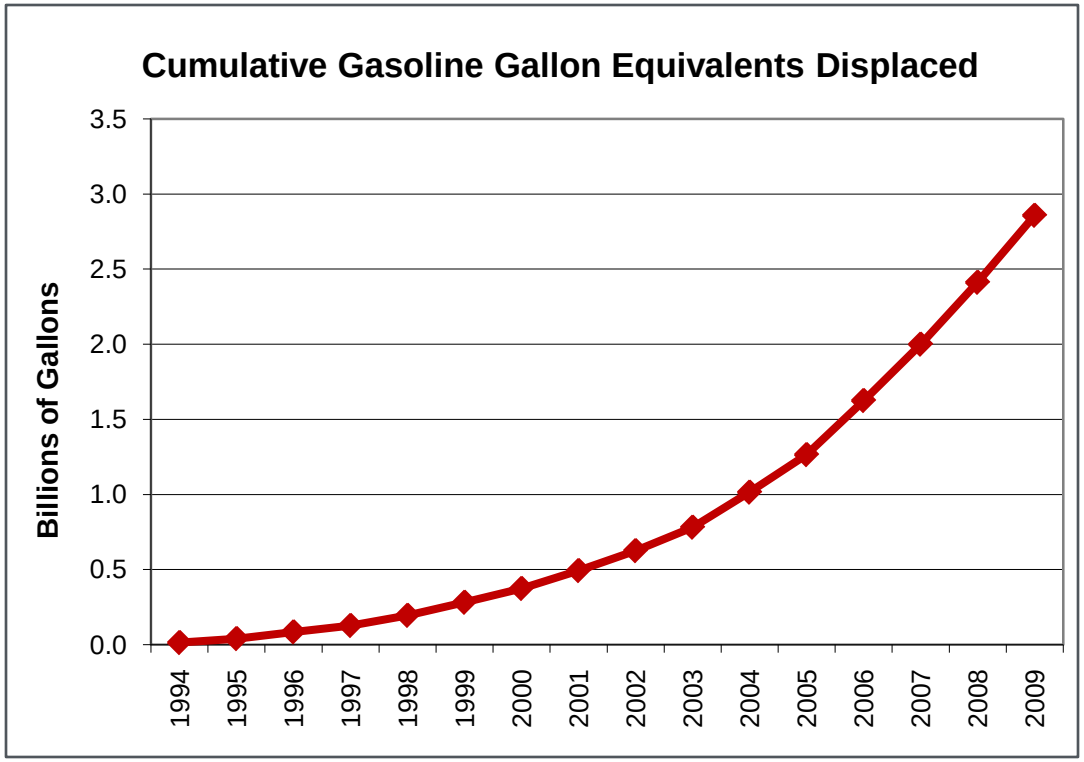
Hybrids

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

Clean Cities Efforts Gets Results !

Nearly 3 Billion Gallons of Petroleum Reduction since 1993

- Over 700,000 AFVs on the road
- 7000 alternative fueling stations (CC influenced >70% of them)
- Long term goal of 2.5B gal/year by 2020



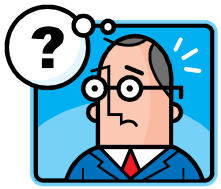
Clean Cities

U. S. Department of Energy

Clean Cities Deployment Efforts include 4 major activities

Local Community/Coalition Support & Partnership Development:
Direct support for CC activities, public events, training for Clean Cities coalitions & community leaders, local project coordination, strategic planning assistance

Consumer Information, Outreach, and Education:
Fuel Economy Guide, Alternative Fuel and Advance Vehicles Data Center (AFDC), other web based consumer tools, publications, workshops, targeted workforce and end-user education



Technical & Problem Solving Assistance:
Addressing Market Barriers, Safety Issues, Technology shortfalls

Financial Assistance:
Funding to Facilitate Infrastructure Development and Vehicle Deployment projects (Competitive Awards)

Forming Local Community Partnerships: *(Clean Cities Coalitions)*

~100 coalitions Serving 78% of the US population

Thousands of stakeholders from businesses, city & state governments, transportation industry, community organizations, fuel providers

Expanding Partnerships with key stakeholders

National Clean Fleet Partners :
… deployment with hi-impact national fleets …

NREL stock photo

Deployment Within National Parks

Partnership

Clean Cities
U.S. Department of Energy

NATIONAL PARK SERVICE

Photos courtesy of NPS

Consumer Education & Outreach:
Clean Cities Web Resources

Clean Cities

Alt Fuel and Advanced Vehicle Data Center (AFDC)

FuelEconomy.gov

New Media to Reach a Wider Audience

Expanded Use of Social Media and Internet Based Communications

Clean Cities tv
U.S. Department of Energy

tv worldwide
Intelligent Internet TV

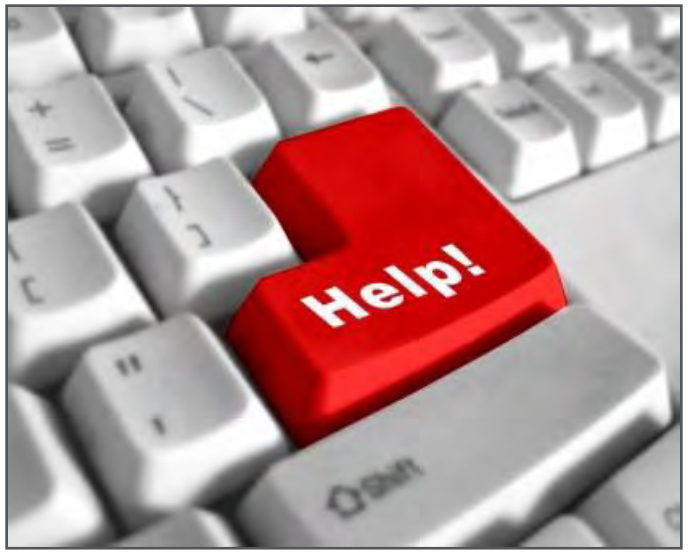
Spanish Resources
Publications and Web tools available in Spanish

Venturing into Bi-Lingual messaging for popular tools and websites …

Personalized Technical Assistance

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
- Hours: 9:00 a.m. – 6:00 p.m. EST

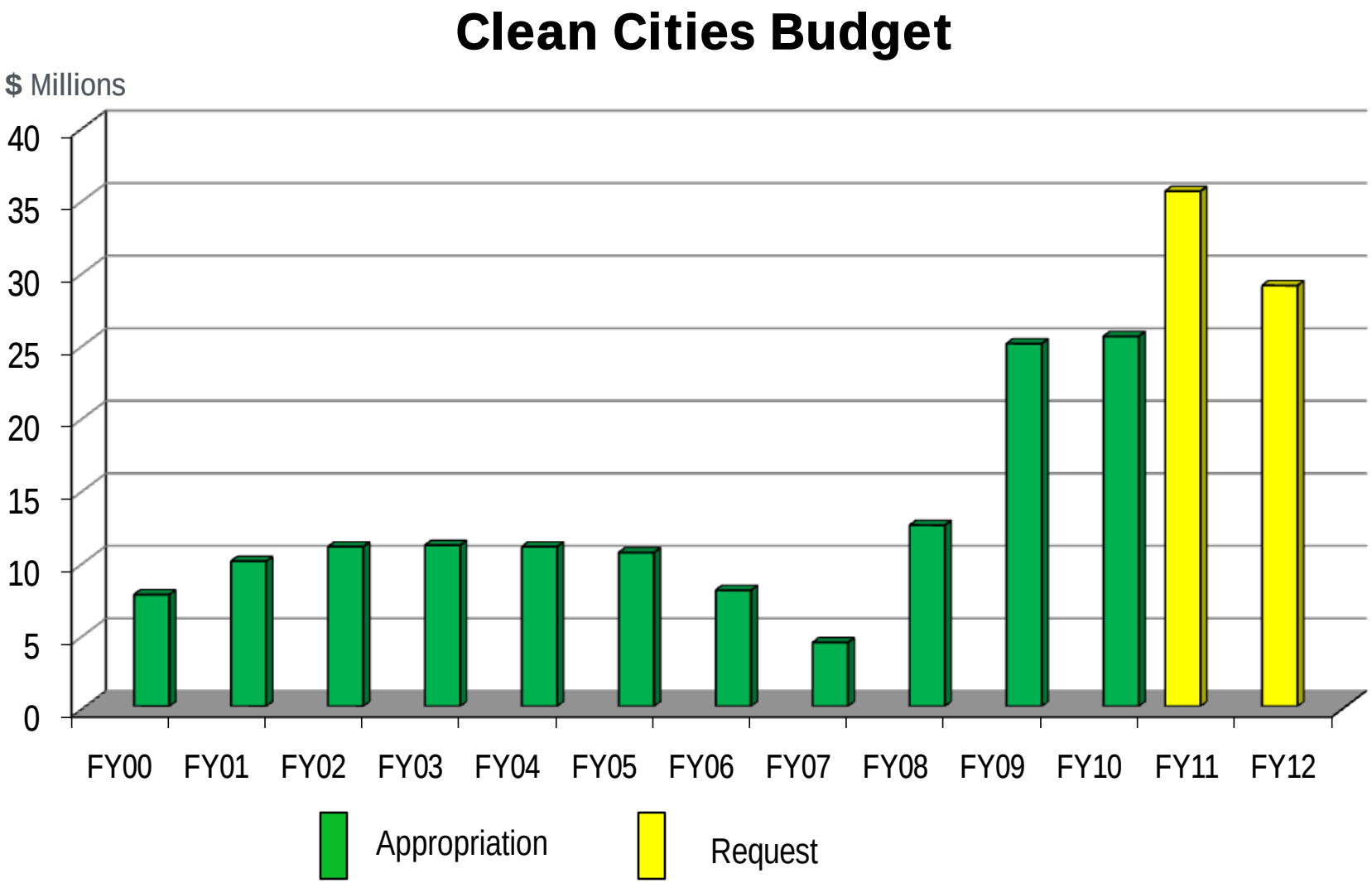


Financial Assistance:
Impact of ARRA & recent Clean Cities Awards …

- Over 1,250 Alternative Fuel and Electric Charging Stations to be built or upgraded (includes 500+ EV charging stations)
- Over 10,000 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

Budget History

(CC only - not including $300M funding from ARRA in FY09



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)

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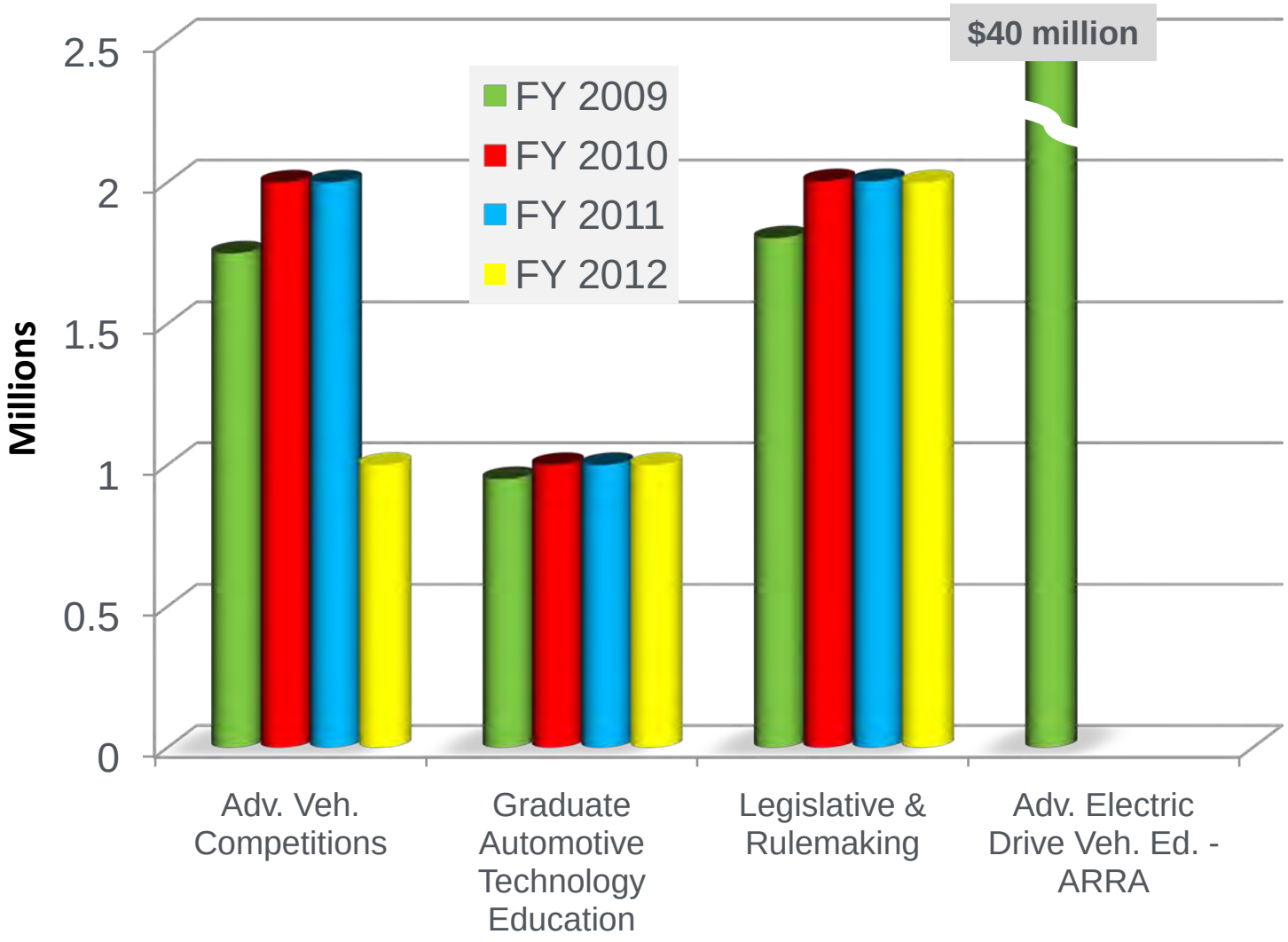

Training the Next Generation of Engineers

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

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 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**
- 3 year competition series concludes in June
  - **Vehicle dynamic events – June 6-13**
  - **Static presentation events – June 14 & 15**
  - **Awards ceremony – June 16**

Introducing EcoCAR 2

- EcoCAR2 launched at SAE World Congress 4/12-13
- Headline Sponsored by DOE and GM, Natural Resources Canada and other North American partners
- Teams will be challenged to reduce the environmental impact of a mid-size car while maintaining the performance and consumer acceptability of the production counterpart

Chevrolet Malibu

Colorado State University

EMBRY-RIDDLE Aeronautical University

Mississippi State University

Cal State LA

The Ohio State University

Penn State

Purdue University

The University of Tennessee

UOIT
Challenge Innovate Connect

University of Ontario Institute of Technology

Rose-Hulman Institute of Technology

NC State

University of Waterloo

Virginia Tech

University of Victoria

University of Washington

Wayne State University

Training the Next Generation of Engineers

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

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.

Solicitation Closed on April 18.

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)**

Automotive X Prize concludes

DOE sponsored the Evaluation, Education & Outreach Program to promote student/public interest and understanding of advanced automotive technology.

- Real-time, on-line availability of competition activities
- Educational events in 16 science centers around the country
- High school aged competition to design next-generation dashboards
- Vehicles tested on the track and dynamometer using consistent methodology.
- Fuelourfuturenow.com

Mainstream
Edison2 "Very Light Car #98"

Alternative
Li-ion Motors Corp "Wave II"

Alternative
X-Tracer Team Switzerland "E-Tracer #79"

Advanced Electric Drive Vehicle Education Program

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

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

Contact Information

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

www.vehicles.energy.gov

Clean Cities
U. S. Department of Energy

Vehicle Education

Legislative & Rulemaking

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- 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.