Technology Integration Overview

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Technology Integration

Activities

- Clean Cities – A voluntary, locally based government/ industry partnership
- Graduate Automotive Technology Education
- Advance Vehicle Competitions
- Legislative & Rulemaking
- Education (Thursday)
- Safety Codes & Standards (Friday)

Clean Cities
U.S. Department of Energy

GATEWAY TO THE FUTURE
GATE
GRADUATE AUTOMOTIVE TECHNOLOGY EDUCATION

EcoCAR
The NeXt Challenge

Clean Cities

A voluntary, locally-based government/industry partnership

> ***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 consumption in the transportation sector**.

- Established in 1993 in response to the Energy Policy Act (EPAct) of 1992
- Companion program to the EPACT mandates requiring certain fleets to acquire AFVs (Federal, State, and Fuel provider fleets)
- Focus on **Deployment** (next steps after R&D is completed)

What's Included ?

Technology Portfolio:

- Alternative (non-petroleum) Fuels & Vehicles
- Advanced vehicles (e.g., HEVs, PHEVs)
- Vehicles and Driver choices that Increase Fuel Economy
- Idle Reduction

Strategies:

- Partner with states & local organizations
- Provide Outreach, Education, & Information resources
- Facilitate Infrastructure Development
- Coordinate efforts with EPAct-regulated fleets
- Provide Technical & Financial assistance

National Laboratory Support

National Energy Technology Lab (NETL – Project Management and Regional coordination of key Clean Cities activities)

National Renewable Energy Lab (NREL – Colorado) – Clean Cities Core program technical support , AFDC, technical communications, publications, Clean Cities Web sites, Hotline Response Service

Oak Ridge National Lab (ORNL - Tennessee) – Federal Fuel Economy Guide, FuelEconomy.Gov websites, National Fuel Economy consumer education and outreach efforts

Brookhaven National Lab (BNL – New York) - BioMethane and Land fill gas recovery

Argonne National Lab (ANL – Illinois) - Emissions Modeling (GREET and AIRCRED) and Idle Reduction analysis

Top Accomplishments

Established a National Network of Coalitions

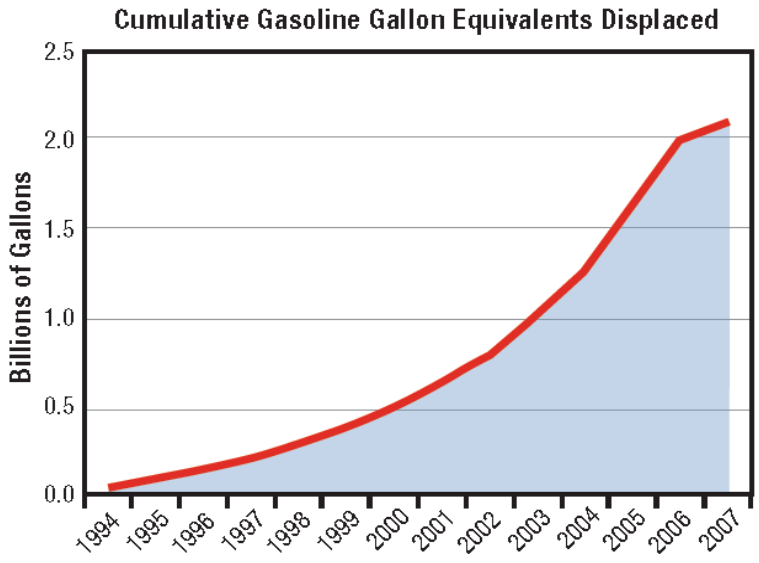
- ~100 coalitions & partnerships
- > 5,700 stakeholders from businesses, city & state governments, transportation industry, community organizations, fuel providers

Bottom line: Created expert community to lead transportation initiatives

Top Accomplishments

Displaced 2 Billion Gallons of Petroleum

- > 2 billion GGE displaced by coalitions since 1993
- 15 million GGE in 1994, 375 million GGE last year (28% annual growth)
- 580,000 new AFVs on the road
- Over 6000 alternative fueling stations (CC helped build >70% of them)



NREL stock photo

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

Top Accomplishments

Major Increase in Alternative Fuel Transit Buses

- 6% alternative fueled in 1997
- 20% in 2007
- Coalitions responsible for > half

Helping to Green National Parks

- Air-quality improvements
- Visitor education/inspiration
- Wildlife preservation
- Effective industry partnerships

NREL stock photos

Bottom line: Penetrated key alternative fuel niche markets

Top Accomplishments

Created Alternative Fuel Corridors

- $35 million for infrastructure since 1998
- Biofuels I-65, OR, NY, PA, MD, VA, DC
- Other fuels, e.g., natural gas in CA, UT, NY

Turning Garbage into Gas

- Deployed biomethane technology from DOE R&D
- Successful refuse truck tests
- Potential 300 landfills each producing 20,000 gal/day LNG

Bottom line: Generated alternative fuels and made them accessible

Top Accomplishments

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

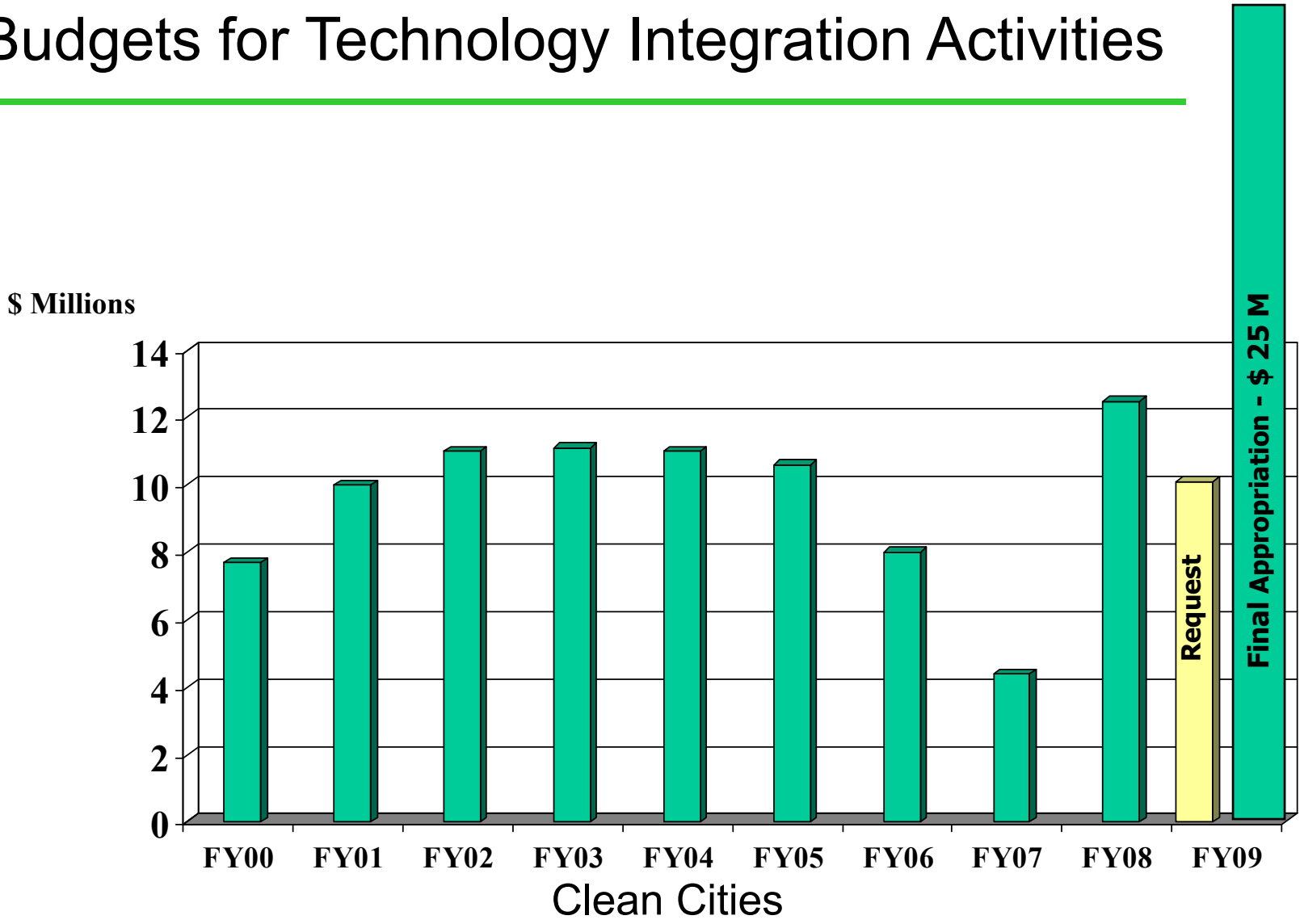
- $43 million from Clean Cities
- Matched by $214 million
- Resultant partnerships brought in additional $845 million

Bottom line: Raised visibility of advanced transportation and energized funding

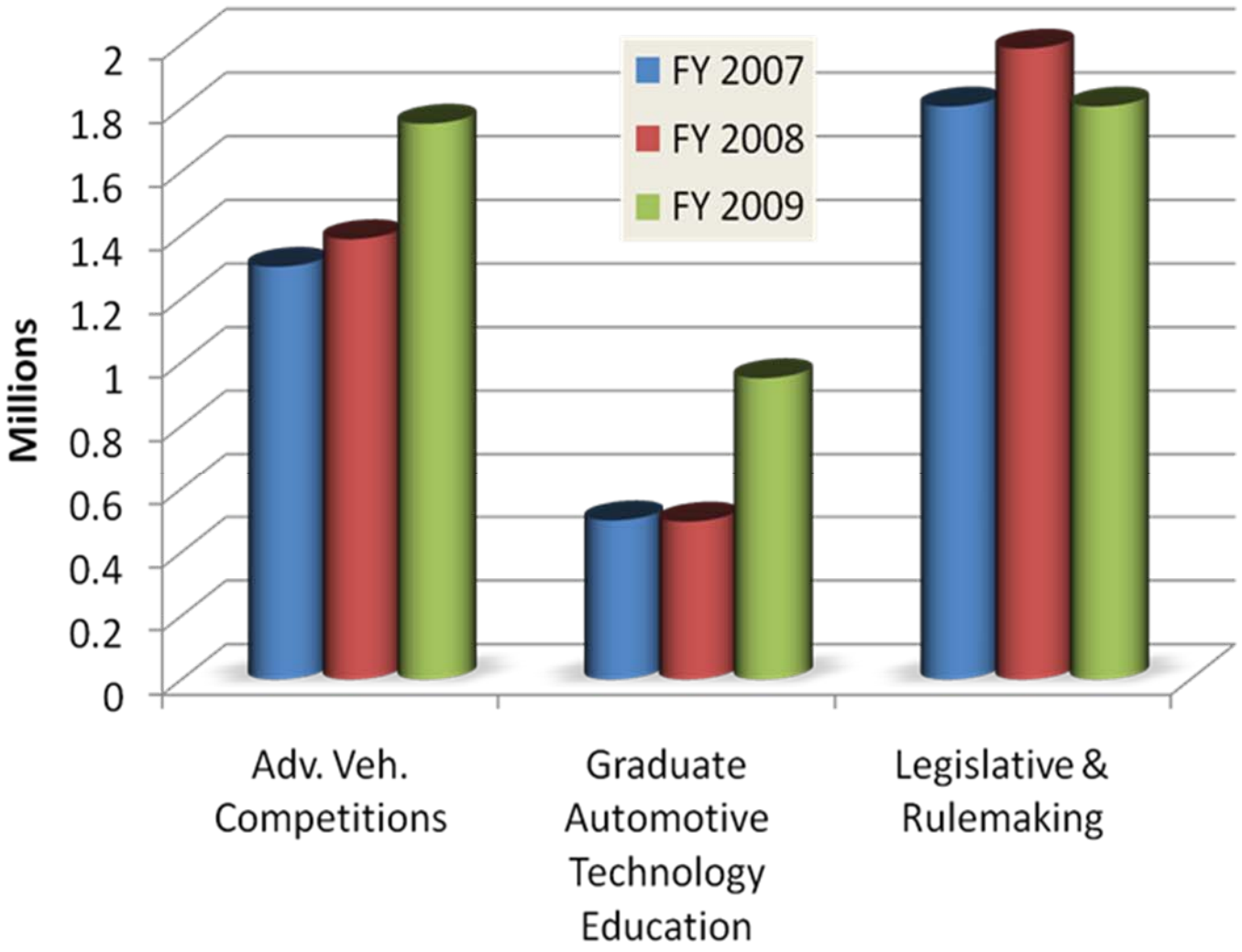
Fuel our Future Now

- **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*

Budgets for Technology Integration Activities



(Budgets - continued)



Training the Next Generation of Engineers

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.

EcoCAR The NeXt Challenge

- 17 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 – 8**
  - **Plug-In Hybrid Electric Vehicles (PHEV) – 6**
  - **Full Function Electric Vehicle (FFEV) – 1**
  - **Fuel Cell Plug-in Hybrid Electric Vehicle (FCPHV) - 2**

Training the Next Generation of Engineers

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)**

Legislative & Rulemaking

Mainly Consists of:

- ❑ Replacement Fuel Program
  - – Replacement Fuel Goal
- ❑ Alternative Fuel Transportation Program
  - – State & Fuel Provider (SFP) Fleet Mandate
- ❑ Alternative Fuel Petitions
- ❑ Legislative Analysis
- ❑ Congressional Reports

State & Fuel Provider Fleet Mandate (SFP)

- Annually 300+ SFP Entities Must Meet Annual Requirements
- Compliance Options
  - Standard Compliance
    - Procurement of AFVs
    - Biodiesel (Capped at 50% of Requirements)
  - Alternative Compliance
    - Petroleum reduction equal to or greater than full compliance with Standard Compliance Option

Contact Information

www.vehicles.energy.gov

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U.S. Department of Energy

Legislative & Rulemaking

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