Technology Integration Overview

May 2009

Dennis A. Smith, PE, CEM
National Clean Cities Director
VT Deployment Manager
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

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.

• 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


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

Argonne National Lab (ANL – Illinois) - Emissions Modeling (GREET and AIRCREDS) 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)

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

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

$ Millions

FY00 FY01 FY02 FY03 FY04 FY05 FY06 FY07 FY08 FY09

Final Appropriation - $25 M

Request

Clean Cities
(Budgets - continued)

Graph showing budget allocations for different categories over FY 2007, FY 2008, and FY 2009.

- **Adv. Veh. Competitions**
  - FY 2007: Approximately 1.5 million
  - FY 2008: Approximately 1.4 million
  - FY 2009: Approximately 1.6 million

- **Graduate Automotive Technology Education**
  - FY 2007: Approximately 0.5 million
  - FY 2008: Approximately 0.4 million
  - FY 2009: Approximately 0.6 million

- **Legislative & Rulemaking**
  - FY 2007: Approximately 2.0 million
  - FY 2008: Approximately 2.2 million
  - FY 2009: Approximately 2.1 million
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.

- 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
Graduate Automotive Technology Education

- 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)
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
- 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

Legislative & Rulemaking

Dennis Smith, 202-586-1791
Dennis.a.smith@ee.doe.gov

Connie Bezanson, 202-586-2339
Connie.bezanson@ee.doe.gov

Dana O’Hara, 202-586-8063
Dana.o’hara@ee.doe.gov