Technology Integration Overview

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Linda Bluestein (Presenter)
Connie Bezanson
Activities

- VT Deployment (Clean Cities) – A voluntary, locally based government/industry partnership initiative.
- Legislative and Rulemaking.
- Advanced Vehicle Competitions.
Increase use of higher-efficiency advanced technology vehicles.

Increase use of vehicles that use renewable, low-carbon, domestic fuels and infrastructure.

Improve overall efficiency of the transportation system.

Support national goals to reduce GHG emissions by 17% by 2020; 26-28% by 2025 and 83% by 2050 (vs 2005 baseline).

Clean Cities Base Budget History

*Base budget: Additional $10M in FY16 for Alternative Fuel Vehicle Community Partner Projects, per Congressional direction
VT Deployment Technology Portfolio

**Low-Carbon Fuels**
- Electric Vehicles
- Biodiesel
- Ethanol
- Drop-in fuels
- Hydrogen
- Gaseous Fuels

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

**Idle Reduction**
- Heavy-Duty Trucks
- School & Transit Buses
- Light-Duty Vehicles

**New Area of Emphasis:**
Holistic Transportation System view, smart cities

**Hybrids**
Light- and heavy-duty electric hybrids, plug-in hybrids
VT Deployment: Accomplishments (GHG Reduction)

2014 Accomplishments:

- 1 Billion GGE reduction and **6.6 Million Tons GHG reduced**.
- Equivalent to removing 1.5 million cars from the road.

*Cumulative Benefits since 1993

**48 Million Tons of GHG Reduced**
2014 Accomplishments:

- **1 Billion GGE reduction** and 6.6 Million Tons GHG reduced.
- **Equivalent to removing 1.5 million cars from the road.**

Cumulative Benefits since 1993

**7.5B GGE of Petroleum Reduction**
VT Deployment Supports Broad Alternative Fuel Portfolio

VT Deployment Accomplishments by Alternative Fuel

- Vehicle Population
- GGEs Saved
- GHG Tons Reduced
Who’s Who in Clean Cities - DOE

DOE Headquarters (HQ)

Dennis Smith
Director

Linda Bluestein
Co-Director

Shannon Shea
Communications Manager

Mark Smith
National Partners Manager

Nick Bleich
Workplace Charging Challenge

DOE Regional Managers
National Energy Technology Laboratory (NETL)

Dan Nardozzi
Northwest

Dave Kirschner
North Central

Darren Stevenson
Mid-Atlantic

Erin Russell-Story
Northeast

Brett Aristegui
California

Neil Kirschner
South Central

Trev Hall
Southeast

Leveraging CC team & stakeholders
Implement national policies and initiatives by facilitating change

Provide a national unbiased source of information.
Provide tools, experts to address barriers and solve problems.
Develop corporate partnerships with industry and national fleets as well as public fleet partners—federal, state, regional and local – to increase awareness and publicize success through mass media and outreach.
Provide financial assistance to jump start markets and incentivize private investment.
Clean Cities Deployment Efforts include 5 Major Activities

**Consumer Information, Outreach, and Education:** DOE-developed tools help consumers save money on fuel cost and help fleets understand their options for cost-effective alternatives to gasoline and diesel fuel (includes FE.gov and AFDC).

**Technical & Problem Solving Assistance:** DOE experts help leaders address permitting and safety issues, technology shortfalls, and other project implementation barriers.

**Training and Stakeholder Coordination:** DOE helps convene key community, industry, and business leaders to develop and implement projects, leverage resources, address local barriers, and assure relevant workforce development.

**Identification/Tracking of Essential Program Metrics:** Coalitions track local/regional market conditions, facilitate infrastructure development, share best practices and lessons-learned.

**Competitively-Awarded Financial Assistance:** Federal cost-share encourages initial private sector match and long-term investment.
Nearly 100 coalitions with thousands of stakeholders representing ~80% of U.S. population.
Non-biased source of VT data and information.
Fuel Economy Guide (FE.gov), Alt-Fuel Data Center (AFDC).
Online tools and cost calculators, other web resources.
Fact Sheets, publications, handbooks, success stories.
Technical Response Service and Hotline.
Public workshops, webinars, industry technical conferences.
Tools, Publications, Data and Mobile Apps

**Fueleconomy.gov**
Enables consumers to find the fuel-efficient vehicle that meets their needs, as well as save gas and money with their current vehicles.

**Alternative Fuels Data Center**
Helps fleets choose the right alternative fuel or other petroleum reduction approach for them, with almost 100 case studies and 14 interactive tools.
AFDC Tools

Calculators
- Vehicle Cost Calculator: Compare cost of ownership and emissions for most vehicle models.
- Petroleum Reduction Planning Tool: Create a plan for your fleet to reduce petroleum consumption and emissions.
- CNG VICE Model 2.0: Evaluate ROI and payback period for natural gas vehicles and infrastructure.
- AFLEET Tool: Calculate a fleet's petroleum use, cost of ownership, and air pollutant and GHG emissions.
- JOBS Model: Estimate economic impacts of natural gas, hydrogen, or fuel cell infrastructure.

Interactive Maps
- Alternative Fueling Station Locator: Locate alternative fueling stations and get maps and driving directions.
- TransAtlas: Analyze vehicle densities and locations of fueling stations and production facilities.
- BioFuels Atlas: Compare feedstocks and analyze biofuel production by location.
- Truck Stop Electrification Sites: Locate truck stops with electrification sites to reduce the need for idling.
- Coalition Locations: Find Clean Cities coalitions and contact information for coordinators.

Data Searches
- Vehicle Search: Compare all classes of alternative fuel vehicles, electric vehicles, and hybrids.
- Laws and Incentives Search: Search for laws and incentives related to alternative fuels and advanced vehicles.
- Fuel Properties Comparison: Compare alternative fuel properties and characteristics.
- Find a Car: Compare fuel efficiency, costs, carbon footprints, and emissions.
- State Information: Find state information about alternative fuels and advanced vehicles.

www.afdc.energy.gov/tools
AFDC Tools

Calculators
- Vehicle Cost Calculator
  Compare cost of ownership and emissions for most vehicle models.
- Petroleum Reduction Planning Tool
  Create a plan for your fleet to reduce petroleum consumption and emissions.
- CNG VCF
  Evaluate the cost of using CNG for your vehicle fleet.
- AFLEE
  Calculate a fleet's petroleum use, cost of ownership, and air pollutant and GHG emissions.
- JOBS Model
  Estimate economic impacts of natural gas, hydrogen, or fuel cell infrastructure.

Interactive Maps
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Data Searches
- Vehicle Search
  Compare all classes of alternative fuel vehicles, electric vehicles, and hybrids.
- Laws and Incentives Search
  Locate state information about alternative fuels and advanced vehicles.

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AFDC Tools

**Calculators**
- **Vehicle Cost Calculator**
  Compare cost of ownership and emissions for most vehicle models.
- **Petroleum Reduction Planning Tool**
  Create a plan for your fleet to reduce petroleum consumption.
- **CNG VICE Model**
  Evaluate Return on Investment for converting to natural gas vehicles.
- **AFLEET Tool**
  Calculate a fleet’s petroleum use, cost of ownership, and air pollutant and GHG emissions.
- **JOBS Model**
  Estimate economic impacts of natural gas, hydrogen, or fuel cell infrastructure.

**Interactive Maps**
- **Alternative Fueling Station Locator**
  Locate alternative fueling stations and get maps and driving directions.
- **TransAtlas**
  Analyze vehicle densities and locations of interest.

**Data Searches**
- **Vehicle Search**
  Compare all classes of alternative fuel vehicles, electric vehicles, and hybrids.
- **Laws and Incentives Search**
  Search for laws and incentives related to alternative fuels and advanced vehicles.

**AFLEET Tool**
Calculate a fleet’s petroleum use, cost of ownership, and air pollutant and GHG emissions.

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AFDC Tools

Calculators
- **Vehicle Cost Calculator**
  Compare cost of ownership and emissions for most vehicle models.
- **CNG Vialis**
  Evaluate CNG vehicle economics.
- **AFLF**
  Calculate a fleet's petroleum use, cost of ownership, and air pollutant and GHG emissions.

Interactive Maps
- **Alternative Fueling Station Locator**
  Locate alternative fueling stations and get maps and driving directions.
- **TransAtlas**
  Interactive maps and driving directions.

Data Searches
- **Vehicle Search**
  Compare all classes of alternative fuel vehicles, electric vehicles, and hybrids.
- **Laws and Incentives Search**
  Find incentives related to alternative fuels and advanced vehicles.

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Technical and Problem Solving Assistance

- Capture lessons learned and develop best practices.
- Technical Forums and User Groups.
- Address unforeseen permitting and safety issues.
- Identify chronic vehicle or infrastructure field problems.
- Incident investigations (learn from failures).

Model EVSE Permit

![Image of an EVSE permit and a charging station]

- **Section 1: Permit Applicant Information**
  - Name:
  - Address:
  - City:
  - State:
  - Zip Code:
  - Contact Person:
  - Phone Number:

- **Section 2: Permit Code Information**
  - Equipment:
  - Description:
  - Certification:
  - Manufacturer:
  - Model:
  - Serial Number:
  - Date of Installation:

- **Technical and Problem Solving Assistance**
  - Capture lessons learned and develop best practices.
  - Technical Forums and User Groups.
  - Address unforeseen permitting and safety issues.
  - Identify chronic vehicle or infrastructure field problems.
  - Incident investigations (learn from failures).
Partnerships: Media Partners Help us Reach the Masses

- >200 professionally produced segments to date on EVs, alt-fuels, advanced vehicles, fuel economy, EcoCAR, and other VTO highlights.
- Bi-weekly Clean Cities success stories.
- Programs air on PBS, Discovery, Velocity, and American Forces Network worldwide on allied military bases.
- Features available on Clean Cities’ websites and YouTube channel.
Partnerships: National Clean Fleets (NCFP)

Working with top fleets across the country to reduce petroleum/GHG footprint

27 Partners
Provides Technical & Financial Assistance to NPS for high visibility transportation projects in National Park Properties to:

- Support the operation of AFVs and GHG reduction goals.
- Conduct appropriate training, outreach, and educational programs for Park Visitors, Rangers, and other NPS employees.
- Call attention to NPS success stories and benefits achieved.
- Leverage resources with NPS and private sector partners.
Financial Assistance: 2016 Announcements

2 Aggregate Purchasing Project awards ($3.0M) – FY15 announced Jan 2016

- CALSTART – (focus on ZEV/MOU states):
  - Develops a cooperative EV purchasing process for state and local government fleets.
  - Goal of facilitating 10,000 EV sales annually.

- National Assn. of Regional Councils:
  - Develops national and regional group contracting agreements.
  - Includes multiple EPAct-defined alternative fuel vehicle types.

FY16 broad FOA – Two Deployment topics (out of 11)

- **EV Everywhere Plug-In Electric Vehicle Local Showcases ($2.5M)** – seeks to establish local demonstration centers that will provide a hands-on consumer experience and in-depth education for commercially available PEVs and EVSE.

- **Alternative Fuel Vehicle Workplace Safety Programs ($1.5M)** – to provide safety training and workshops related to garage facility/building upgrades that are required for gaseous fuels (natural gas, propane, and hydrogen).

FY16 Multi-Topic FOA – Alternative Fuel Vehicle Community Partner Projects ($10M)

- **Coming Soon. Supports highly-leveraged public-private partnerships to significantly accelerate alternative fuel use.**
Clean Cities Strategic Plan Overview

The Clean Cities Mission
- The Vision
- The Approach
- The Framework for Action

Next Priority Opportunities for Fuels & Technologies

Cross-Cutting Strategic Actions
- Information Products
- Education, Outreach, and Training
- Partnerships

Organizational

Programmatic
- Biofuels
- Hydrogen Fuel Cells
- Plug-in Vehicles
- Other Low Carbon Fuels
- SMART Mobility Applications

Operational
- Strengthening Coalitions
Clean Cities 2015-2016 Notable Accomplishments

- National Partners saved 81 million GGEs of petroleum.
- Updated AFLEET tool (Alternative Fuel Life Cycle Environmental and Economic Transportation); 5,000 users.
  - AFLEET calculates a fleet’s petroleum use, cost of ownership and air pollutant and GHG emissions.
- Adding Transportation as a System (TaaS) activities to Clean Cities portfolio.
- Supporting partnership with DOT on Smart Cities Challenge; participating in DOE/DOT MOU.
  - Clean Cities coalitions are engaged with seven Smart Cities finalists.
EPAct requires State fleets and Alternative Fuel Provider fleets to acquire AFVs, deploy fuels.

Implementing program revisions providing credit for acquisitions of non-AFV electric drive vehicles, and investments in infrastructure, emerging technologies, etc.

Management of legislative and regulatory activities for VTO, including designation of alternative fuels.
Training the Next Generation of Engineers

Advance Vehicle Technology Competitions
Provide a new generation of engineers with knowledge and skills in developing and commercializing advanced automotive technologies.
Our Impact

- 93 North American universities have participated since 1989.
- 531 individual university teams have competed.
- More than 16,500 students have participated.
- 83% of AVTC graduates have entered the automotive industry.
- 69 patent applications submitted by AVTC graduates.

President Obama visits the Ohio State University EcoCAR team

OEMs Suppliers Software Cos.

Academia Government
EcoCAR3

- Based on a real-world vehicle design process.
- 16 Teams are challenged to reduce the environmental impact of a GM-donated vehicle by minimizing the vehicle’s fuel consumption and reducing its emissions.
- Consider cost and explore innovation.
- All while retaining the vehicle’s performance, safety, and consumer appeal.

- DOE is teaming with General Motors and more than 30 other government and industry leaders.
Year 2 Competition: Yuma, AZ and San Diego, CA

- Safety and technical inspections and Vehicle testing at the GM Desert Proving Grounds in Yuma, AZ.
- In San Diego, teams will participate in more than a dozen technical, communications, and project management presentations highlighting their activities.

16 North American Universities
- Arizona State University
- California State University – LA
- Colorado State University
- Embry-Riddle Aeronautical University
- Georgia Institute of Technology
- McMaster University
- Mississippi State University
- Ohio State University
- Pennsylvania State University
- University of Tennessee, Knoxville
- University of Alabama
- University of Washington
- University of Waterloo
- Virginia Tech
- Wayne State University
- West Virginia University
Focus continues on tools, resources, education and supporting local coalitions that can help bring new petroleum reduction projects to market.

- Biggest factor: GHG reduction and sustainability.
- Strategic Planning important to set goals and objectives for the program for the next five years and beyond; allows stakeholders to help SMART drive the agenda.
- Updated tools. Resources and technical support and funding opportunities for communities and businesses.

FY16 FOA Topics:

- *EV Everywhere PEV Showcases;*
- *Workplace Safety; and*
- *Alternative Fuel Vehicle Community Partner Projects.*

EcoCAR 3:

- Student designed vehicles evaluated by industry leaders at the Year 2 competition. Teams will focus on full development and integration on their designs in the third year of the competition.
Contact Information

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

Linda Bluestein,
202-586-6116
Linda.Bluestein@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

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Legislative & Rulemaking

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