

U.S. DEPARTMENT OF
ENERGY

Office of
ENERGY EFFICIENCY &
RENEWABLE ENERGY

***2019 STEAB Meeting
Washington, DC
April 25-26, 2019***

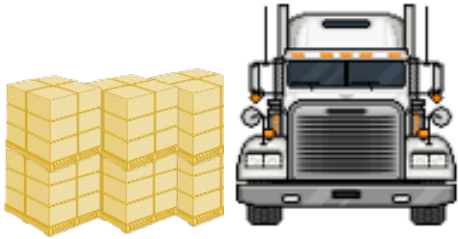
Vehicle Technologies Office

Linda Bluestein

Technology Manager, Technology Integration



Annually



11 billion
Tons goods



Over **3** Trillion
Miles



Transportation is
the **2nd** largest
expense for U.S.
households



70% of total
U.S. petroleum
usage is for
transportation

On-road vehicles
account for

85% of
transportation
petroleum usage

U.S. Department of Energy Priorities



National Security



Economic Growth



Affordability for Businesses and Consumers



Reliability/Resiliency

Vehicle Technologies Office

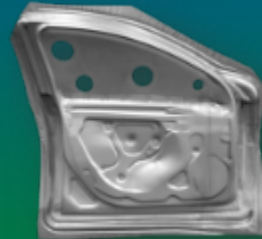
Electrification



Advanced Combustion Systems and Fuels



Materials Technology



Energy Efficient Mobility Systems



Technology Integration



VTO develops advanced transportation technologies to:

- ✓ Improve energy *efficiency*
- ✓ Increase domestic energy *security*
- ✓ Reduce operating *cost* for consumers & business
- ✓ Improve global *competitiveness* of US economy

Technology Integration - Core Activities

Provide **objective/unbiased data** and real world **lessons learned** that inform **future research** needs and support local **decision-making**

Clean Cities
Coalitions
engage with
these core
activities



1. Clean Cities Coalitions



2. Information and Tools



3. Technical Assistance



4. Training, Outreach, Partnerships



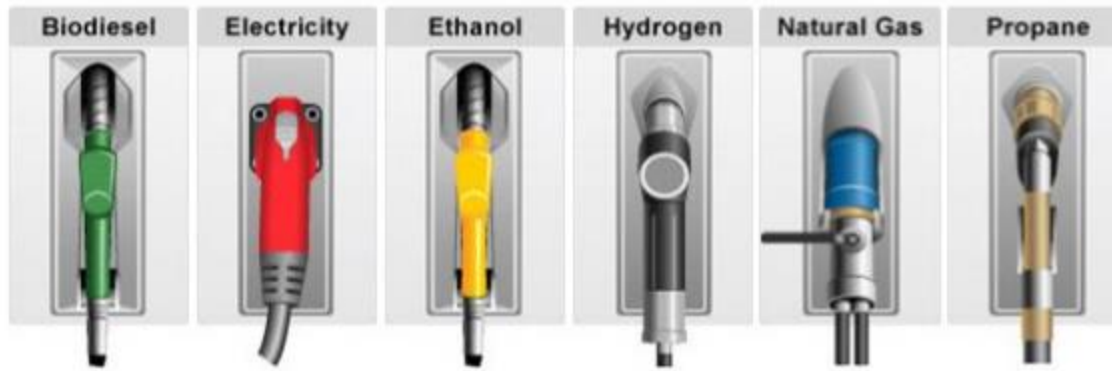
5. Financial Assistance

Technology Integration Focus Areas

Light-, medium-, and heavy-duty vehicles



Alternative Fuel Infrastructure



Energy Efficient
Mobility Systems and
Technologies

National Network of Clean Cities Coalitions

Clean Cities Coalitions



Map Date: 01/10/19

Clean Cities Coalitions Hosts

Hosted by a State Energy Office

- *Arkansas*
- *Delaware*
- *Iowa*
- *Maryland*
- *Massachusetts*
- *Middle-West Tennessee*
- *New Hampshire*
- *Ocean State (R.I.)*
- *Palmetto State (S.C.)*
- *West Virginia*

Hosted by a State University

- *East Tennessee (UT Knoxville)*
- *Tampa Bay (U. of South FL)*
- *Vermont (U. of Vermont)*



U. S. Department of Energy

DOE-Funded Projects at State Universities, 2018

Batteries

- *Michigan State*
- *Penn State*
- *Rutgers*
- *Stony Brook*
- *Texas A&M*
- *UC, Berkeley*
- *Maryland*
- *Michigan*
- *Missouri*
- *Pittsburgh*
- *Tennessee*
- *UT, Austin*
- *Washington*
- *Wisconsin*
- *West Virginia*

DOE-Funded Projects at State Universities, 2018

Materials

- *Clemson*
- *Michigan State*
- *Ohio State*
- *Florida*
- *Michigan*
- *Virginia*

Electrification

- *Illinois Institute of Technology*
- *Ohio State*
- *Missouri University of Science & Technology*
- *North Carolina State*
- *Virginia Tech*

DOE-Funded Projects at State Universities, 2018

Fuels

- *Colorado State*
- *Purdue*
- *Minnesota*

Energy Efficient Mobility Systems

- *Clemson*
- *UC, Berkeley*
- *Virginia Tech*

Advanced Combustion Engines

- *Houston*
- *Kentucky*

Alternative Fuels Data Center (AFDC)

Alternative Fuels Data Center

Search the AFDC

SEARCH

FUELS & VEHICLES

CONSERVE FUEL

LOCATE STATIONS

LAWS & INCENTIVES

Maps & Data

Case Studies

Publications

Tools

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Fuels & Vehicles

Biodiesel


Electricity

Ethanol

Hydrogen

Natural Gas


Propane



Find Fleet Information by Application


Get detailed vehicle data, case studies, and resources.


Information by State





select a state ▼

Information by Fleet Application

 Delivery Services

 Refuse Collection

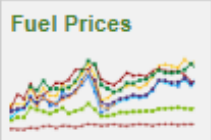
 Public Transit

 School Transportation

Maps & Data

- U.S. Alternative Fueling Stations by Fuel Type
- Alternative Fuel Vehicles in Use
- U.S. Hybrid Electric Vehicle Sales by Model

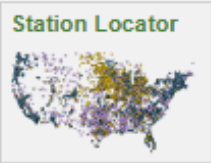
Fuel Prices



Tools

- Laws & Incentives
- Electricity Sources & Emissions
- Vehicle Cost Calculator
- Vehicle Search

Station Locator



[Download iPhone app](#) or [Android app](#)

- ✓ Specific information on fuels, vehicles, technologies, and strategies
- ✓ Tools
- ✓ Publications
- ✓ State-specific information

afdc.energy.gov

AFDC Tools



Calculators



[Vehicle Cost Calculator](#)

Compare cost of ownership and emissions for most vehicle models. [mobile](#)



[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 emissions.



[JOBS Model](#)

Estimate economic impacts of natural gas, hydrogen, or fuel cell infrastructure.



[GREET Fleet Footprint Calculator](#)

Calculate your fleet's petroleum use and emissions footprint.



[Heavy-Duty Vehicle Emissions](#)

Calculate the emissions of alternative fuel medium- and heavy-duty vehicles.



[EVI-Pro Lite](#)

Estimate how much electric vehicle charging a city or state might need.



Interactive Maps



[Alternative Fueling Station Locator](#)

Locate alternative fueling stations and get maps and driving directions. [mobile](#)



[TransAtlas](#)

Analyze vehicle densities and locations of fueling stations and production facilities.



[BioFuels Atlas](#)

Compare feedstocks and analyze biofuel production by location.



[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. [mobile](#)



[State Information](#)

Find state information about alternative fuels and advanced vehicles.

afdc.energy.gov/tools

AFDC Case Studies

Alternative Fuels Data Center


Search the AFDC **SEARCH**

FUELS & VEHICLES **CONSERVE FUEL** **LOCATE STATIONS** **LAWS & INCENTIVES** **Maps & Data** **Case Studies** **Publications** **Tools** **About** **Home**

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Oct. 11, 2018

Alternative Fuels Corridor



Learn how planning cross-country road trips for your alternative fuel vehicle or fleet is becoming easier than ever. For information about this project, contact [Palmetto Clean Fuels Coalition](#)

[QuickTime \(.mov\)](#)
[Windows Media \(.wmv\)](#)
[Video Download Help](#)

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See more videos provided by [Clean Cities TV](#) and [FuelEconomy.gov](#).

MotorWeek Provided by Maryland Public Television

Related Videos

- [D.C. EV Buses](#)
Nov. 8, 2018
- [Electric Vehicles Charge up at State Parks in West Virginia](#)
Dec. 9, 2017
- [Hydrogen Powers Fuel Cell Vehicles in California](#)
Nov. 18, 2017
- [Smart Car Shopping](#)
Nov. 4, 2017

Search for another case study **SEARCH**

- ✓ Searchable
- ✓ Web Stories
- ✓ MotorWeek Videos
- ✓ Documents

afdc.energy.gov/case

Category **Keyword**

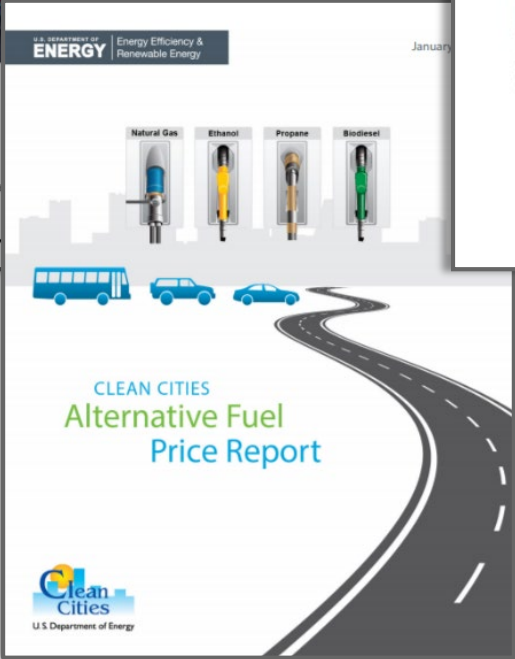
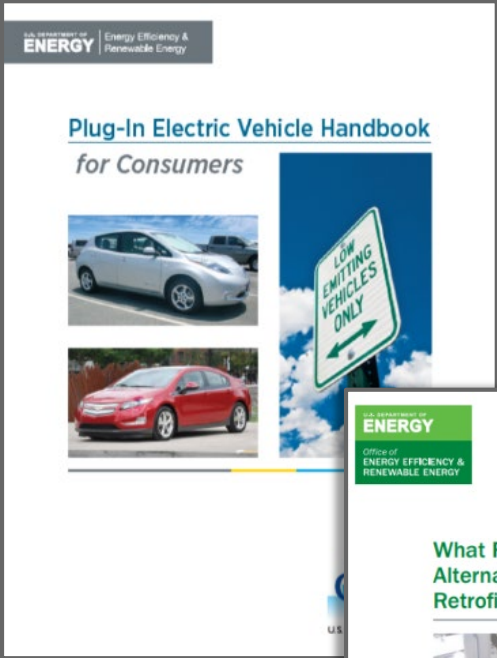
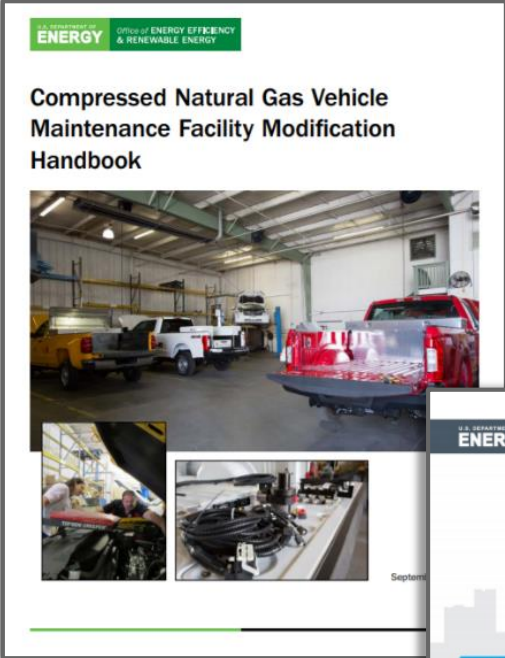
SEARCH

Type:



Search Results 29 case studies		
Date	Title	Type
Aug. 13, 2018	Republic Services Reduces Waste with CNG Vehicles	Web Story
July 11, 2018	Ryder Opens Natural Gas Vehicle Maintenance Facility	Web Story
Feb. 28, 2018	Clean Cities Coalitions Enlighten Local Fleets on Landfill Gas as Fuel	Web Story
Aug. 26, 2017	Phoenix Utility Fleet Drives Smarter with Biodiesel	Video
Aug. 1, 2017	Waste-to-Fuel: A Case Study of Converting Food Waste to Renewable Natural Gas as a Transportation Fuel	Document
Aug. 1, 2017	Cow Power: A Case Study of Renewable Compressed Natural Gas as a Transportation Fuel	Document

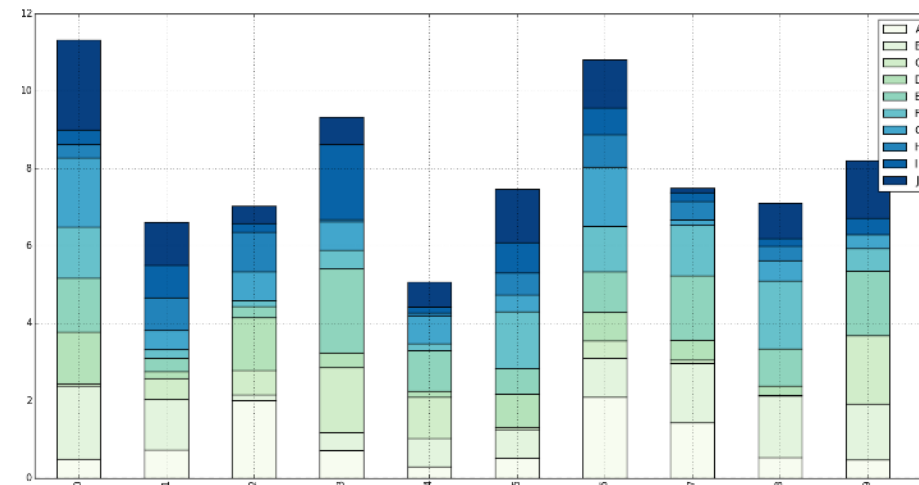
Publications



Information & Tools: AFLEET Tool

Alt. Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool *Analyze AFV Costs & Benefits*

- Estimates NO_x as well as other economic and environmental costs and benefits of AFVs based on latest research
- **18 fuel/vehicle technologies for light- & heavy-duty vehicles**
 - Alternative fuels: CNG, LNG, LPG, H₂, ethanol, biodiesel, renewable diesel
 - Plug-in electrics
 - Hybrids
 - Conventional
- **AFLEET 2017 updates:**
 - Diesel in-use NO_x
 - NGV low-NO_x engines
 - Idle reduction calculator
 - Upstream & vehicle cycle emissions
- **AFLEET Tool 2017 & user manual:** <http://greet.es.anl.gov/afleet>



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


Office of Transportation & Air Quality | U.S. ENVIRONMENTAL PROTECTION AGENCY

www.fueleconomy.gov

the official U.S. government source for fuel economy information

Mobile Español Site Map Links FAQ Videos


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Want to know more about hybrid and electric car options?


We can help.

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Calculate or Share Your MPG
Estimates from Drivers Like You
Enter Your MPG at the Pump

Save Money



Gas Mileage Tips
Fuel Cost Calculator
Find the Cheapest Gas

Hybrids & Electrics



Hybrids
Plug-in Hybrids
All-Electric Vehicles

Calculators and Other Tools

Fuel Savings Calculator
Trip Calculator
Can a Hybrid Save Me Money?
My Plug-in Hybrid Calculator
Used Car Label Tool
Developer Tools
Find a Car Widget

New on fueleconomy.gov...

2015 Fuel Economy Data Updated
2015 Fuel Economy Guide
2015 Best and Worst Fuel Economy
2015 Top 10 Most Efficient Vehicles

Quick Picks

Can a Hybrid Save Me Money?
Video - How Plug-in Hybrids Save Money
Extreme MPG
Motorweek Videos
Top 10 - Most Efficient Vehicles, Myths and More
My Plug-in Hybrid Calculator

Related Links

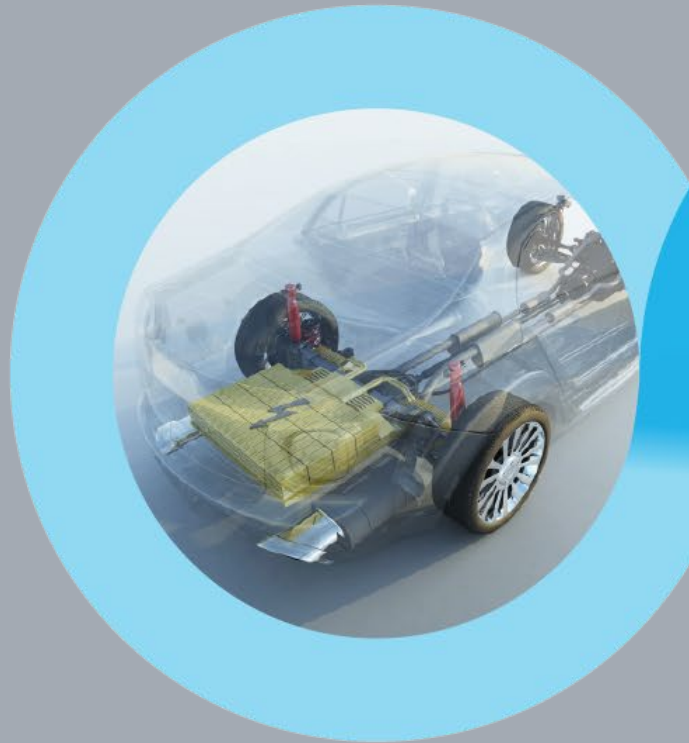
Clean Cities
Alternative Fuels Data Center
Vehicle Cost Calculator
Station Locator
EPA Climate Change Website
EV Explorer

- ✓ Find and compare cars
- ✓ Get driving and vehicle maintenance tips
- ✓ Calculate fuel costs
- ✓ Track your MPG
- ✓ Explore advanced vehicle information
- ✓ Learn about the ratings

FuelEconomy.gov



NEW CHALLENGES BRING NEW OPPORTUNITIES



**NEW TECHNOLOGIES &
BUSINESS MODELS ARE**

DRIVING DISRUPTION



**Shared
Mobility**



**Mobility
On Demand**



**Goods
On Demand**



**Connected &
Automated Vehicles**

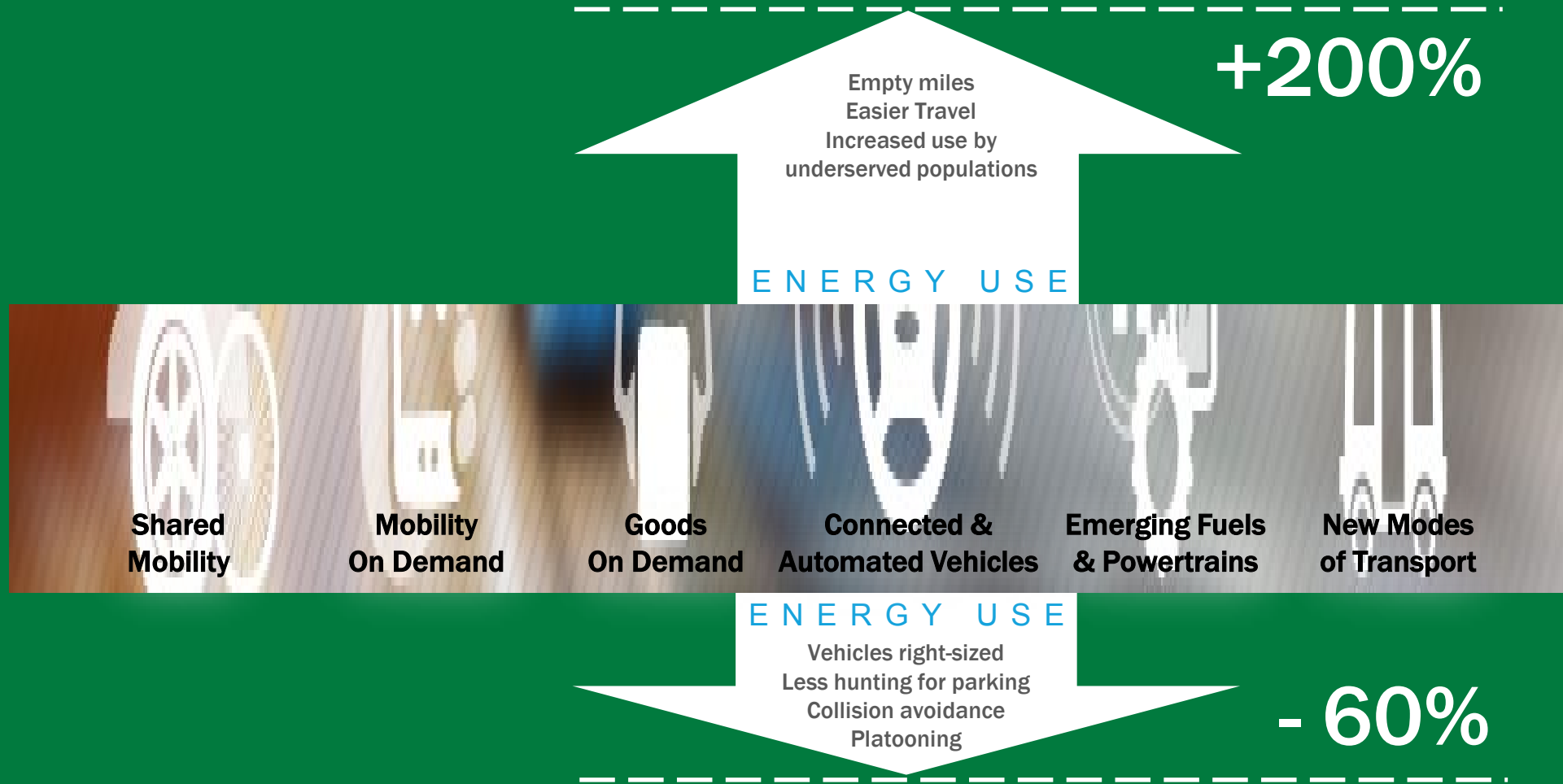


**Emerging Fuels
& Powertrains**



**New Modes
of Transport**

EEMS PROGRAM



Advanced
Fueling
Infrastructure



Connected &
Automated
Vehicles



Urban Science



SMART MOBILITY LAB

CONSORTIUM

7 labs, 30+ projects, 65 researchers,
\$34M* over 3 years.

Mobility Decision
Science

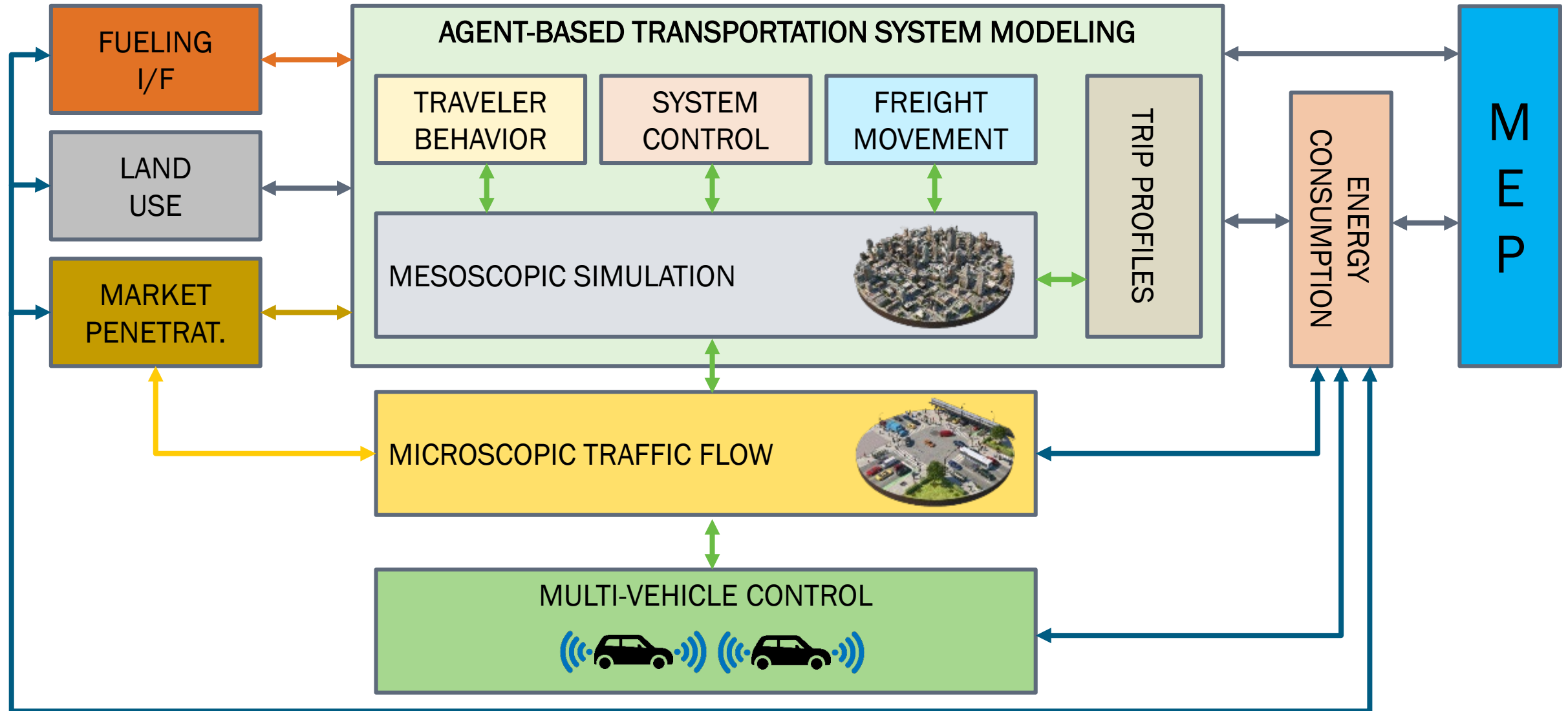


Multi-Modal
Transport



*Based on anticipated funding

END-TO-END MODELING WORKFLOW



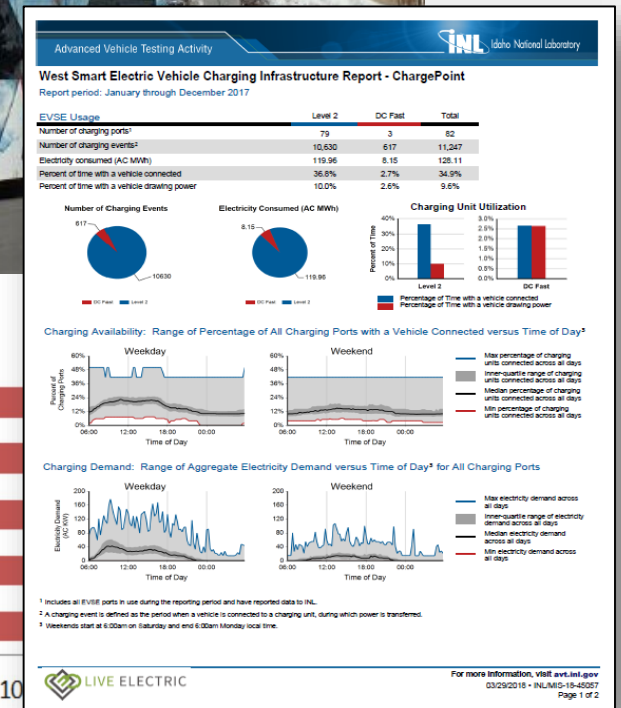
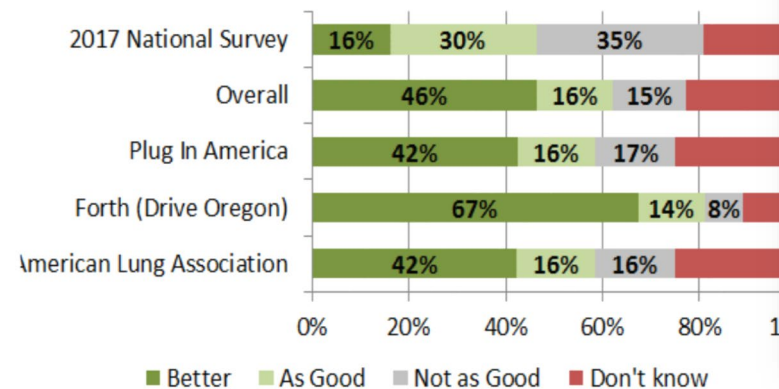
Technology Integration Funding Opportunities

Linda Bluestein, Tech. Mgr.

- What? Technology Integration Funding Opportunities
- Why? Demonstrate innovative vehicle technologies and practices: benefit end users, increase resiliency, reduce costs, feedback to researchers
- Barriers? Cost, lack of user knowledge, experience and data



Of the vehicle options that are available today, what is your opinion of pure electric vehicles?



Technology Integration Funding Opportunities

Training – Experience/Education – Safety – Resiliency – Infrastructure – Living Labs



Technology Integration Funding Opportunities

Living Laboratories USING REAL-WORLD DATA TO UNDERSTAND ENERGY IMPACTS

3 Projects, \$4.9M in FY2017



ELECTRIC SHARED MOBILITY

Seattle, Portland, NYC, Denver
Uber, GM's Maven, BMW's ReachNow



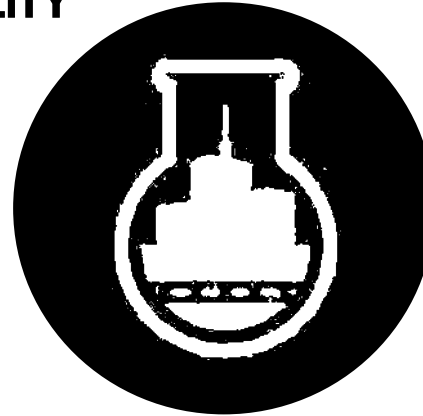
ELECTRIC LAST MILE

Austin
Pecan Street, CapMetro



ENERGY EFFICIENT FREIGHT LOGISTICS

NYC-Albany Corridor
Rensselaer Polytechnic Institute, freight carriers & receivers, urban supply chain



15 Projects, \$27M in FY2018

High Performance Computing
for Transportation Hubs



First/Last Mile for
People/Goods Movement



System-Level Data for
Energy Efficient Mobility



Fuel Efficient Platooning



Multi-Unit Dwelling & Curbside
Residential Charging Innovation



Open Topic



Technology Integration Funding Opportunities

FY 2019 TI FOA Topics DE-FOA-0002014 \$17.5 Million

AREA OF INTEREST	FEDERAL FUNDING	# PROJECTS
6a—Alternative Fuel Vehicles and Infrastructure for Resiliency and Emergency Preparedness	\$1.5 Million	1-2
6b—New Mobility Services in Rural America	\$3 Million	3-6
6c—Alternative Fuel Proof of Concept in New Communities and Fleets	\$7 Million	9-20
6d—EV Data Collection	\$4 Million	1-2
6e—Open Topic	\$2 Million	3-6

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RENEWABLE ENERGY

Vehicle Technologies Office

April 3, 2019

DOE Announces \$59 Million to Accelerate Advanced Vehicle Technologies Research

Today, U.S. Department of Energy Under Secretary of Energy Mark W. Menezes announced up to \$59 million for new and innovative advanced vehicle technologies research. Funded through the Office of Energy Efficiency and Renewable Energy, this funding opportunity seeks projects to address priorities in advanced batteries and electric drive systems, energy efficient mobility systems, materials for more efficient powertrains, co-optimized advanced engine and fuel technologies, and alternative fuels and new mobility options.

FY2019 Advanced Vehicle Technologies Research Funding Opportunity Announcement

Solicitation released: April 3
Concept Papers due: May 1
Full Applications due: June 19

Solicitation #DE-FOA-0002014
eere-exchange.energy.gov
email: DE-FOA-0002014@netl.doe.gov

AOI 3: Energy Efficient Mobility Systems Research (\$7M): *This AOI seeks to (1) develop and validate novel approaches to improve traffic network system-level efficiency through cost-effective connected and automated vehicle and transportation solutions, and (2) remove technical barriers to the implementation of such systems. ... Applications must include three project phases for technology development, implementation, and validation.*

OUR VISION



more choices

more efficient technology

when & where it is needed

more affordable

Advanced Vehicle Technology Competitions

Developing the scientists and engineers to address our energy needs.



DOE teaming with General Motors, the Mathworks and over 15 other government and industry leaders to challenge participating teams to:

1

Integrate advanced propulsion systems to enable significant improvements in energy efficiency

2

Deploy CAV technologies to meet energy efficiency goals and Mobility-as-a-System market needs

3

Balance energy efficiency needs with the consumer acceptability, safety and cost considerations unique to the Mobility-as-a-System market



Vehicle Platform:
2019 Chevrolet Blazer

VTO AMR: 300 Oral Presentations, Reviews and Posters

2019 Vehicle Technologies Office Annual Merit Review



When: June 10-13, 2019

Where: Hyatt Regency Crystal City
Arlington, VA

For more information visit:

<https://www.energy.gov/eere/vehicles/annual-merit-review>

Interested in becoming a reviewer?

Email: VTAMR@ORAU.org



THANK YOU

Linda Bluestein

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<https://www.energy.gov/eere/vehicles/vehicle-technologies-office>