U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

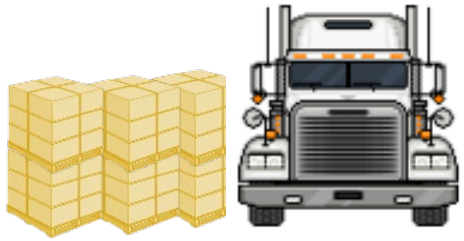
2019 STEAB Meeting
Washington, DC
April 25-26, 2019

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

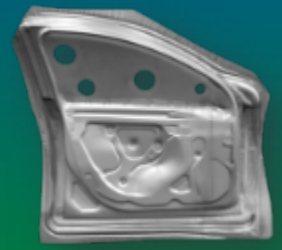
Reliability/Resiliency

Vehicle Technologies Office

Electrification

Advanced Combustion Systems and Fuels

Materials Technology



Energy Efficient Mobility Systems

Technology Integration

Clean Cities

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 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)*

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*

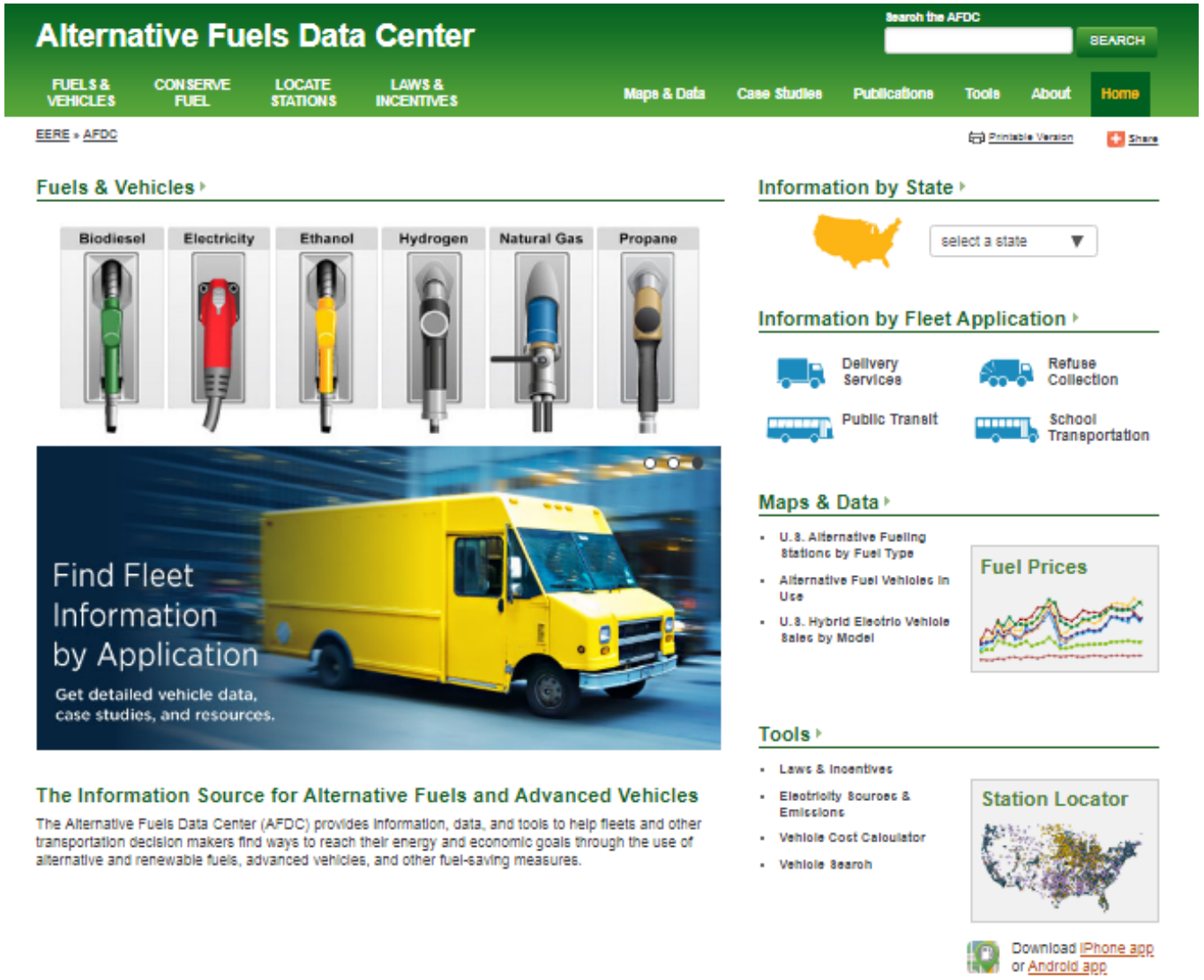
Advanced Combustion Engines

- *Houston*
- *Kentucky*

Energy Efficient Mobility Systems

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

Alternative Fuels Data Center (AFDC)



- ✓ **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.

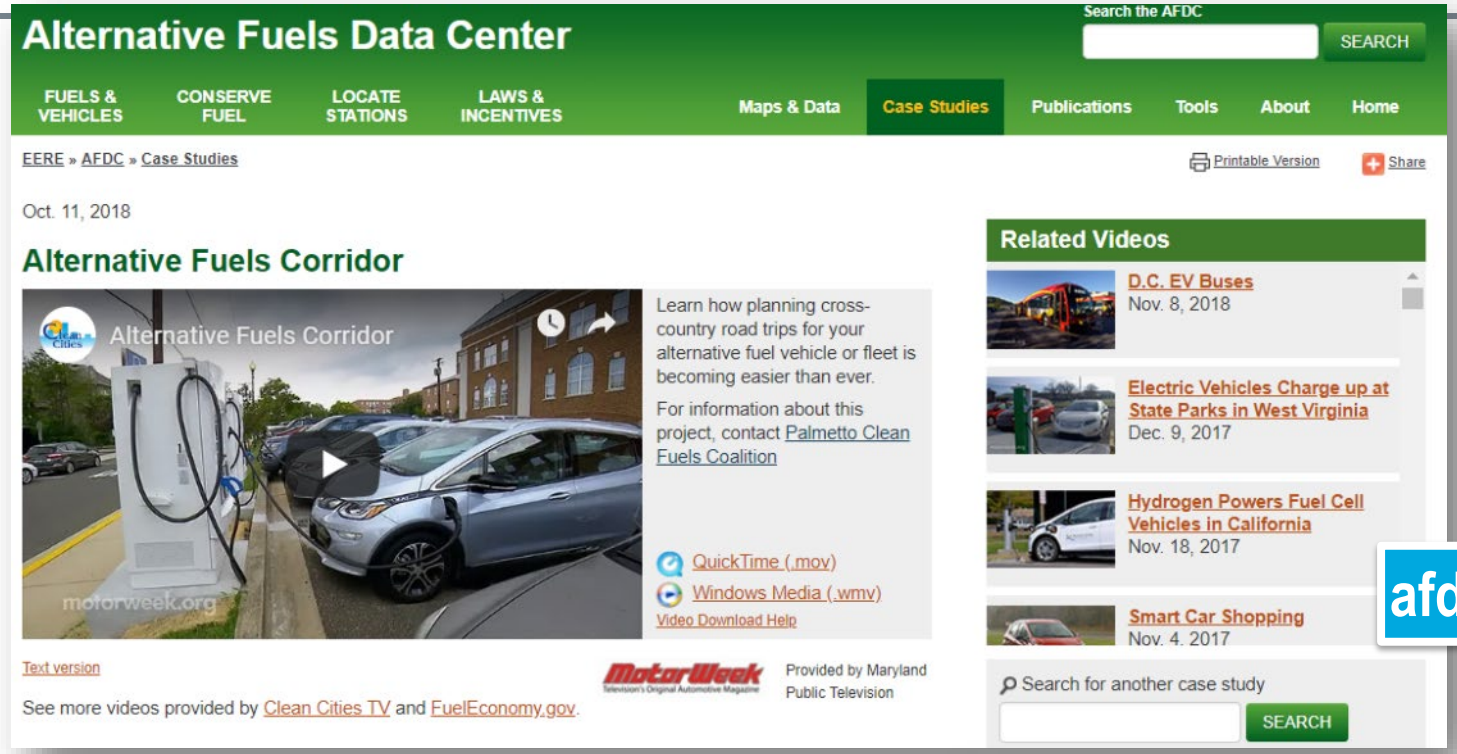
Fuel Properties Comparison
Compare alternative fuel properties and characteristics.

Find a Car
Compare fuel efficiency, costs, carbon footprints, and emissions. mobile

State Information
Find state information about alternative fuels and advanced vehicles.

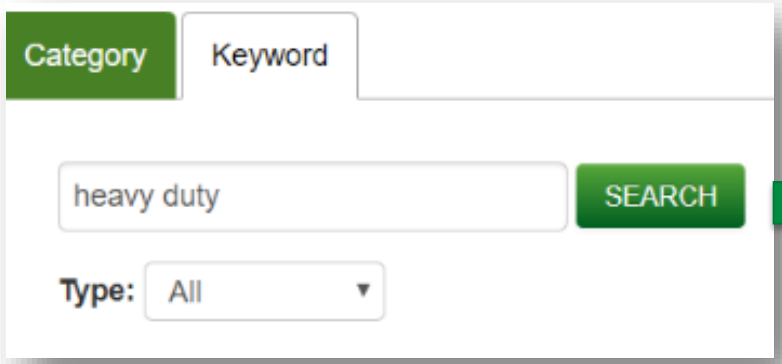
afdc.energy.gov/tools

AFDC Case Studies



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

afdc.energy.gov/case



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

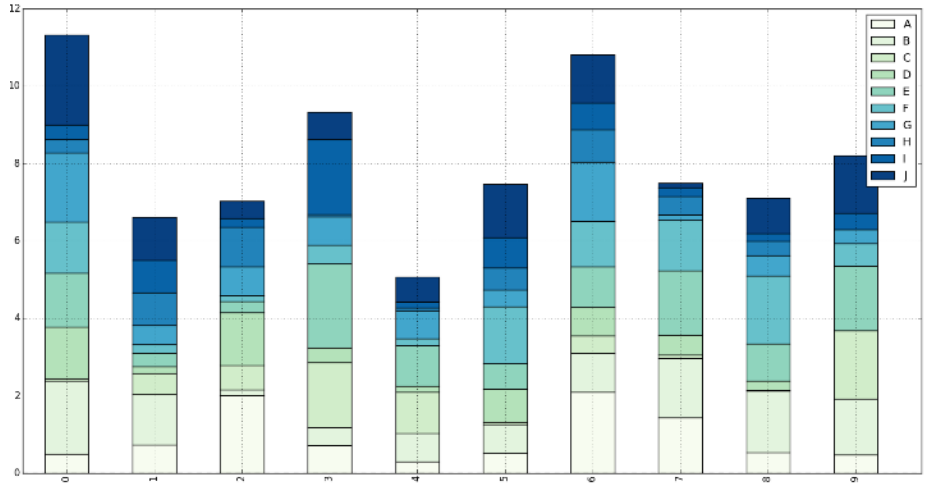
Information & Tools: AFLEET Tool

Alt. Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool

Analyze AFV Costs & Benefits

- **Estimates NOx as well as other economic and environmental costs and benefits of AFVs based on latest research**

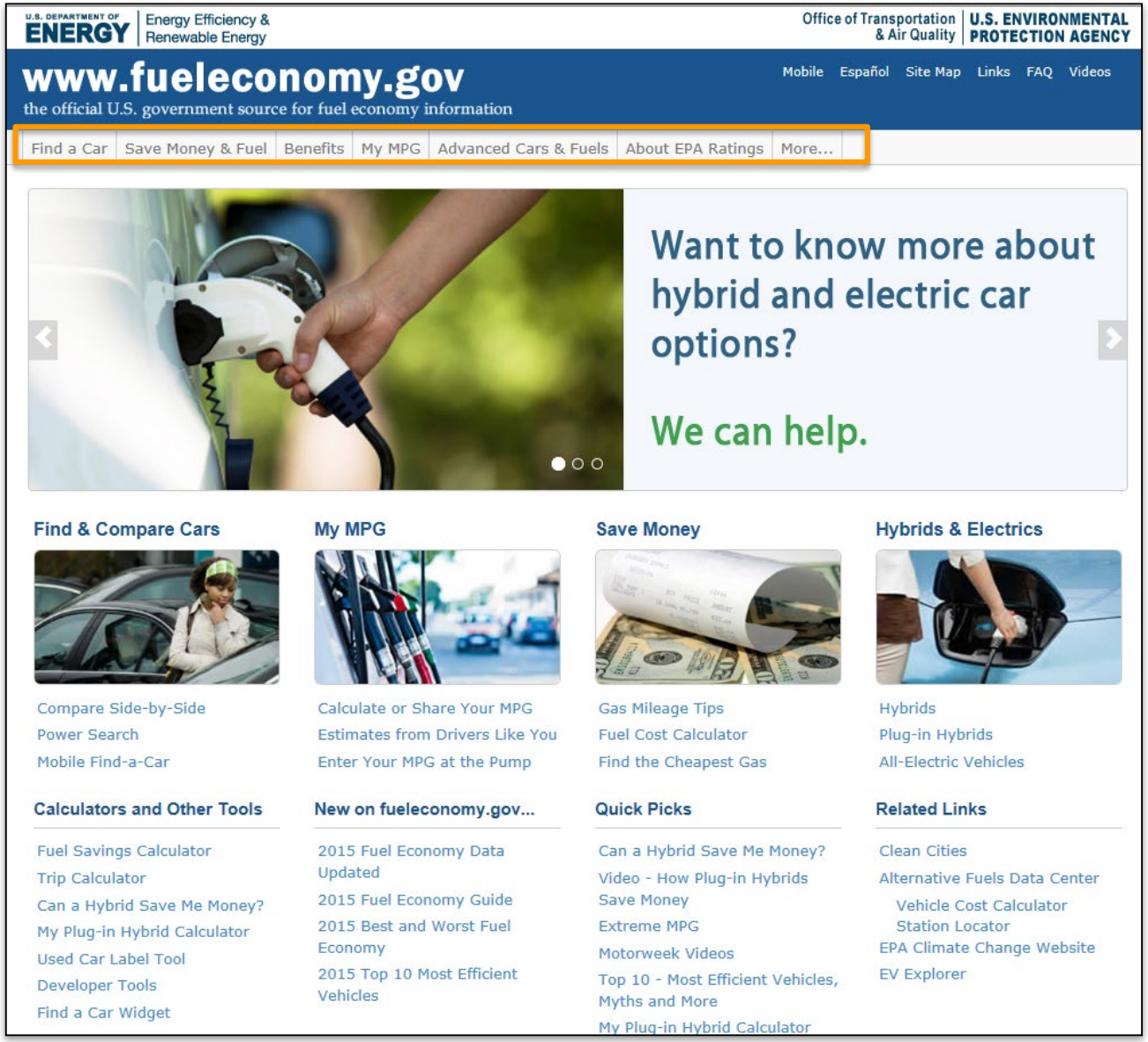
- **18 fuel/vehicle technologies for light- & heavy-duty vehicles**
  - Alternative fuels: CNG, LNG, LPG, H_2, ethanol, biodiesel, renewable diesel
  - Plug-in electrics
  - Hybrids
  - Conventional



- **AFLEET 2017 updates:**
  - Diesel in-use NOx
  - NGV low-NOx engines
  - Idle reduction calculator
  - Upstream & vehicle cycle emissions

- **AFLEET Tool 2017 & user manual: http://greet.es.anl.gov/afleet**

FuelEconomy.gov



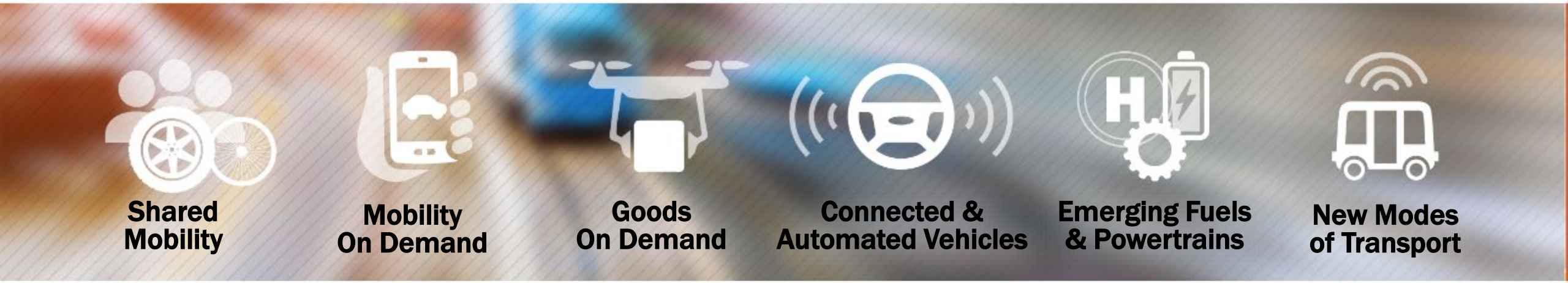
- ✓ Find and compare cars
- ✓ Get driving and vehicle maintenance tips
- ✓ Calculate fuel costs
- ✓ Track your MPG
- ✓ Explore advanced vehicle information
- ✓ Learn about the ratings

FuelEconomy.gov

NEW CHALLENGES BRING

NEW OPPORTUNITIES

NEW TECHNOLOGIES & BUSINESS MODELS ARE DRIVING DISRUPTION



EEMS PROGRAM

+200%

Empty miles
Easier Travel
Increased use by
underserved populations

ENERGY USE

ENERGY USE

Vehicles right-sized
Less hunting for parking
Collision avoidance
Platooning

- 60%

Advanced Fueling Infrastructure

Connected & Automated Vehicles

Urban Science

SMART MOBILITY LAB

CONSORTIUM

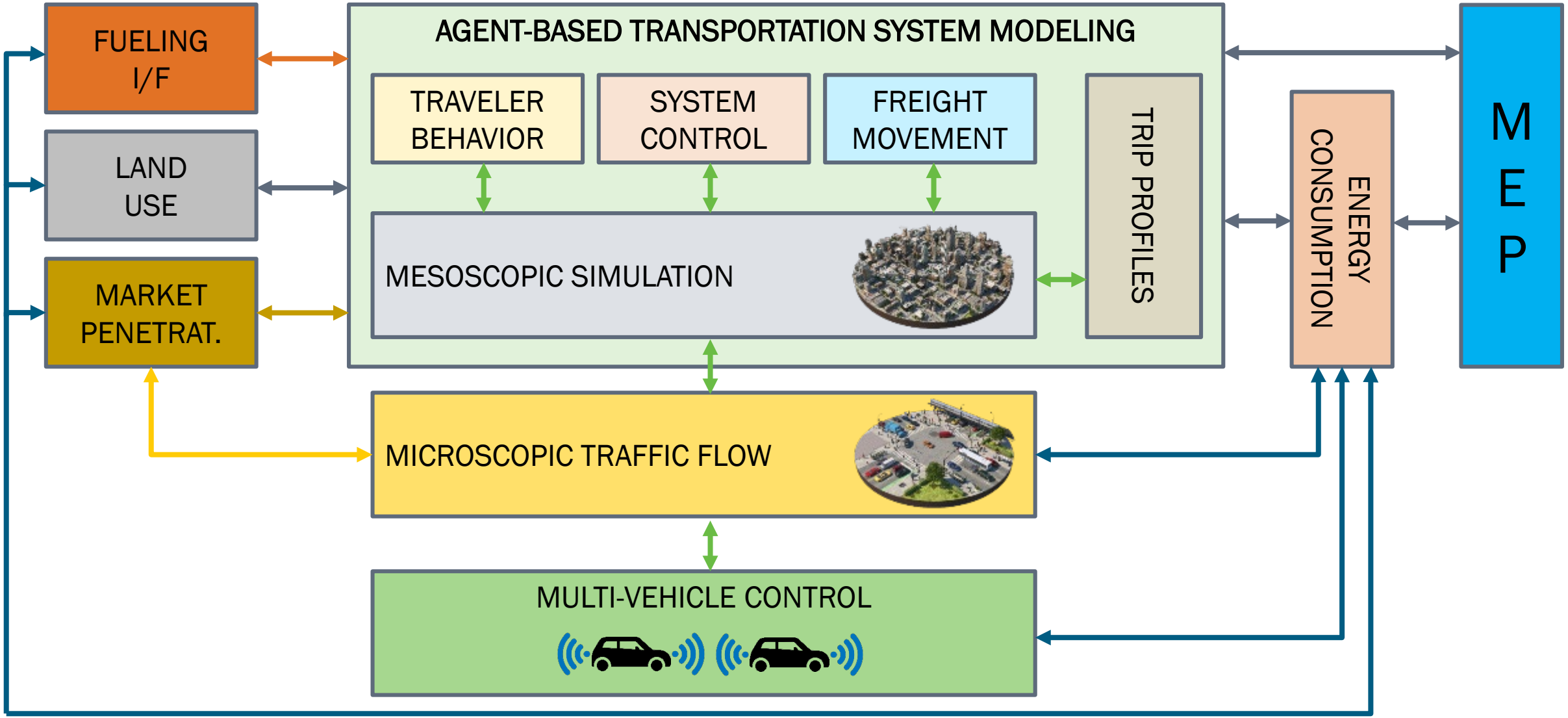
7 labs, 30+ projects, 65 researchers, $34M* over 3 years.

Mobility Decision Science

Multi-Modal Transport

*Based on anticipated funding

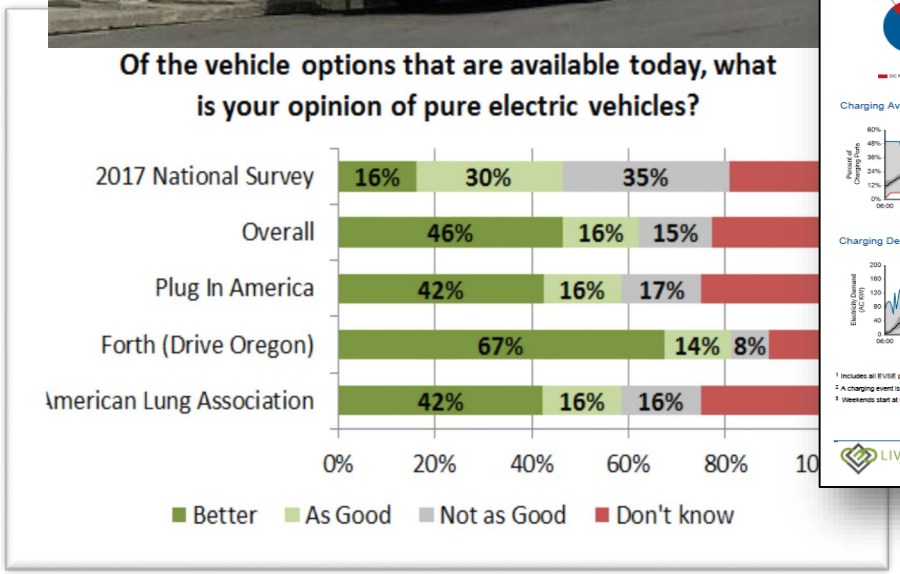
END-TO-END MODELING WORKFLOW

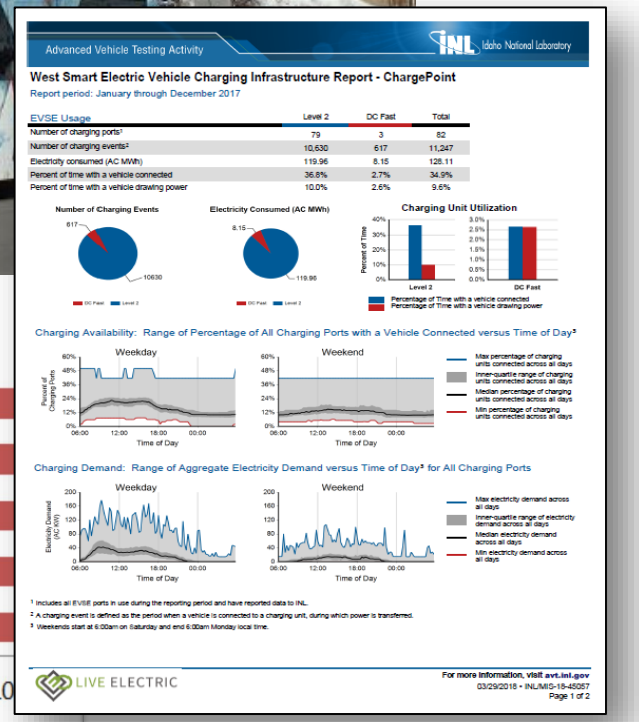


Technology Integration Funding Opportunities

Linda Bluestein, Tech. Mgr.

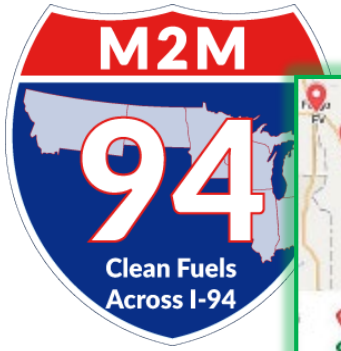
- What? Technology Integration Funding Opportunities
- Why? Demonstrate innovative vehicle technologies and practices: benefit end users, increase resiliency, reduce costs, feedback to researchers
- Barriers? Cost, lack of user knowledge, experience and data

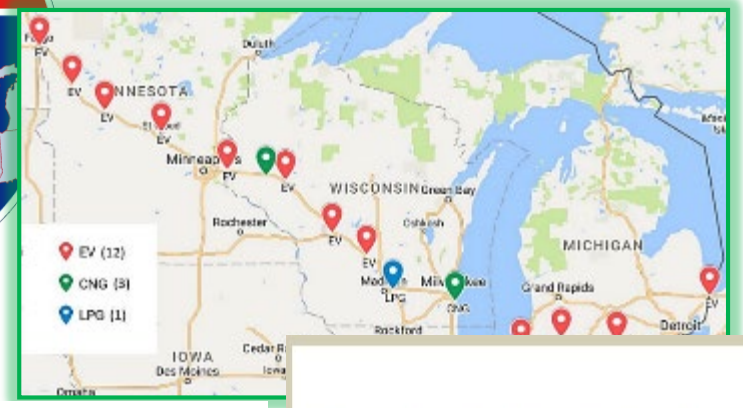


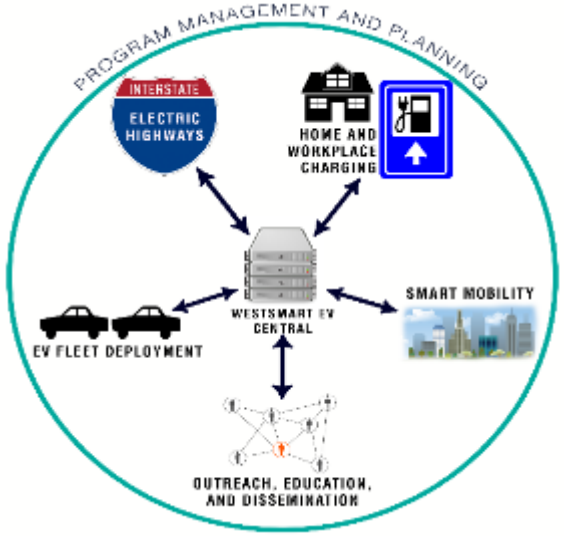


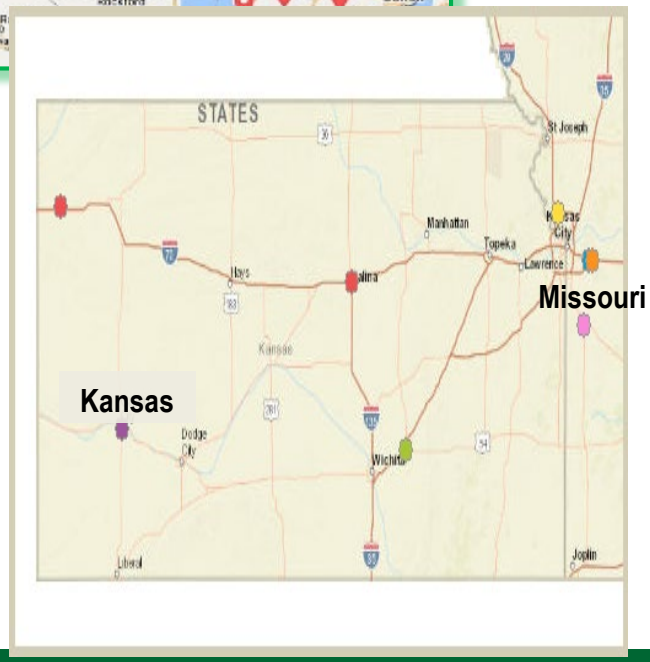
Technology Integration Funding Opportunities

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 (1010011 1100100 0110001)
- 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

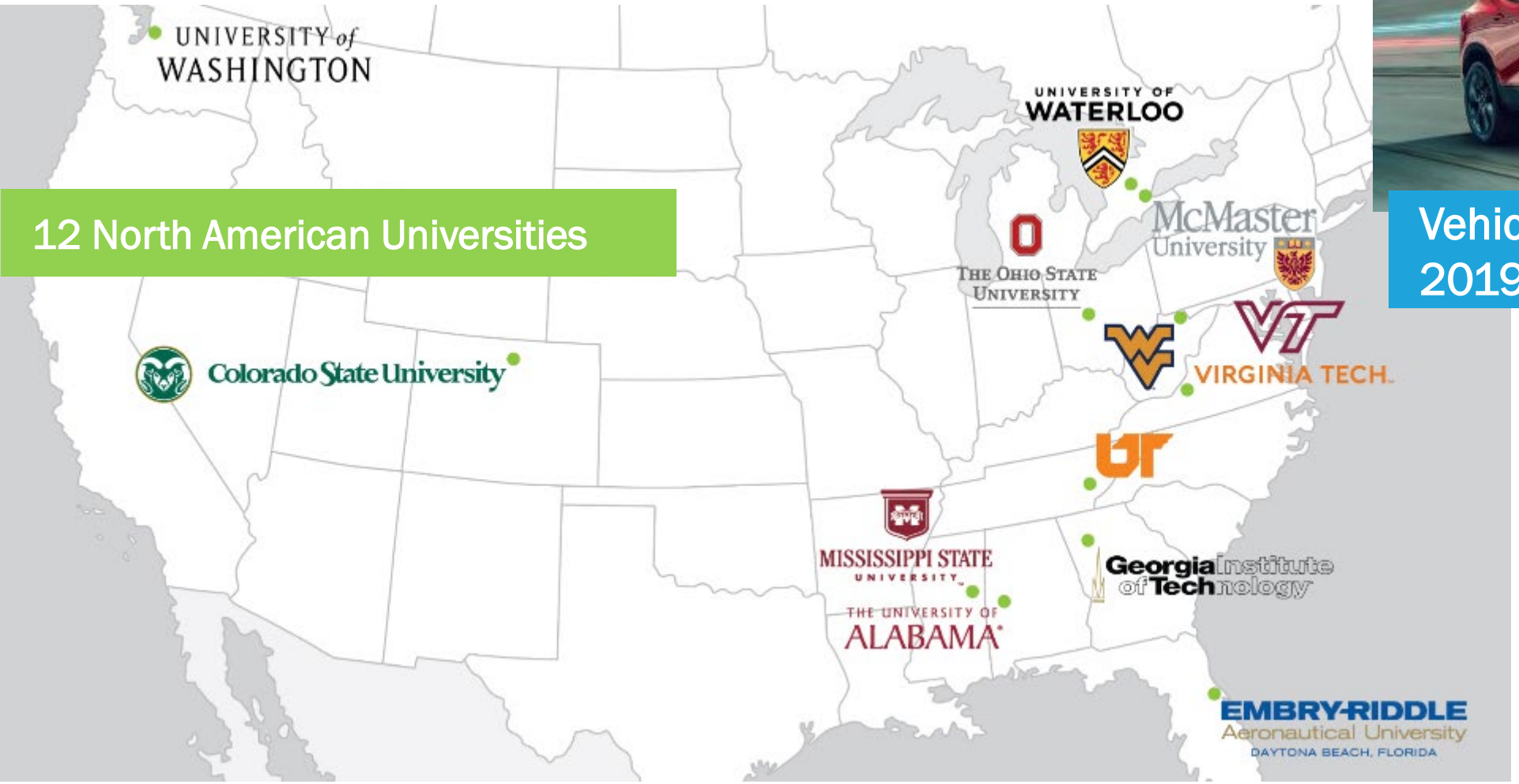
Developing the scientists and engineers to address our energy needs.

ECO CAR MOBILITY CHALLENGE

ECO CAR MOBILITY CHALLENGE

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**



12 North American Universities

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

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