

U.S. DEPARTMENT OF  
**ENERGY**

Office of  
ENERGY EFFICIENCY &  
RENEWABLE ENERGY

# An Overview of DOE Vehicle Technologies Research for New Mobility Opportunities

Michael D. Laughlin, VTO Technology Manager

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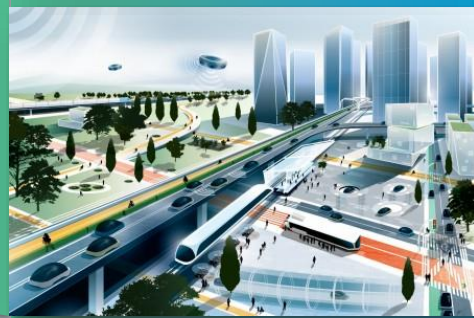
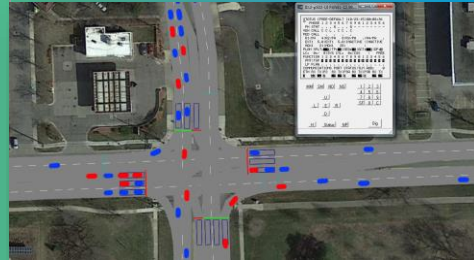
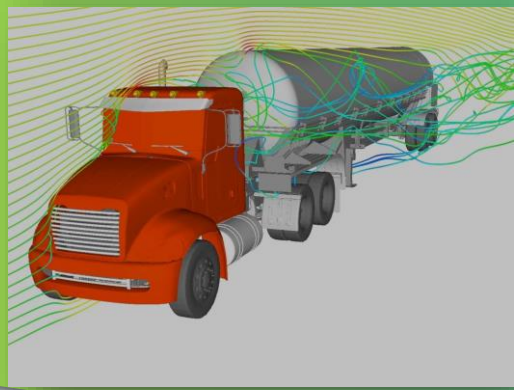




## How can I make sense of all this?

# VTO DEVELOPS SOLUTIONS

# AT ALL LEVELS





# EERE'S VEHICLE TECHNOLOGIES OFFICE (VTO)

## R&D Focus Areas

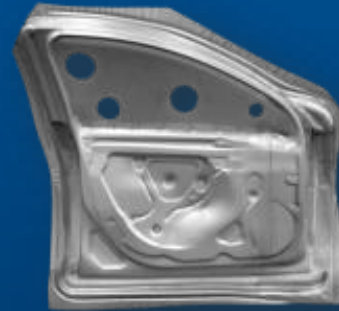
Batteries &  
Electrification



Advanced  
Combustion  
Systems &  
Fuels



Materials  
Technology



Energy  
Efficient  
Mobility  
Systems



Analysis & Technology Integration

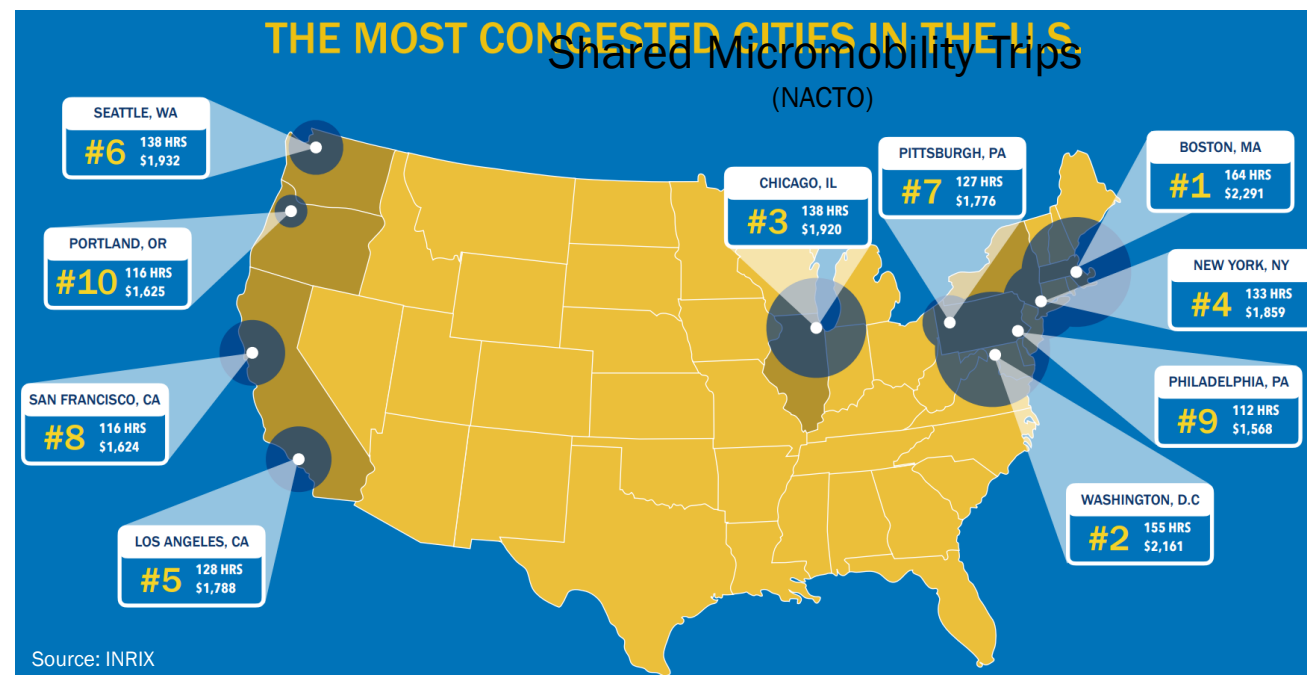
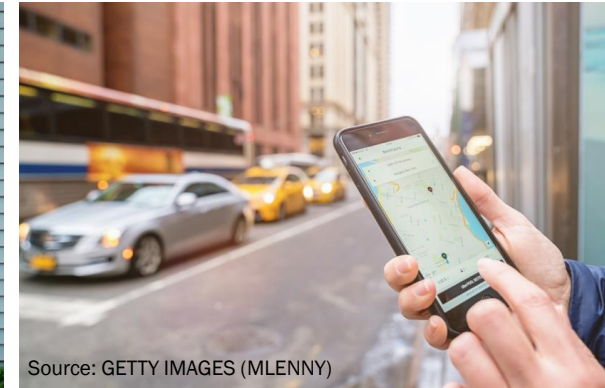
# ...but what IS Energy Efficient Mobility Systems

## ...and why Vehicle Technologies Office



Source: Warner Brothers

# ...but what IS Energy Efficient Mobility Systems





Advanced Fueling  
Infrastructure



U.S. DEPARTMENT OF ENERGY

# SMARTMOBILITY

Systems and Modeling for Accelerated Research in Transportation

Connected &  
Automated  
Vehicles



Urban  
Science

**5 LABS, 30+ PROJECTS, 50+ RESEARCHERS, \$15M PER YEAR**

Mobility  
Decision  
Science



Multi-Modal  
Transport

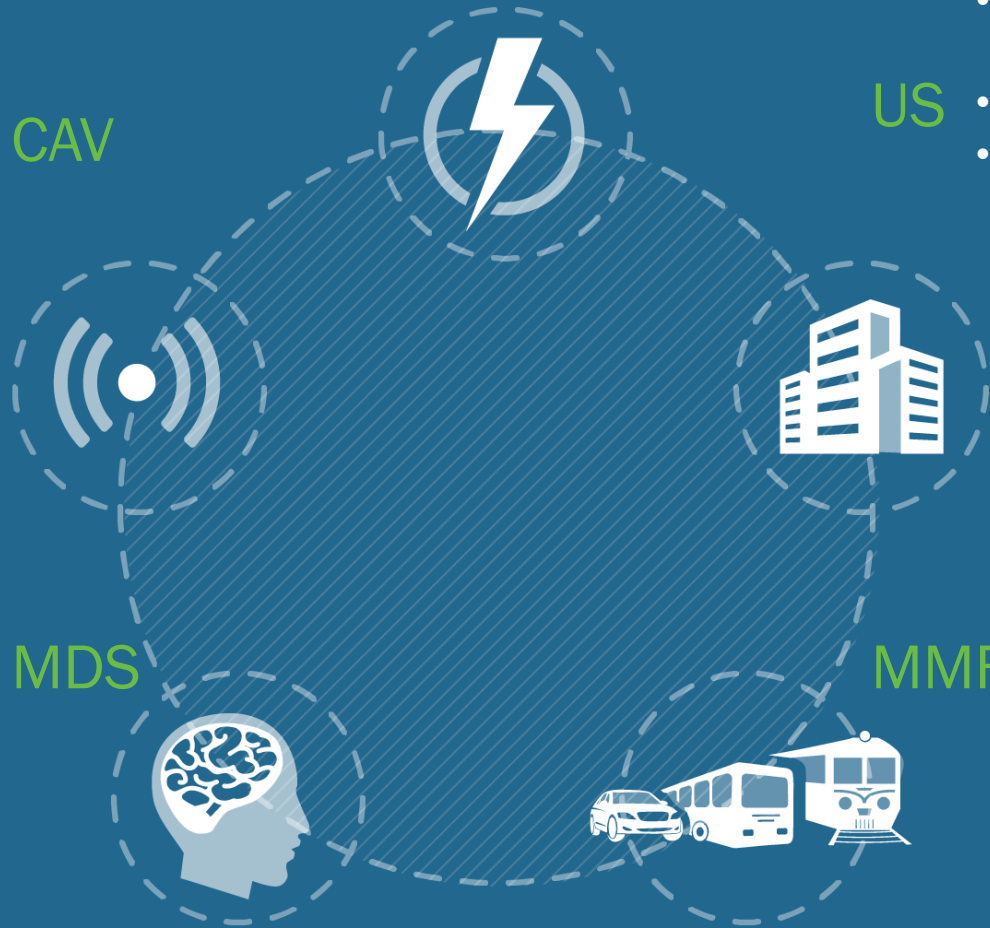


- All about tradeoffs (service, cost, mobility)
- Home EV charging is influential
- What's best? It depends...

AFI

- Private CAV can increase total miles AND empty miles
- AVs can encourage people to spend more time in the car (value of travel time)

- E-commerce substitutes AND adds to shopping trips
- Correlation of age, parental status, transportation modes
- Ride hailing preference also correlated with age



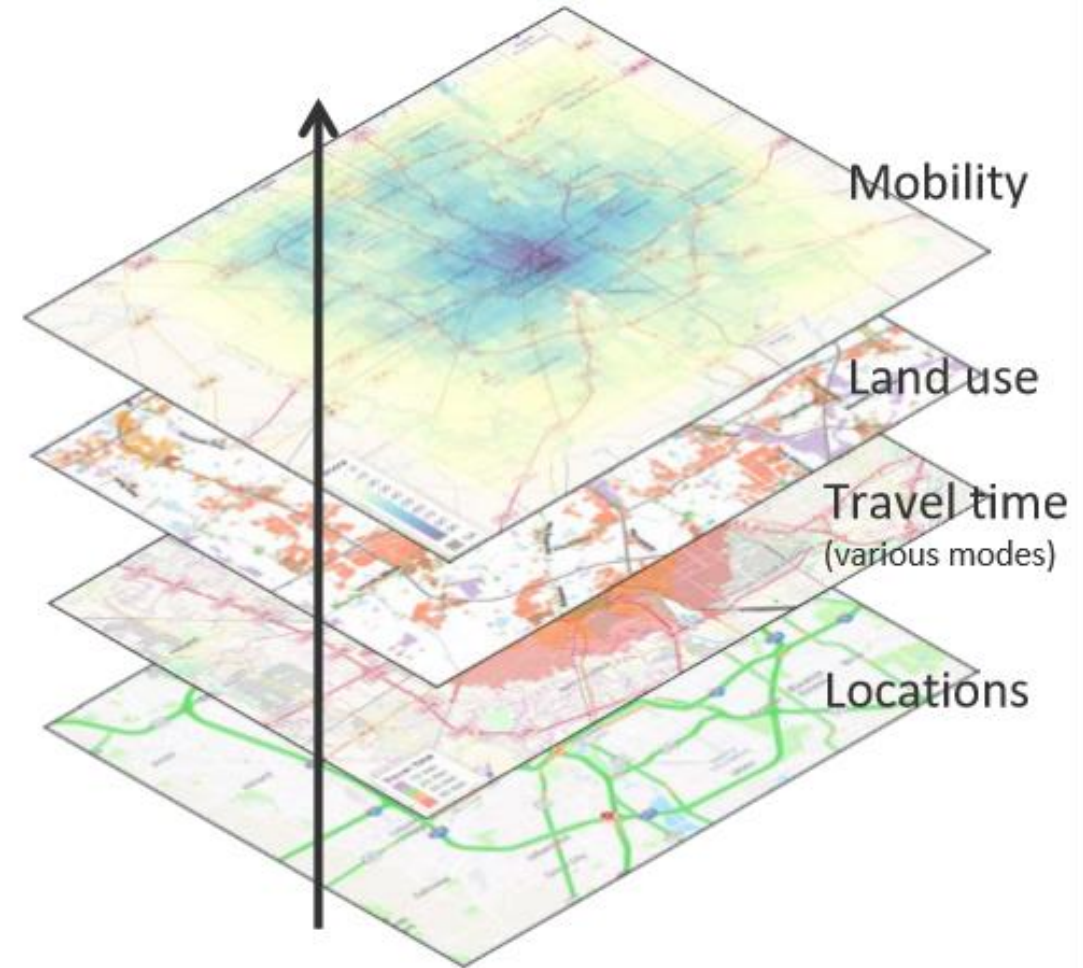
- A new metric for transportation efficiency
- What is easily and cheaply accessible?
- New urban problems (curb space)

- Drones similar to small EV (kWh/mile)
- E-commerce can reduce energy use (if done right)



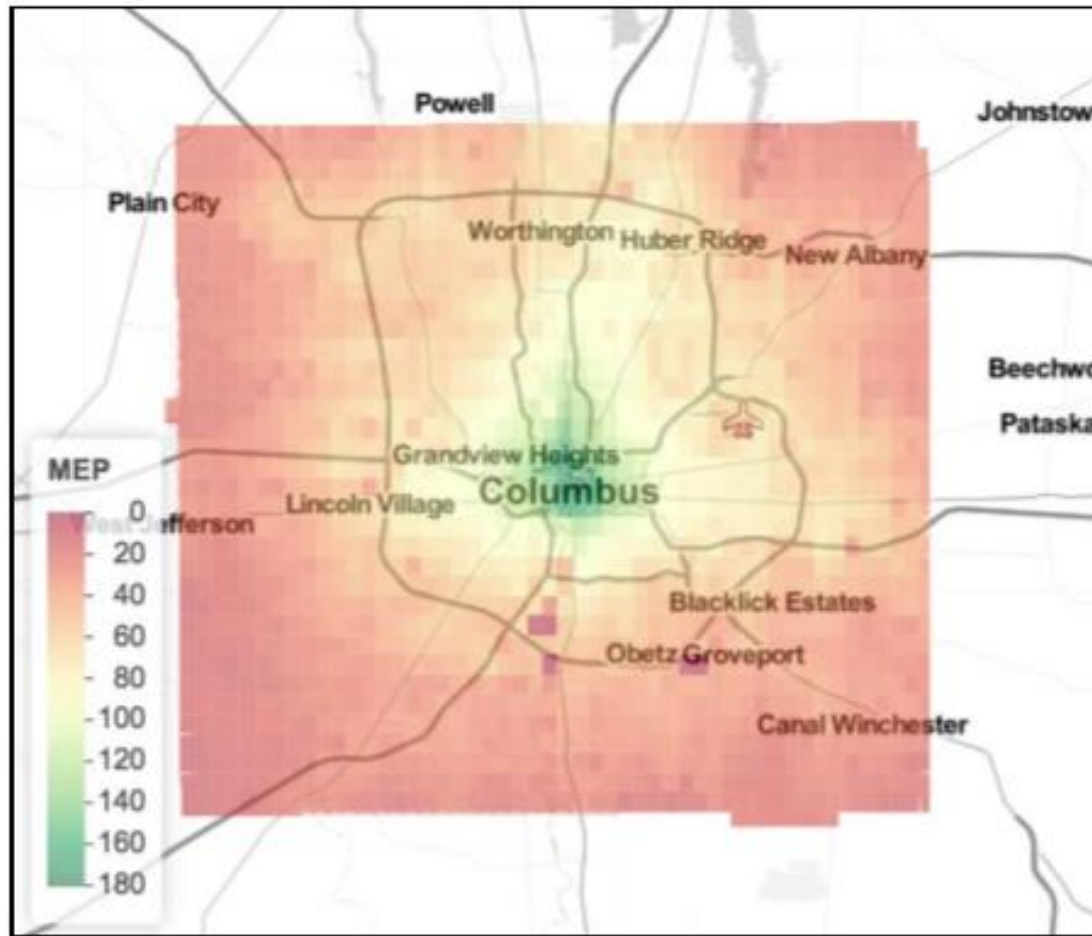
# Mobility Energy Protocol Metric – What Is It?

- Combines different modes of transport into a holistic metric
- Quantify the number of opportunities people can reach within a given time using different modes, proportioned across frequency of trip purpose
- Weighted by time, energy, and cost efficiency metrics of transportation modes
- Incorporate energy, cost, land use components as well as trip purpose
- Reflects efficiency of accessing goods, services, and employment
- Can compare
  - Multiple locations within a city
  - Multiple planning strategies
  - Multiple technologies
  - NOT intended for comparing cities/regions

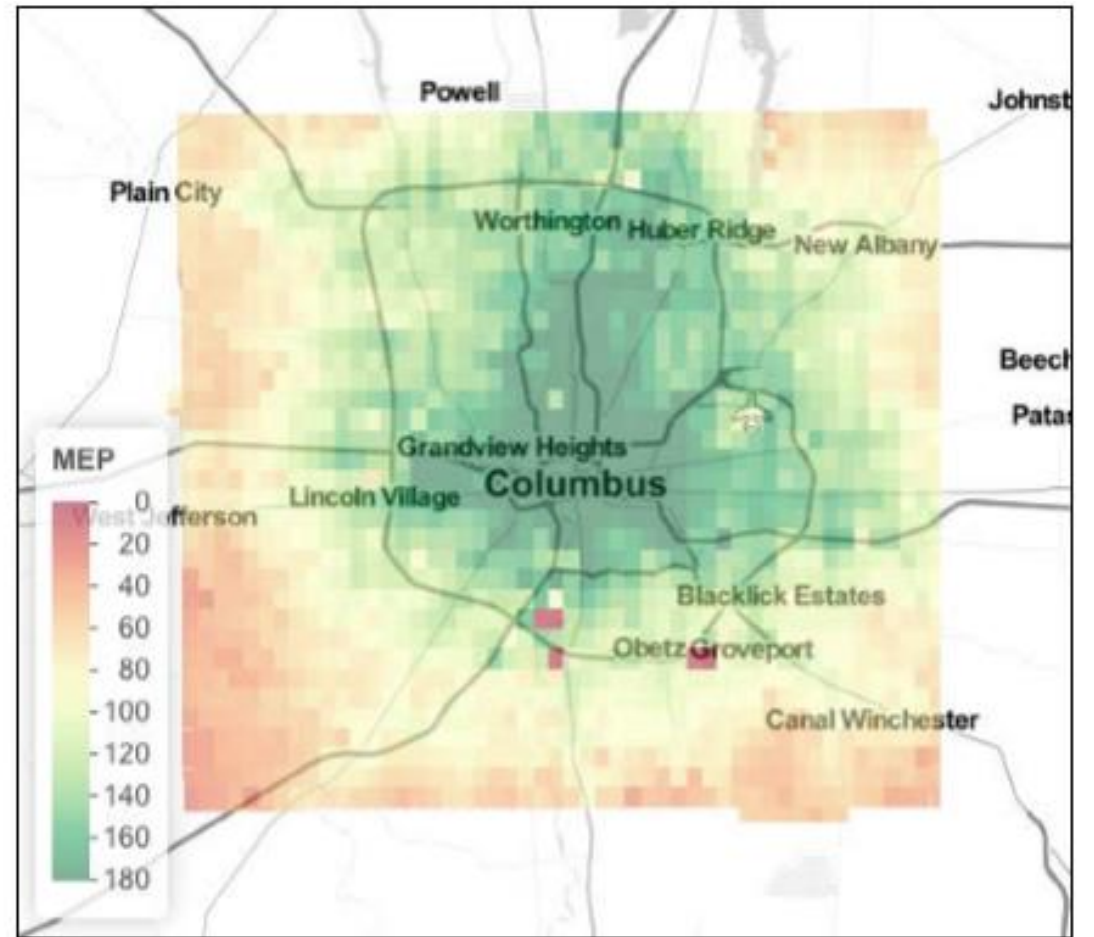


# An Illustrative Use of MEP (for discussion purposes)

What if car fuel efficiency in a region tripled (25 mpg average to 75 mpg average)



BEFORE EFFICIENCY INCREASE

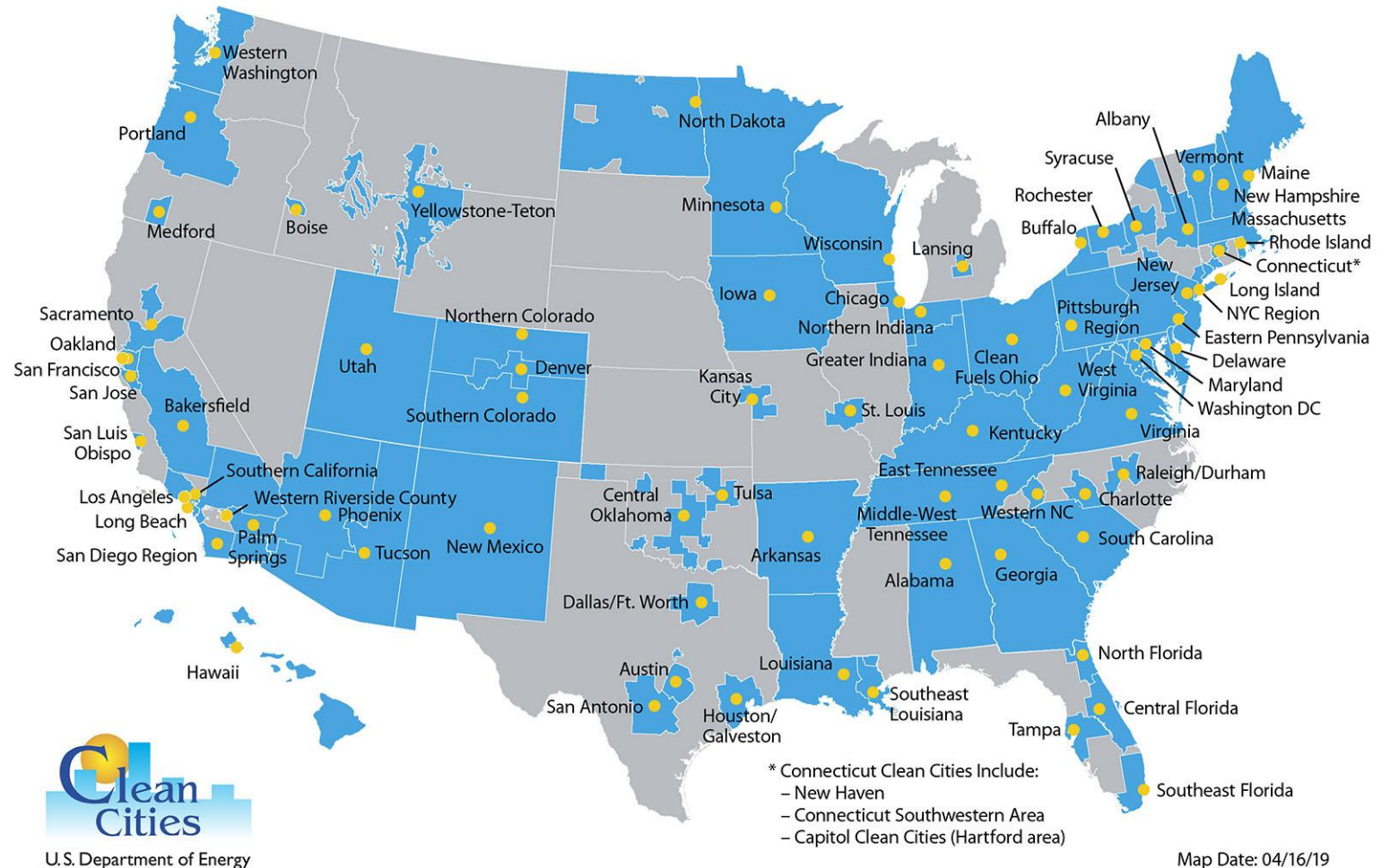


AFTER EFFICIENCY INCREASE

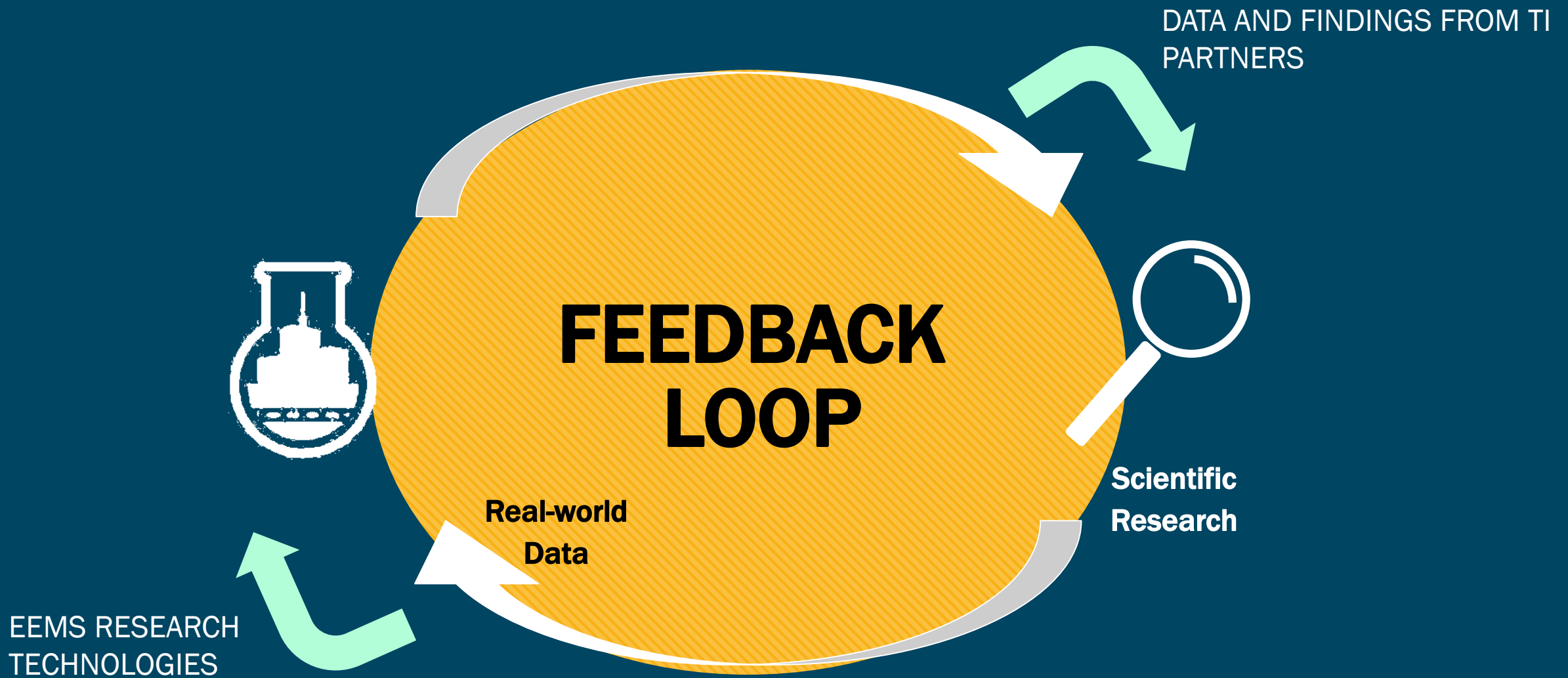
# Technology Integration

- Provide objective and unbiased data and real-world lessons learned to inform future research needs and support local decision making efforts
  - National framework for collaboration
  - Relate near-term technology experiences to long-term technology research needs
  - Data, tools, and information
- Nearly 100 coalitions, thousands of stakeholders, covering ~80% of the U.S. population

## Clean Cities Coalitions







# Recent TI Projects in New Mobility Areas

- EVs for shared mobility/rideshare
- Case studies, marketing campaigns
- EVSE (including DC fast charging) and EVs



## **ELECTRIC SHARED MOBILITY**

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

- Electric shuttle “last mile” connection to transit
- Small EV shuttle with app for hailing/payment
- Name your price test



## **ELECTRIC LAST MILE**

Austin  
Pecan Street, CapMetro

- Efficient freight logistics from supply and demand sides
- Many urban freight initiatives already catalogued
- Modeling and simulation to identify possible pilot tests



## **ENERGY EFFICIENT FREIGHT LOGISTICS**

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



## Wrapping up...

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- **The future for mobility is bright (we think!)**
- **Consumer behavior is a key**
- **DOE's Vehicle Technologies Office has experts already working on these problems**
- **VTO has tools, resources, and insights to help all of you with this new mobility world**
- **Clean Cities is a connection to this community of experts – they (and we) are here to help!**



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**Comments or Questions?**

**Michael Laughlin**

**[michael.laughlin@ee.doe.gov](mailto:michael.laughlin@ee.doe.gov)**

**202-586-1888**

**[vehicles.energy.gov](http://vehicles.energy.gov)**

