Funding the 21st Century Transportation System

National Association of State Energy Officials

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National Renewable Energy Laboratory

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National Renewable Energy Laboratory

Only national laboratory dedicated to energy efficiency and renewable energy

- Leading clean-energy innovation for 35 years
- About 2,400 employees with world-class facilities
- Campus is a living model of sustainable energy
- Owned by the Department of Energy
- Operated by the Alliance for Sustainable Energy

The Future of Transportation Funding is at an Impasse

Transportation fundamentals are changing and current funding paradigms are being challenged

- Infrastructure is deteriorating and funding mechanisms are insufficient

State Energy Offices have a role

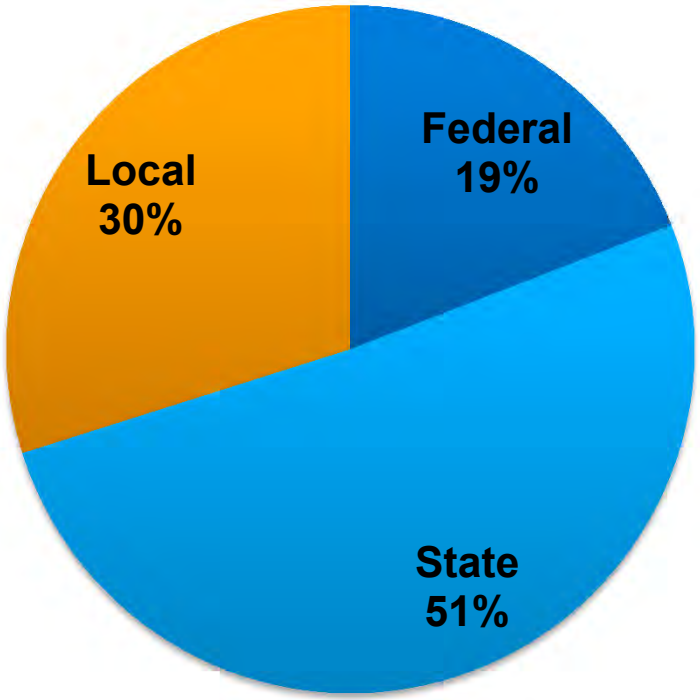
- There are strong energy implications with current and future funding mechanisms
- IEA projects that more efficient transportation can realize projected savings of $70 trillion globally over the next 40 years

Infrastructure Funding Reform

Modified Management of Transportation System

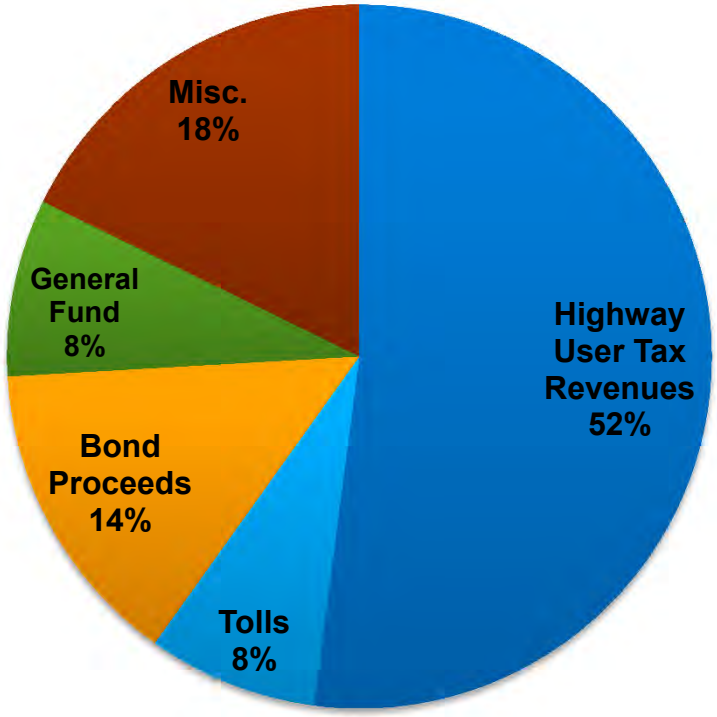
Who Pays for These Roads Anyways?

Aggregate Federal/State/Local Funding Allocation



Federal Highway Administration (2013)

Average State Highway Revenue Source



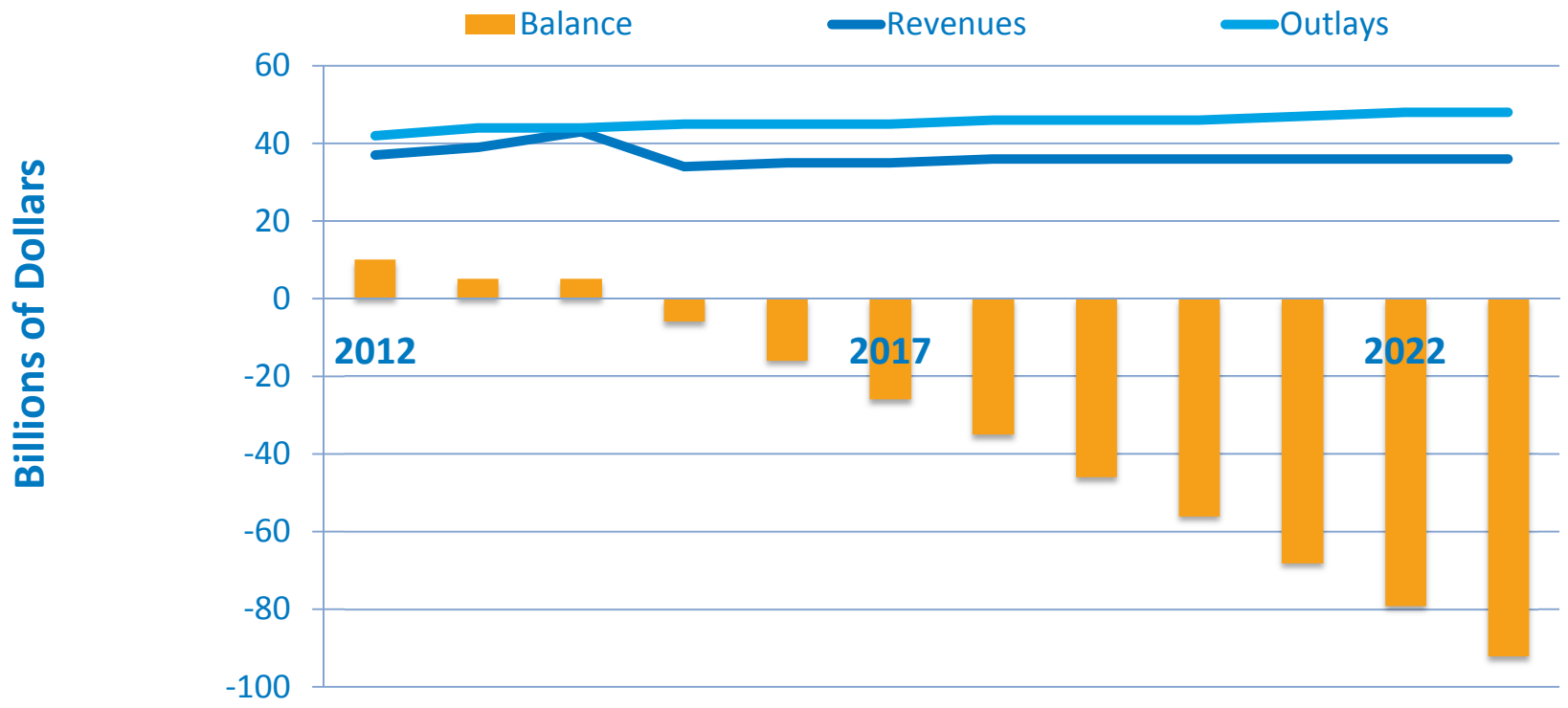
Federal Highway Administration (2013)

Future Highway Funding Projections Are Not Bright

An Estimated $178 Billion in Annual Funding is Needed to Significantly Improve Conditions and Performance[1]

Purchasing Power of Gas Tax Has Decreased 28% Since 1997[2]

1. ASCE, 2013
2. ITEP, 2013

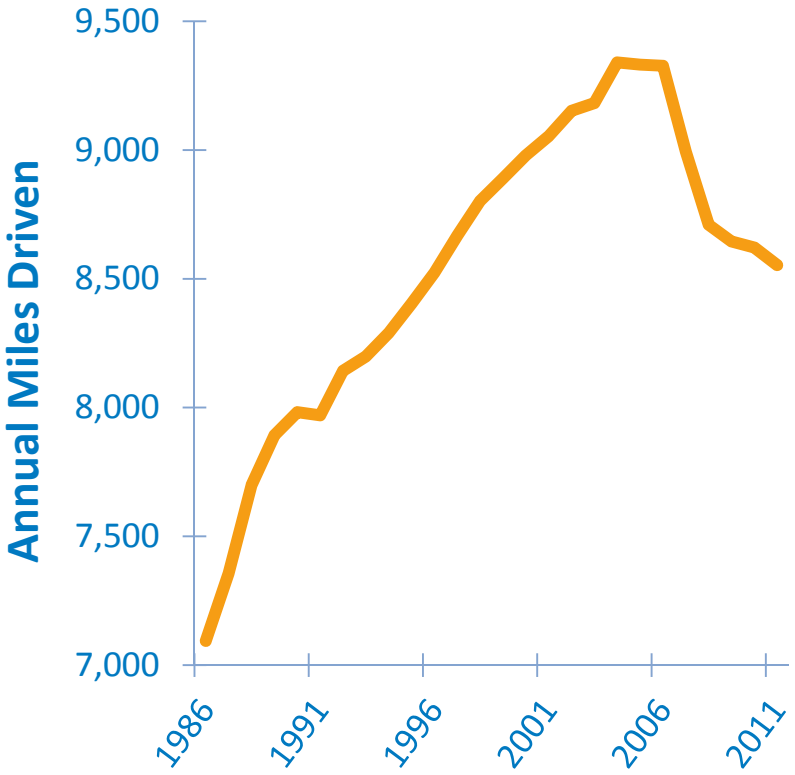


U.S. Congressional Budget Office

Federal Highway Funding Projections

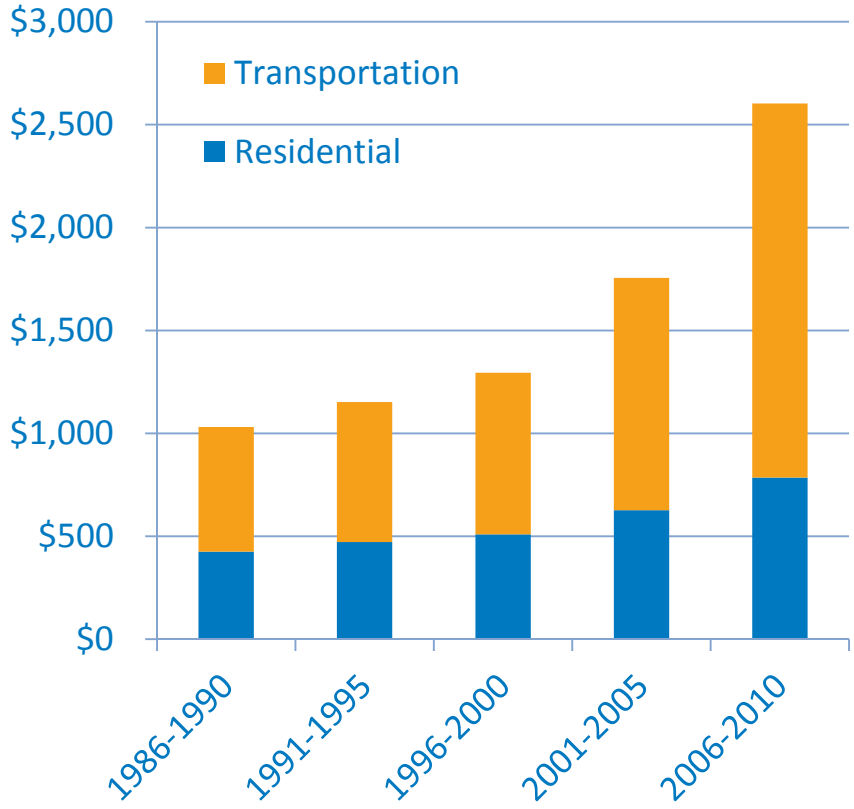
People are Driving Less, but Paying More to Do So

Average Annual Vehicle Miles Traveled



U.S. Department of Energy Alternative Fuel Data Center

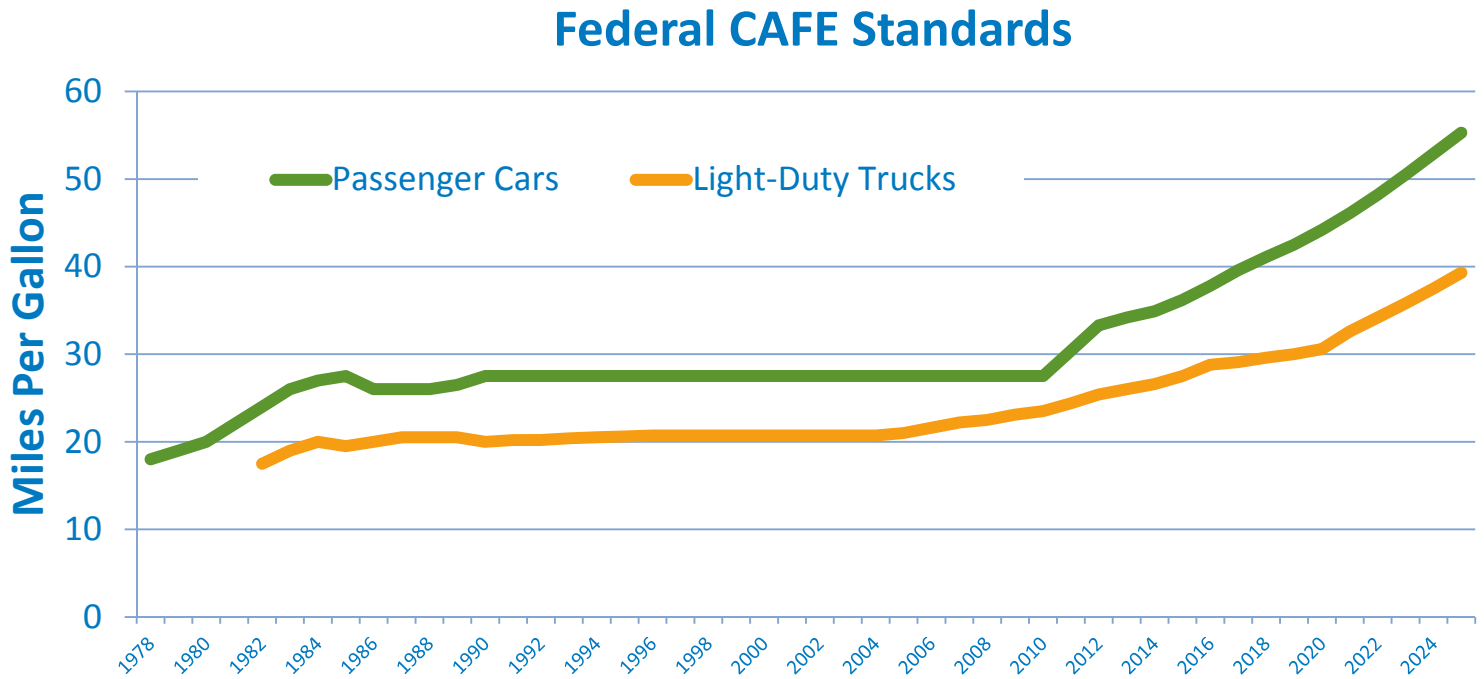
Average Per Capita Annual Energy Expenditures



Source: U.S. Energy Information Administration and U.S. DOE Alternative Fuels Data Center

Transportation and Energy Policies Are Not Aligned

Vehicle Efficiency and Transportation Funding are Fundamentally Opposed in Current Policy



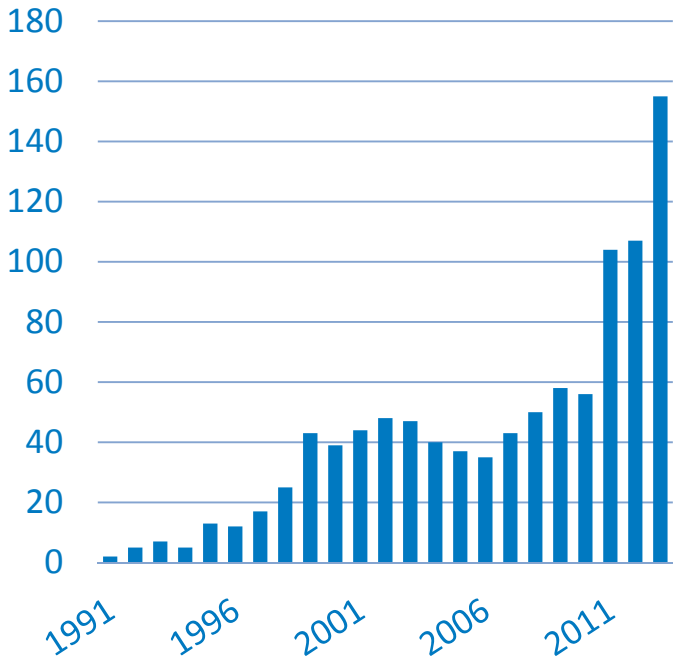
U.S. Department of Energy Alternative Fuel Data Center

CAFE is expected to save consumers between $372 and $507 billion by 2025,[1] but decrease fuel tax revenues by $57 billion by 2020[2]

1. NHTSA, 2011
2. 2. Dinan and Austin, 2012

The Market for Alternative Fuels Is Increasing

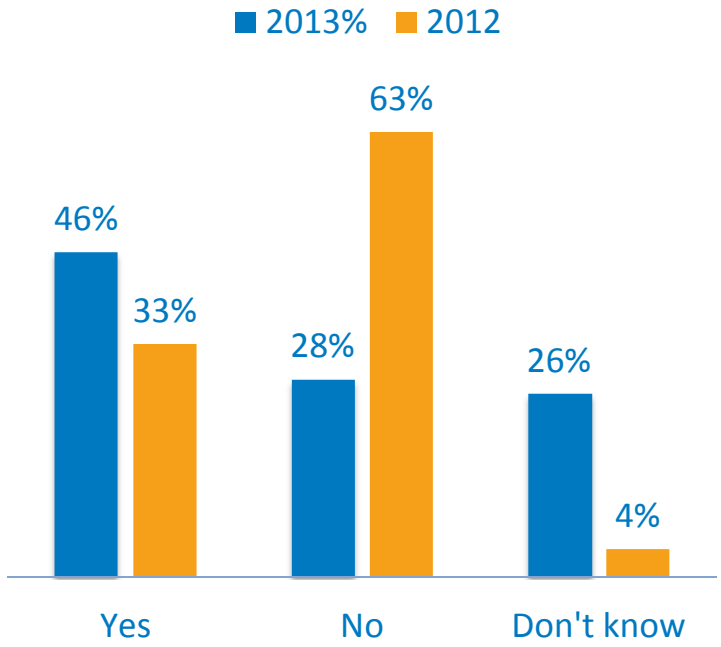
Light-Duty Hybrid and Alternative Fuel Vehicle Models Available to Consumers



U.S. Department of Energy Alternative Fuel Data Center

U.S. Congressional Budget Office

Prospective Buyer Willingness to Purchase a Non-Gas Vehicle in the Next 3 Years

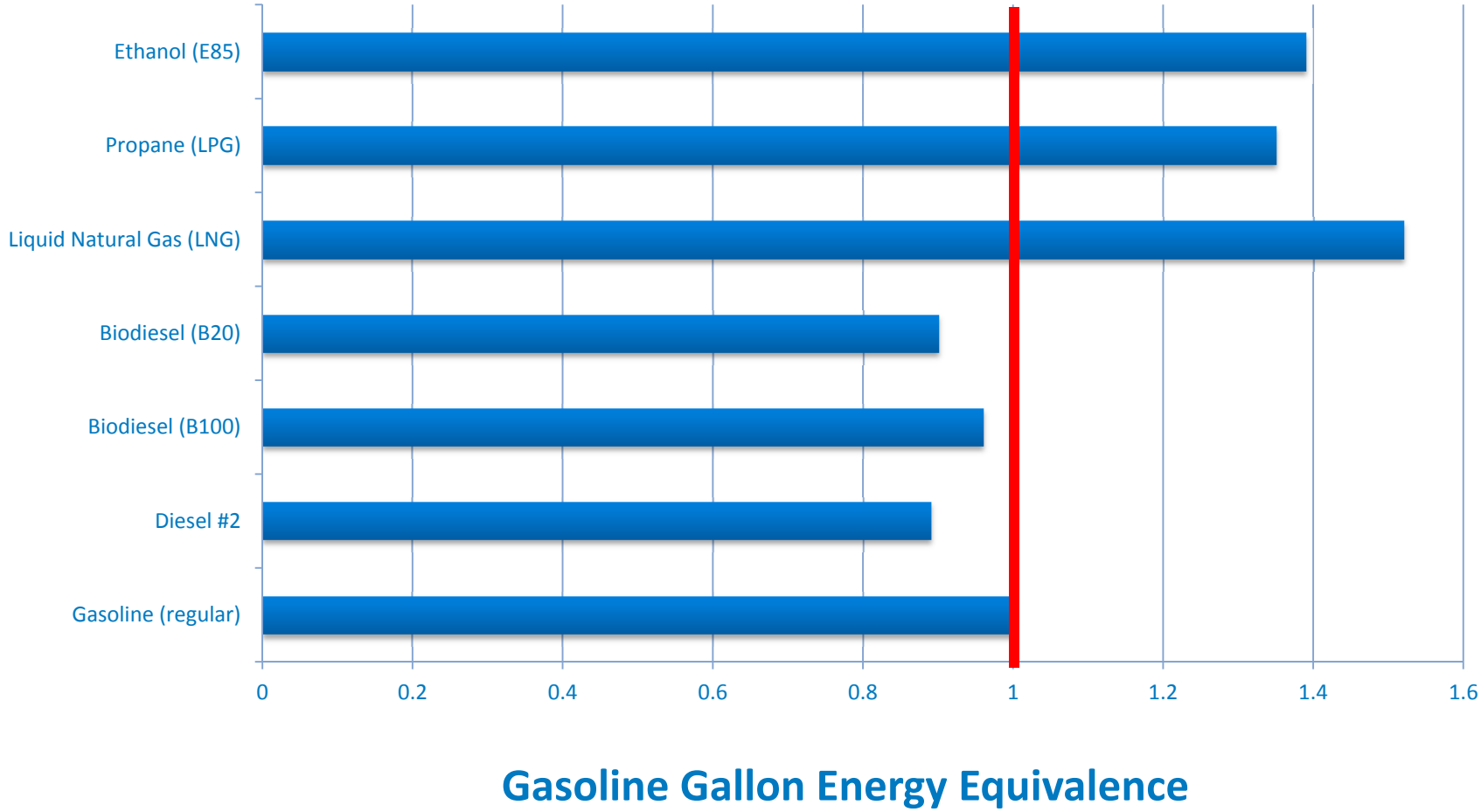


National Association of Convenience Stores: What do Consumers Think about Fuels Retailers and the Future? 2013

U.S. Energy Information Administration

Transportation and Energy Policies Are Not Aligned

Current System of Taxation Does Not Accommodate Variation Among Alternative Fuels



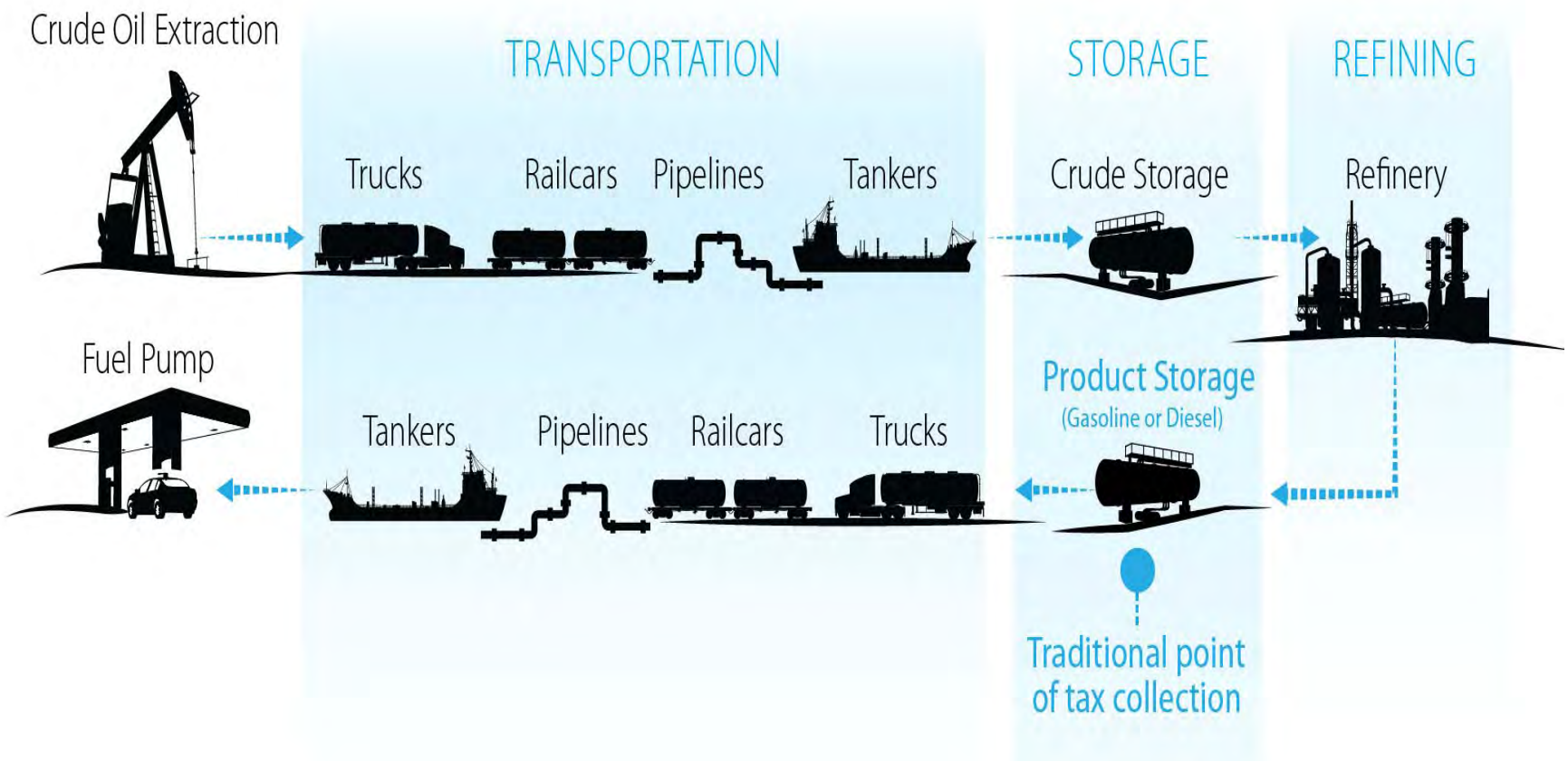
Zero Emission Vehicles Will Alter the Fuel Supply Chain

Zero Emission Vehicle Standards

- California's zero emissions vehicle standard requires that by 2025, 15.4% of all vehicles sold will need to produce zero emissions. This is estimated to be equivalent to 1.4 million vehicles.
- 10 states and Washington DC have adopted California's zero emission vehicle requirements.
- ZEV states account for almost 1/3 of new car sales.
- Hydrogen and plug-in electric vehicles are being pursued by multiple automakers as a means to meet ZEV requirements.

Transportation and Energy Policies Are Not Aligned

New Paradigm of Fueling/Charging at Home – Mechanics of Collection Matter



Electric Vehicles and the Gas Tax

Current System Does Not Consider "Fueling" at Home

A Number of States are Implementing Decals, but There is No Emerging Methodology for Decal Fee

- Need to avoid penalizing EV efficiency
- Different EV technologies will have different revenue impacts
- Some EVs will pay gas tax

Photo by Andrew Hudgins, NREL 17416

Vehicle Type	Vehicle Make and Model	MPGe	Utility Factor	Estimated Annual Gas Tax
ICE	Average New Car	24.5	1.0	$90.12
EV	Nissan Leaf	99	1.0	$22.30
PHEV	Chevrolet Volt Total		1.0	$36.68
	Chevrolet Volt Electricity	93	0.6	$14.25
	Chevrolet Volt Gasoline	37	0.4	$23.87

States Are Taking the Lead With New Funding Mechanisms

Electric Vehicle Fees

Colorado charges $50 annually for EVSE at the time of registration. $25 goes to fund infrastructure, $25 goes to fund EVSE

Vehicle Miles Travelled Fee (ex. Oregon)

Oregon is conducting a pilot that allows for up to 5,000 drivers of certain types of light-duty vehicles to participate in a program that will pay $0.015/mile in lieu of the $0.30/gallon state gasoline tax

Variable Fuel Tax Rates

Virginia eliminated its $0.175/gallon motor fuels tax in favor of a 3.5% sales tax on gasoline and a 6% sales tax on diesel fuel. The tax is adjusted twice annually.

Carbon Tax

In 2008, British Columbia instituted a carbon tax that is levied in proportion to equivalent tons of carbon dioxide emitted by a given fuel

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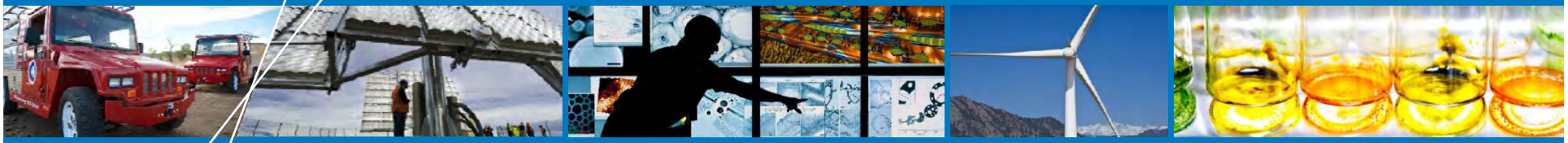
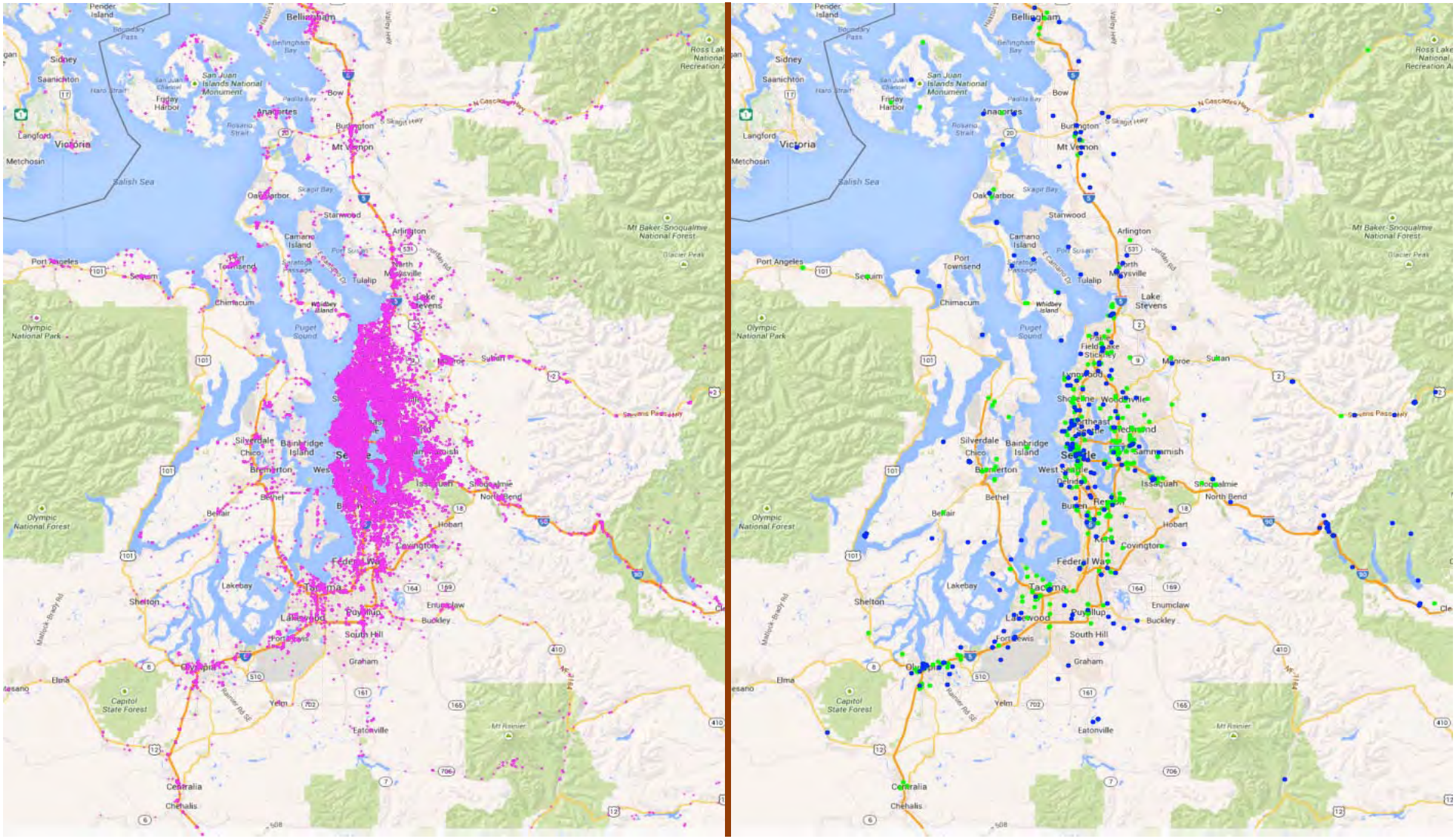


Other Emerging Transportation Infrastructure Questions

Where Should EV/AFV Infrastructure Go?

33,477 Locations → 281 Locations



Thank You

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