

Alternative Fuel Taxes, Decals, and Compliance



**National Conference of State Legislatures
Energy Supply Task Force**

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National Renewable Energy Laboratory



Photo by Dennis Schroeder, NREL 17613

NREL at a Glance

- Only U.S. National Laboratory dedicated to renewable energy and energy efficiency research
- Established in 1979 as Solar Energy Research Institute
- About 2,400 employees with world-class facilities
- Owned by the Department of Energy, operated by the Alliance for Sustainable Energy

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
- Federal and state governments are responding in a variety of ways

Infrastructure
Funding Reform



Modified
Management of
Transportation
System

Alternative fuels introduce increased complexity

- Multiple fuels with varying energy contents, delivery methods, and taxation schemes present challenges towards balancing parity and promotion
- Decals and energy-content based taxation are two mechanisms being implemented

Transportation and Energy Policies are Not Aligned

Energy/
Environment



Infrastructure
Revenue

CAFE is projected to provide economic benefit of between \$372 and \$507 billion by 2025

Source: NHTSA 2011

Fuel tax revenues are projected to decrease by \$57 billion by 2022

Source: Dinan and Austin 2012

States Are Implementing New Funding Mechanisms

Vehicle Miles Travelled Fee

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

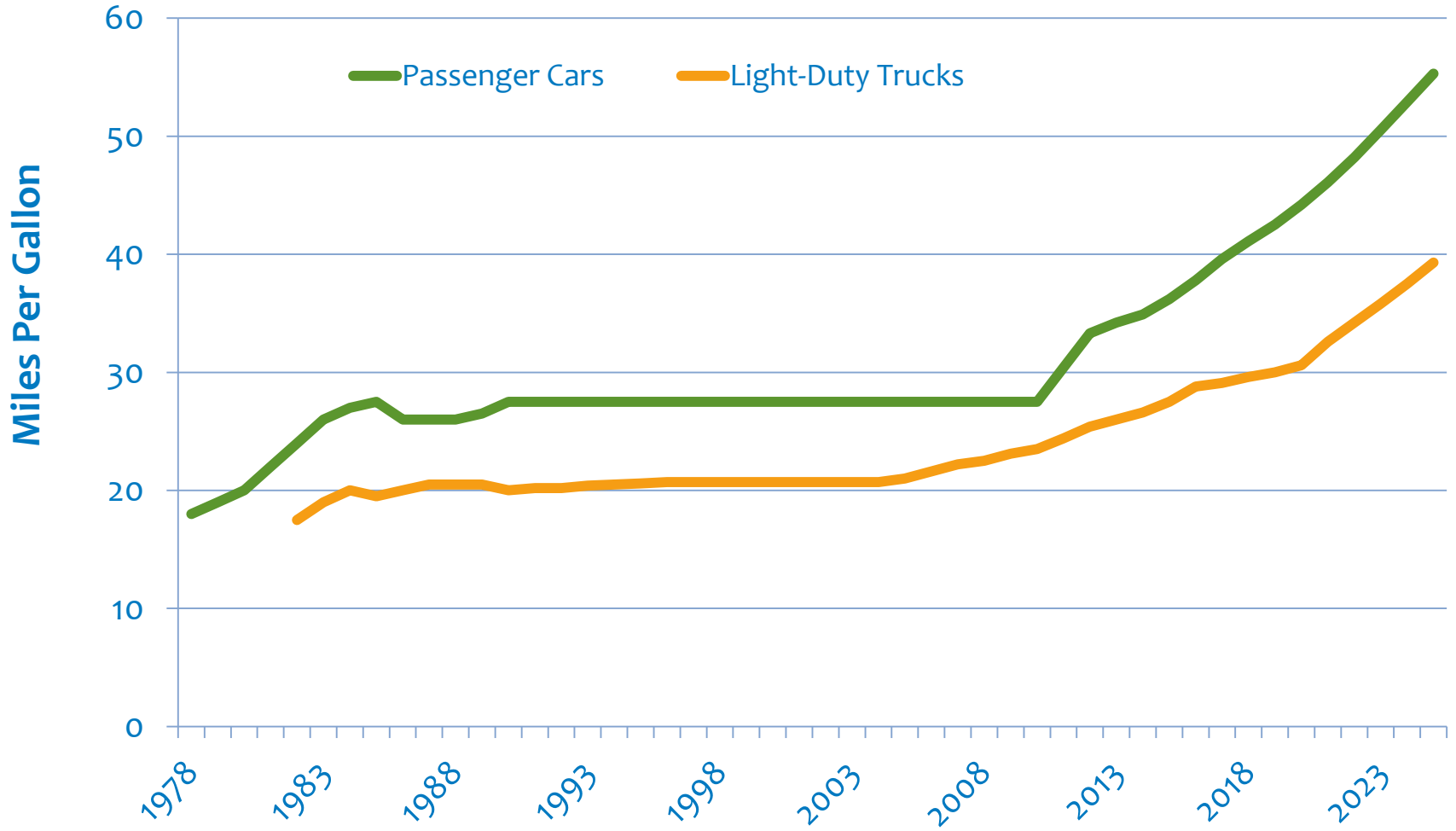
In 2008, British Columbia instituted a carbon tax that is levied in proportion to equivalent tons of carbon dioxide emitted by a given fuel



Photo by Warren Gretz, NREL 10640

Vehicles Are Becoming Increasingly Fuel Efficient

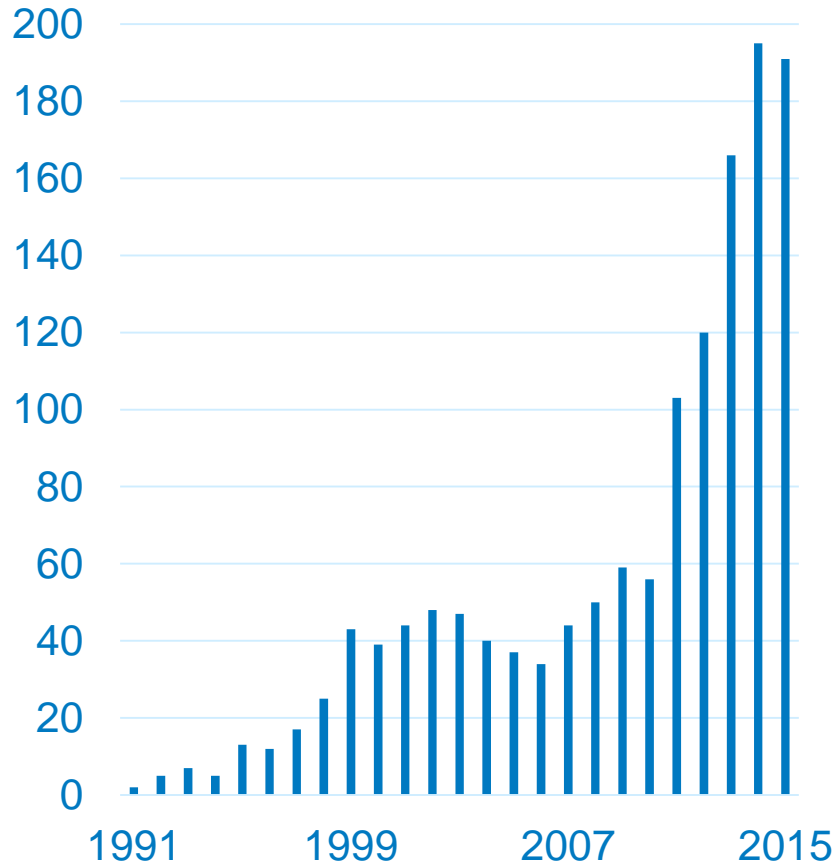
Federal Light-duty Fuel Economy Standards



U.S. Department of Energy Alternative Fuel Data Center

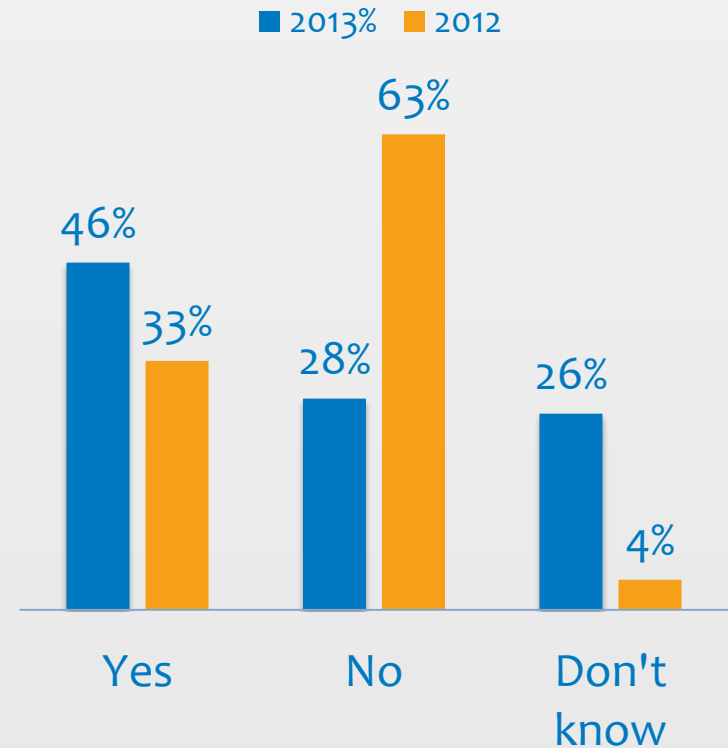
The Market for Alternative Fuels Is Increasing

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



U.S. Department of Energy Alternative Fuel Data Center

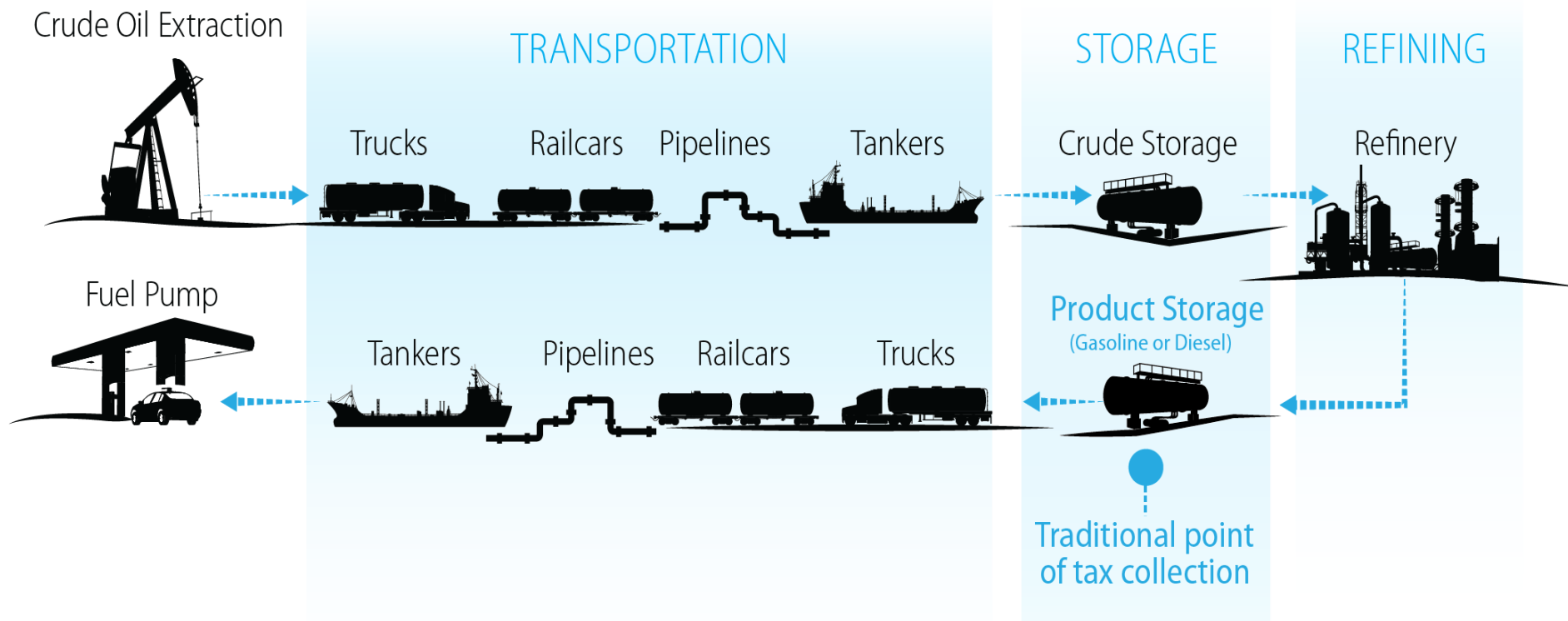
Prospective Buyer Willingness to Purchase a Non-Gas Vehicle in the Next 3 Years



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

Collecting Motor Fuel Taxes Used to be So Simple

- Single, consistent point of enforcement
- Two major fuels (gasoline and diesel)
- International Fuel Tax Agreement for Interstate Transactions



New Fuels and Technologies Complicate Things



Photo by Pearson Fuels

Plug-in Hybrid Electric Vehicle
Series Hybrid Vehicle
Parallel Hybrid Vehicle
Series/Parallel Hybrid Vehicle
Mild Hybrid
Battery Electric vehicle
Hybrid Electric Vehicle
Fuel Cell Electric Vehicle

Gasoline Vehicle

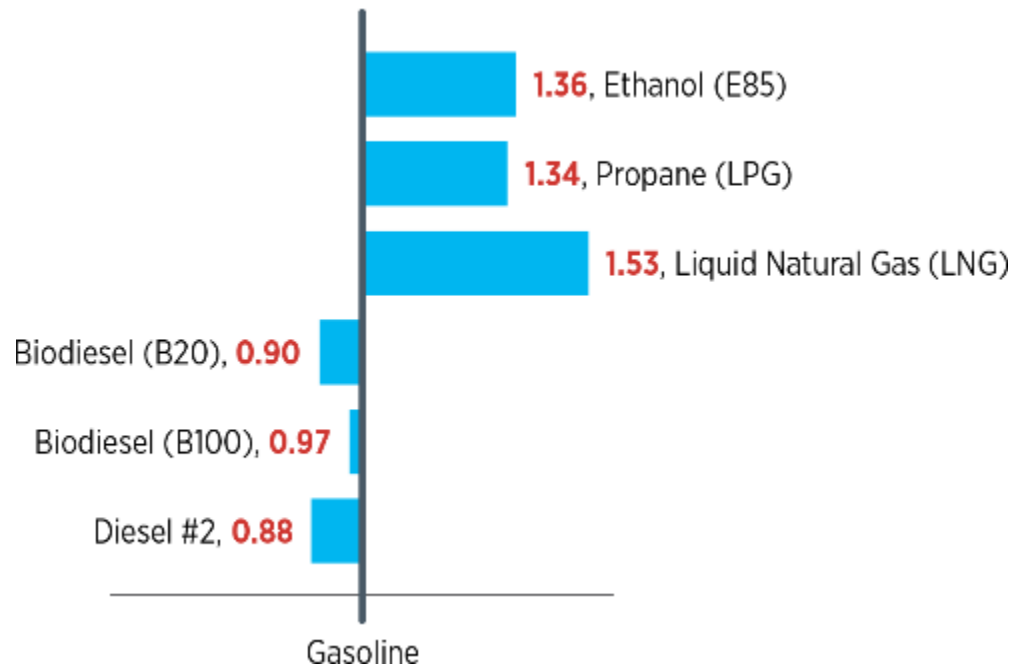
Diesel Vehicle

Fuel Cell Hybrid Vehicle
Bi-fuel Natural Gas Vehicle
Dedicated Natural Gas Vehicle
Dual-fuel Natural Gas Vehicle
Propane Vehicle
Flexible Fuel Vehicle
Extended Range Electric Vehicle
Neighborhood Electric Vehicle

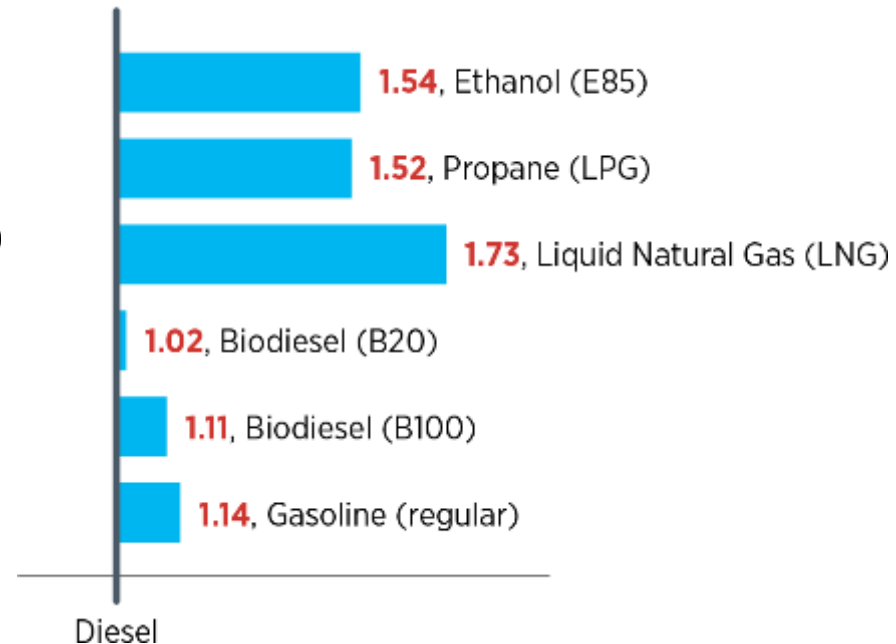
Fuel Taxes are Traditionally Based on Volume

Current System of Taxation Does Not Accommodate Variation Among Alternative Fuels

Gallons of Fuel Needed to Produce the Energy Equivalent of a Gallon of Gasoline



Gallons of Fuel Needed to Produce the Energy Equivalent of a Gallon of Diesel



Please note that these values are averages and are subject to regional and seasonal variation.

Source: U.S. Department of Energy Alternative Fuels Data Center

Energy Content-Based Taxation

State and Federal Legislation Seeks to Tax Alternative Fuels Based on Energy Content



Consideration of for Energy Content Based Fuel Taxes

- Establishing a baseline
- Fuel blending and vehicle conversion
- Introduction of non-traditional “fuels” such as electricity
- Funding impacts

Utilizing Decals for Alternative Fuels

Decals being used in 17 states as a mechanism for compliance, convenience, and incentive

- Recover revenues from non-traditional fueling options (home fueling, behind the fence, etc.)
- Facilitate private fleet use of alternative fuels
- Incentivize the use of alternative fuels, especially for vehicles/fleets with relatively high fuel consumption

Considerations for Implementation/Administration

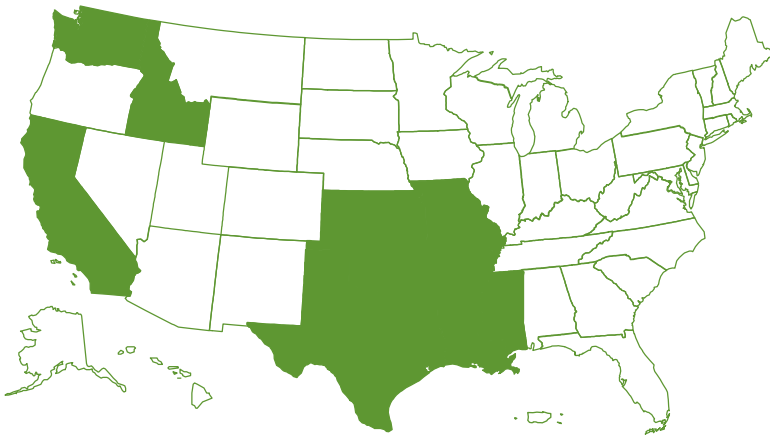
- Fair and efficient taxation
- Taxation in commercial transactions
- Parity with electric and bi-fuel vehicles
- Enforcement



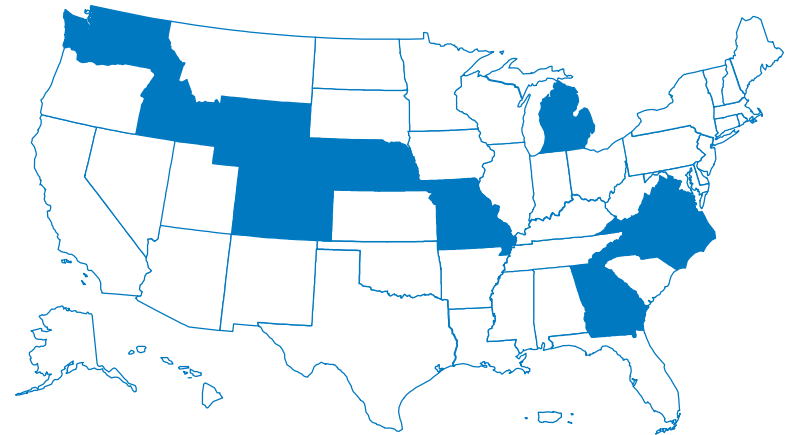
Photo by Pat Corkery, NREL 18175

States with Annual AFV Fees

Nationally, annual fees are being phased out for CNG/LNG/LPG and established for EVs



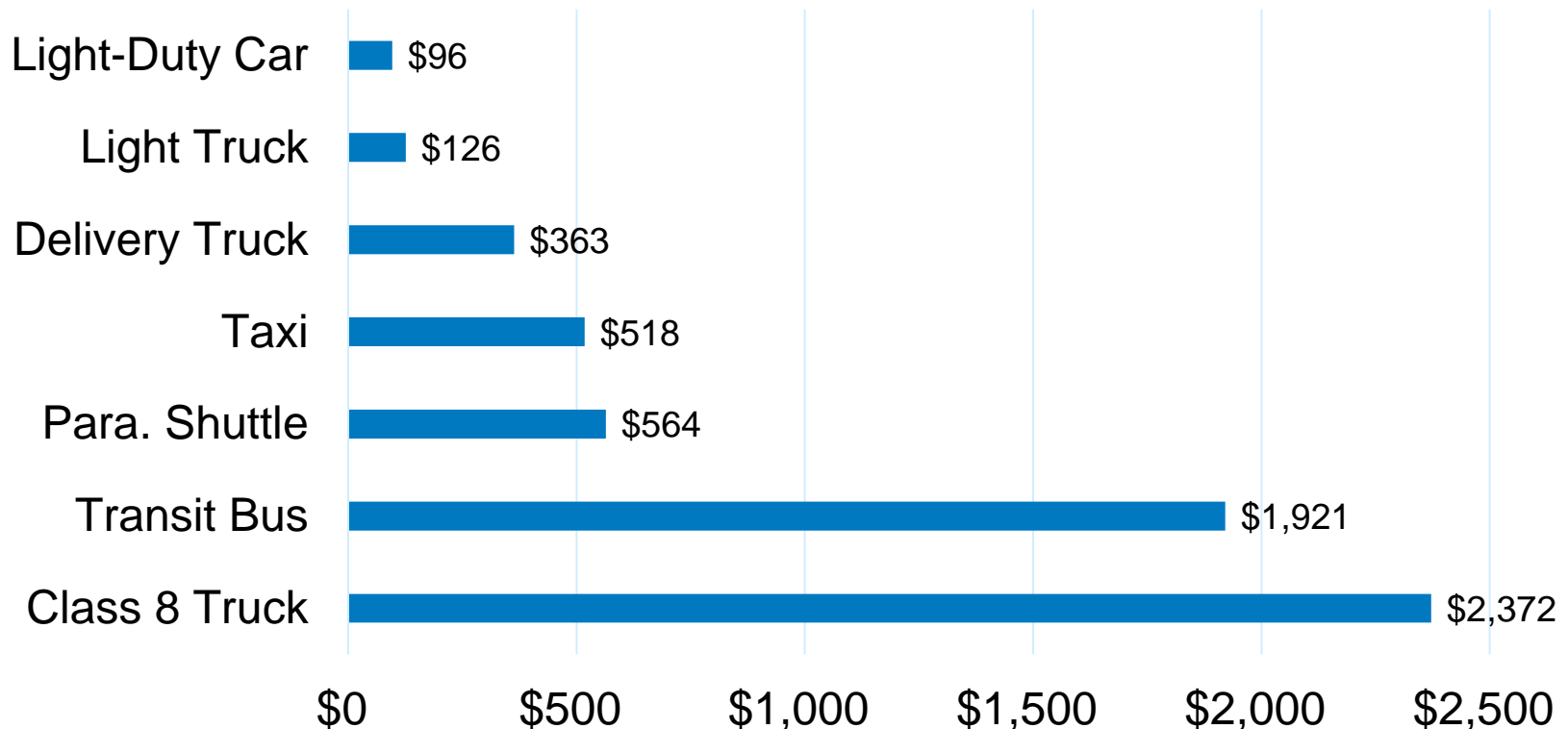
States with an annual fee of decal for CNG, LNG, and/or LPG



States with an annual fee on an electric vehicle

Vehicle Fees Across Vehicles Types

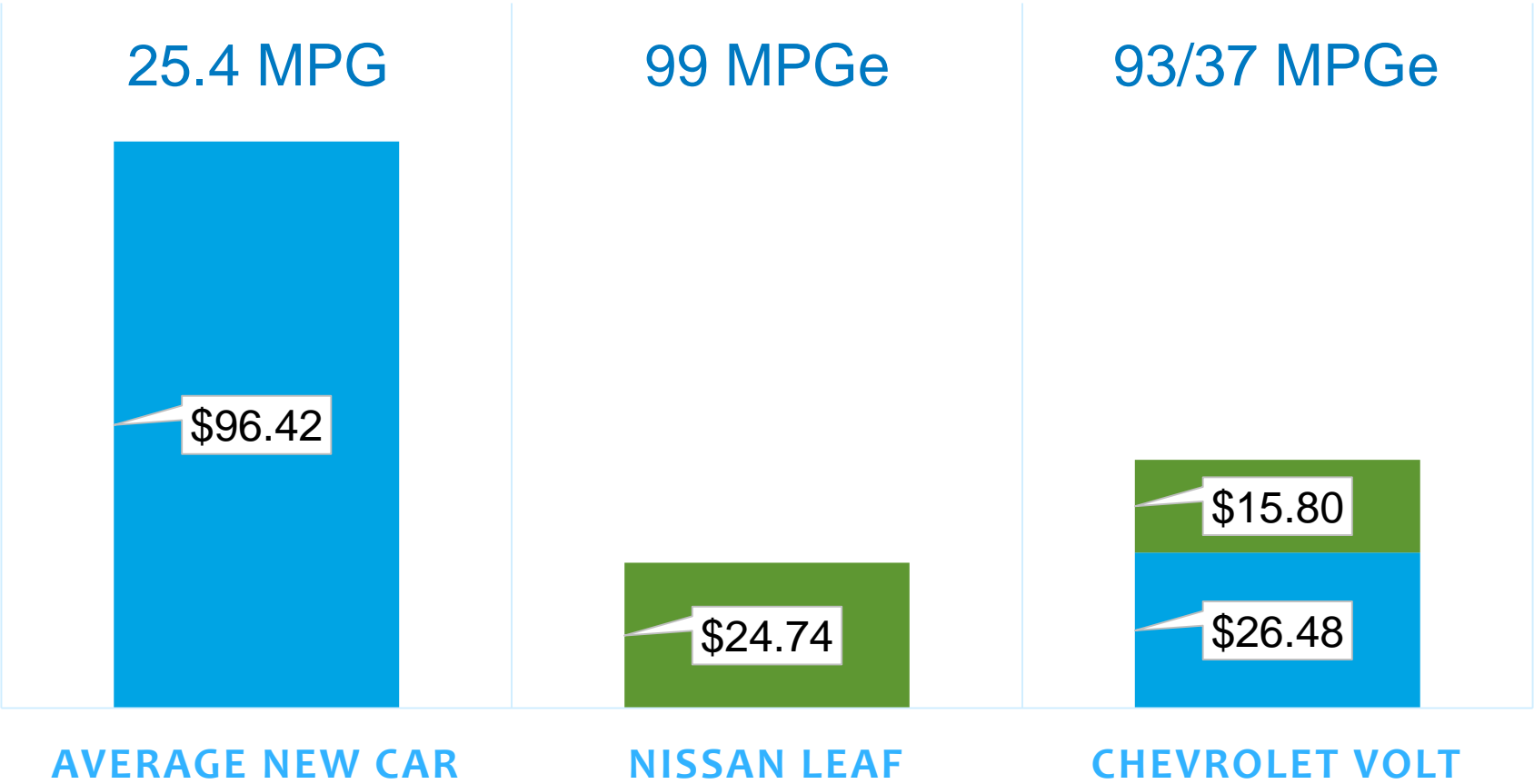
- Flat-fee decals effectively provide a subsidy to heavy fuel users and a penalty on light-duty vehicle drivers
- Burden of compliance is often not clear resulting in possible situations of double taxation or no taxation



Average Federal Fuel Tax Revenue for Various Vehicle Classes

^[1] Average mileage values are derived from **Federal Highway Administration Table VM-1 American Public Transit Association's Public Transportation Fact Book** Tables 8, 16, and 21

How Much Revenue Are EVs Displacing?



Estimate of Annual Federal Fuel Taxes Paid by an Average Conventional Vehicle, Nissan Leaf EV, and Chevrolet Volt PHEV if Electricity Were Taxed as a Motor Fuel

Tax assumed to be \$0.18 per gallon of gasoline
Average annual vehicle mileage assumed to be 13,310 miles based on average fuel consumption from FHWA
Average new car fuel economy from mpg for Nissan Leaf and Chevrolet Volt from U.S. Environmental protection agency fuel economy guide

Recent Legislation

U.S. Congress

Legislation was passed to equalize the federal excise tax on LNG with that of diesel (H.R. 3236)

Colorado

HB1110 phased out decal for CNG/LNG/LPG and phased in energy-content based fuel taxation. Assessed \$50 annual fee on EVs - \$25 of which goes to transportation infrastructure, \$25 of which goes to EV charging infrastructure

Mississippi

HB1590 defined a diesel gallon equivalent for the purpose of taxation of LNG

New Mexico

HB30 removed the decal as established an energy equivalent tax for CNG, LNG, and LPG



Photo by National Park Service, NREL 5690



Thank You

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Learn more at
www.nrel.gov/transportation