Alternative Fuel Taxes, Decals, and Compliance

National Conference of State Legislatures
Energy Supply Task Force

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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

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

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

Miles Per Gallon


Passenger Cars
Light-Duty Trucks

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

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

- Yes: 46% (2013), 33% (2012)
- No: 63% (2013), 28% (2012)
- Don't know: 26% (2013), 4% (2012)

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

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

Photo by Pearson Fuels
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

- Biodiesel (B20), 0.90
- Biodiesel (B100), 0.97
- Diesel #2, 0.88
- 1.36, Ethanol (E85)
- 1.34, Propane (LPG)
- 1.53, Liquid Natural Gas (LNG)

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

- 1.54, Ethanol (E85)
- 1.52, Propane (LPG)
- 1.73, Liquid Natural Gas (LNG)
- 1.02, Biodiesel (B20)
- 1.11, Biodiesel (B100)
- 1.14, Gasoline (regular)

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

<table>
<thead>
<tr>
<th>Vehicle Class</th>
<th>Average Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light-Duty Car</td>
<td>$96</td>
</tr>
<tr>
<td>Light Truck</td>
<td>$126</td>
</tr>
<tr>
<td>Delivery Truck</td>
<td>$363</td>
</tr>
<tr>
<td>Taxi</td>
<td>$518</td>
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<tr>
<td>Para. Shuttle</td>
<td>$564</td>
</tr>
<tr>
<td>Transit Bus</td>
<td>$1,921</td>
</tr>
<tr>
<td>Class 8 Truck</td>
<td>$2,372</td>
</tr>
</tbody>
</table>

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

- AVERAGE NEW CAR: 25.4 MPG, $96.42
- NISSAN LEAF: 99 MPGe, $24.74
- CHEVROLET VOLT: 93/37 MPGe, $15.80

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