

Motor Fuel Excise Taxes

A new report from the National Renewable Energy Laboratory (NREL) explores the role of alternative fuels and energy efficient vehicles in motor fuel taxes.

Throughout the United States, it is common practice for federal, state, and local governments to tax motor fuels on a per gallon basis to fund construction and maintenance of our transportation infrastructure. In recent years, however, expenses have outpaced revenues—creating substantial funding shortfalls that have required supplemental funding sources. While rising infrastructure costs and the decreasing purchasing power of the gas tax are significant factors contributing to the shortfall, the increased use of alternative fuels and more stringent fuel economy standards are also exacerbating revenue shortfalls.

The current dynamic places vehicle efficiency and petroleum use reduction policies at direct odds with policies promoting robust transportation infrastructure. Understanding the energy, transportation, and environmental tradeoffs of motor fuel tax policies can be complicated, but recent experiences at the state level are helping policymakers align their energy and environmental priorities with highway funding requirements.

Status of Motor Fuel Tax Revenues

Policymakers first established motor fuel taxes as a way to finance our nation’s transportation infrastructure, yet evolving economic, political, and technological influences have constrained this ability. Specifically, while the increase in federal fuel efficiency standards for vehicle model years 2017 through 2025 is projected to benefit the U.S. economy by \$372 to \$507 billion by 2025¹, fuel tax revenues are projected to decrease by \$57 billion by 2022². Furthermore, the introduction of alternative fuels with varying energy contents, delivery methods, and taxation schemes presents challenges to balancing parity and promotion of alternative and traditional motor fuels.

NREL’s report, *A Primer on Motor Fuel Excise Taxes and the Role of Alternative Fuels and Energy Efficient Vehicles* (available at afdc.energy.gov/publications), examines how federal and state governments are addressing the future of traditional motor fuel excise taxes by evaluating and implementing alternative mechanisms for electric and alternative fuel vehicles.



The introduction of alternative fuels with varying energy contents, delivery methods, and taxation schemes presents challenges to balancing parity and promotion of motor fuels. *Photo from Pearson Fuels, NREL 16745*

Infrastructure and Funding Challenges

At the federal level, motor fuel taxes are responsible for generating about 85% of the funds used for managing our transportation infrastructure. Yet figures from the U.S. Congressional Budget Office (CBO) showed a shortfall of \$5 billion between revenues and expenses for 2012, which has generated a need for revenue from other sources. The CBO projected that by 2015 the Highway Trust Fund (HTF) will be insolvent³; the prediction was recently confirmed by the U.S. Department of Transportation. This comes at a time when U.S. infrastructure is deteriorating at a rate that outpaces improvements. In 2013, the American Society of Civil Engineers graded U.S. transportation infrastructure with a D+ and estimated that an additional \$178 billion in annual funding would be required to “significantly improve conditions and performance”⁴. These statistics, among others, have prompted a number of decision makers to initiate discussions and take action to address shortfalls in funding transportation infrastructure.

Keeping Pace with New Technologies

As vehicle technologies and fuels have evolved, general inconsistencies in motor fuel tax policies among federal and state governments have created market barriers for the increased adoption of alternative fuels. The most common method of calculating fuel taxes based on volumetric measures also penalizes

a number of alternative, non-petroleum fuels. Additionally, the ability to charge a vehicle at home has caused the loss of traditional motor fuel taxes from a growing subset of transportation system users.

State-Level Actions

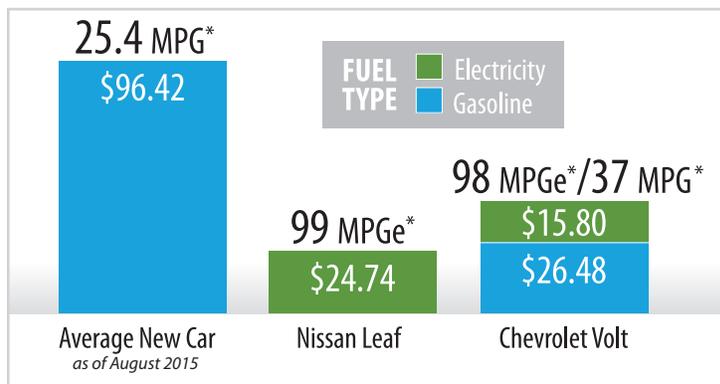
To make up for the deficit in fuel revenues, many states are considering or employing alternatives to traditional motor fuel tax models aimed at being more effective in achieving fair and equal taxation. Some of this legislation bases fuel taxation on the energy content of a fuel, while other states have chosen to establish new fees for alternative fuel and electric vehicles (EVs). These mechanisms, while limited in their ability to solve broader funding questions, can help to contribute to greater tax parity among motor fuels and vehicle technologies. Beyond traditional motor fuel taxes, states and provinces are implementing or piloting other innovative funding mechanisms. Some actions have included:

- Virginia replacing their fuel excise tax with an indexed sales tax, allowing for adjustments to account for inflation.
- Oregon piloting a tax on vehicle miles traveled as an alternative metric for taxing infrastructure use.
- British Columbia implementing a carbon tax on motor fuels under its greenhouse gas reduction target.

The experiences of these states and provinces, among others, are increasing the number of tools and collective knowledge available to policymakers who hope to align their energy and environmental priorities with adequate highway funding.

Energy Content-based Taxation

Energy content-based taxation can help level the playing field across fuels, and is a step toward removing the financial penalty on less energy-dense fuels. Implementation of this policy at the federal level could help to align practices across states by providing a set of standards to work from. Organizations such as the International Fuel Tax Association can greatly enhance the effectiveness and coordination of such an effort. Establishing baseline standards will be key to the implementation of such a policy.



How Much Revenue are EVs Displacing?

Estimate of annual federal fuel taxes paid by an average conventional vehicle, Nissan Leaf EV, and Chevrolet Volt plug-in hybrid electric vehicle if electricity were taxed as a motor fuel (tax assumed to be \$0.18 per gallon of gasoline and average annual vehicle mileage assumed to be 13,310 miles based on average fuel consumption).
*Average new car miles per gallon (MPG) from University of Michigan Transportation Research Institute⁵. Nissan Leaf and Chevrolet Volt MPG and miles per gallon equivalent (MPGe) according to 2015 FuelEconomy.gov data.

Flat Fees

Levying flat fees either at the time of registration or in the form of annual decals can help recover uncollected revenues and/or provide incentives. However, flat fees can impose a higher effective tax on some users depending on annual fuel consumption. For traditional and alternative motor fuels, a fee or decal is only needed if the intention is to incentivize certain fuels or to generate additional revenues for infrastructure. If that is not the case, an energy content-based tax would be a more fair and efficient way to collect revenue. The exception to this would be with EVs, which are not currently subject to motor fuel taxes, as well as other vehicles that can fuel at home. In both situations, a fee or decal can recover lost revenue, but may do so in a way that penalizes certain users.

Learn More

Find *A Primer on Motor Fuel Excise Taxes and the Role of Alternative Fuels and Energy Efficient Vehicles* and other resources on afdc.energy.gov.

¹National Highway and Transportation Safety Administration (NHTSA). 2012. "NHTSA and EPA Set Standards to Improve Fuel Economy and Reduce Greenhouse Gases for Passenger Cars and Light Trucks for Model Years 2017 and Beyond." Accessed: July 22, 2015. http://www.nhtsa.gov/staticfiles/rulemaking/pdf/cafe/CAFE_2017-25_Fact_Sheet.pdf.

²Dinan, Terry, and David Austin. "How Would Proposed Fuel Economy Standards Affect the Highway Trust Fund?" Washington, DC: U.S. Congressional Budget Office, 2012.

³Cawley, Kim P. "Status of the Highway Trust Fund." CBO Subcommittee on Highways and Transit, Committee on Transportation and Infrastructure, U.S. House of Representatives, 2013.

⁴American Society of Civil Engineers (ASCE). 2013. "Report Card for America's Infrastructure." Accessed July 14, 2015. <http://www.infrastructurereportcard.org>.

⁵University of Michigan (UMTRI). "Monthly monitoring of vehicle fuel economy and emissions". August 2015. Accessed August 12, 2015. http://www.umich.edu/~umtriswt/EDI_sales-weighted-mpg.html.