Motor Fuel Tax Issues with Natural Gas and Other Alternative Fuels (2009)

Background

Due to various market forces including the spikes in prices (most evident in 2008), and increasingly restrictive laws and standards the use of alternative fueled vehicles has been expanding. Historical impediments to the expansion of the use of alternative fuels included issues with manufacture and distribution of the fuels; availability of refueling locations; and price of the fuel compared with the traditional fuels, gasoline and diesel. However, combinations of forces such as the increases in prices of the traditional fuels and the financial incentives offered by federal and state governments, has made the use of the alternative fuels more affordable. Finally, environmental issues, especially smog and pollution abatement require the use of lower-polluting and toxic fuels and in many cases the alternative fuels help meet the standards.

While not exhaustive, the following list identifies the most used alternative fuels in highway vehicles:

- Biodiesel
- Ethanol
- Compressed Natural Gas
- Propane
- Hydrogen
- Electricity

In addition, in recent years there has been an expansion of the sales of hybrid vehicles which combine gasoline engines with battery power to make the vehicles more efficient. While these would not present potential issues for fuel tax collections, their use would decrease the taxes paid vs. a vehicle that travels the same distance using just gasoline. This discussion of reduction in receipts to federal and state transportation trust fund revenues is a discussion for another day.

The following descriptions of the uses and benefits of the different fuels are taken from the US Environmental Protection Agency (EPA) website, Alternative Fuel Vehicles and Alternative Fuels, http://www.fueleconomy.gov/Feg/current.shtml, May 2, 2009

BIODIESEL - Biodiesel is a form of diesel fuel manufactured from vegetable oils, animal fats, or recycled restaurant greases. It is safe, biodegradable, and produces less air pollutants than petroleum-based diesel.

Biodiesel can be used in its pure form (B100) or blended with petroleum diesel. Common blends include B2 (2% biodiesel), B5, and B20. B2 and B5 can be used safely in most diesel engines. However, most vehicle manufacturers do not recommend using blends greater than B5, and engine damage caused by higher blends is not covered by some manufacturer warranties. Check with your owner's manual or vehicle manufacturer to determine the right blend for your vehicle.

ETHANOL - Ethanol is an alcohol-based fuel made by fermenting and distilling starch crops, such as corn. It can also be made from "cellulosic biomass" such as trees and grasses. The use of ethanol can reduce our dependence upon foreign oil and reduce greenhouse gas emissions.

E10 (also called "gasohol") is a blend of 10% ethanol, and 90% gasoline sold in many parts of the country. All auto manufacturers approve the use of blends of 10% ethanol or less in their gasoline vehicles.

E85, a blend of 85% ethanol and 15% gasoline, can be used in flexible fuel vehicles (FFVs), which are specially designed to run on gasoline, E85, or any mixture of the two. FFVs are offered by several vehicle manufacturers. To determine if your vehicle can use E85, consult your owner's manual or check the inside of your car's fuel filler door for an identification sticker.

http://www.e85fuel.com/e85101/flexfuelvehicles.php.

NATURAL GAS - a fossil fuel comprised mostly of methane, is one of the cleanest burning alternative fuels. It can be used in the form of compressed natural gas (CNG) or liquefied natural gas (LNG) to fuel cars and trucks.

Dedicated natural gas vehicles are designed to run on natural gas only, while *dual-fuel* or *bi-fuel* vehicles can also run on gasoline or diesel. Dual-fuel vehicles allow users to take advantage of the wide-spread availability of gasoline or diesel but use a cleaner, more economical alternative when natural gas is available. Since natural gas is stored in high-pressure fuel tanks, dual-fuel vehicles require two separate fueling systems, which take up passenger/cargo space.

Natural gas vehicles are not produced commercially in large numbers—the Honda GX CNG is the only new vehicle available in the U.S. However, conventional gasoline and diesel vehicles can be retrofitted for CNG.

Advantages & Disadvantages of Natural Gas

Advantages	Disadvantages
• Nearly 87% of U.S. natural gas used is domestically produced • 60-90% less smog-producing pollutants • 30-40% less greenhouse gas emissions • Less expensive than gasoline	• Limited vehicle availability • Less readily available than gasoline & diesel • Fewer miles on a tank of fuel

PROPANE OR LIQUEFIED PETROLEUM GAS (LPG) - a clean-burning fossil fuel that can be used to power internal combustion engines. LPG-fueled vehicles produce fewer toxic and smog-forming air pollutants. LPG is usually less expensive than gasoline, and most LPG used in U.S. comes from domestic sources.

No LPG-fueled light-duty passenger cars or trucks have been produced commercially in the U.S. since the 2004 model year, but gasoline and diesel vehicles can be retrofitted to run on LPG in addition to conventional fuel. The LPG is stored in high-pressure fuel tanks, so separate fuel systems are needed in vehicles powered by both LPG and a conventional fuel such as gasoline.

Advantages & Disadvantages of LPG

Advantages	Disadvantages
• Fewer toxic and smog-forming air pollutants • 85% of LPG used in U.S. comes from domestic sources • Less expensive than gasoline	• No new passenger cars or trucks commercially available (vehicles can be retrofitted for LPG) • Less readily available than gasoline & diesel • Fewer miles on a tank of fuel

HYDROGEN (H2) - is being aggressively explored as a fuel for passenger vehicles. It can be used in fuel cells to power electric motors or burned in internal combustion engines (ICEs).

It is an environmentally friendly fuel that has the potential to dramatically reduce our dependence on foreign oil, but several significant challenges must be overcome before it can be widely used.

Benefits

Produced Domestically - Hydrogen can be produced domestically from several sources, reducing our dependence on petroleum imports.
Environmentally Friendly - Hydrogen produces no air pollutants or greenhouse gases when used in fuel cells; it produces only NOx when burned in ICEs.

In addition to the various cost, efficiency, and other benefits of these fuels, ethanol in particular has come into wide spread use not only due to its ability to be renewable, but it is in widespread use as an additive to gasoline known as an oxygenate. This is done primarily to reduce the production of carbon monoxide in the burning of the fuel. While the ester compound MTBE was in widespread use as an oxygenate, it has been found that that substance can contaminate groundwater, especially during leaks of underground storage tanks, and states have moved to ban its use. In its place, a blend of gasoline and ethanol, usually E10, is used.

ELECTRICITY – While the EPA site does not list electricity as a fuel type, for purposes of this discussion it being covered. While some people think of the batteries in hybrid vehicles to be an example of electric vehicles, there are also vehicles which have on-board batteries and can be charged at an electricity source.

Advantages & Disadvantages of Electricity (Plug-Ins)

Advantages	Disadvantages
• Energy resilience and petroleum replacement • Greater fuel efficiency • Lower greenhouse gas emissions • Lower operating costs	• Cost, size, weight and disposal of batteries • Access to electrical outlets (apartment dwellers) • Emissions shifted to electric plants • Electricity billing issues

FUEL TAX COMPLIANCE ISSUES

Given the various benefits of alternative fuels and their increasing development, the production, distribution, and sales of the fuel are of interest to those who collect taxes on the fuels and track their movements. With gasoline and diesel, the production process is relatively complex and costly when compared with alternative fuels. It would be difficult to refine gasoline in your back yard, but you could manufacture biofuels (including biodiesel) and ethanol in very small quantities for personal use. As we will also see it becomes more difficult to track electricity in plug-in vehicles, CNG in certain applications, and if hydrogen (fuel cell vehicles are developed) becomes widespread, gas that may be delivered in different methods.

Ethanol – the challenges with Ethanol stem in part from the inability to make bulk distribution through traditional liquid fuel pipelines. Thus, ethanol moves more on dedicated pipelines, rail cars, and by truck load. While these methods are certainly not difficult to track, most revenue and transportation agencies have not dedicated a lot of resources into tracking product moved that way, and as a result they may not know how much ethanol is moving into their state on rail cars, or even where the product might be loaded or unloaded. Another issue, that while

somewhat difficult to quantify, but nonetheless can be a problem, is the fact that a number of ethanol manufacturers have not operated as fuel distributors and do not know the requirements for registering and reporting to the federal and state agencies. Since in some cases the production numbers are lower than gasoline or motor fuel distributors, the administrative agencies may not even be aware of their operations for some time. Attachment A shows a commercial business advertising equipment to make your own ethanol at home. Nowhere on the website is there a mention of motor fuel taxes.

Biodiesel – this is a term that can cover a wide range of liquids from vegetable oils and animal fats. Sources of the feed stocks can be soybeans and rapeseed (canola oil) but also include waste vegetable ("used french fry oil") oils from restaurants, and in theory algae from water sources. It is evident that the sources of these fuels would make it very difficult in many cases, for the tracking of production and distribution of fuel. People not only make small batches of the fuel in for personal use and limited distribution, but restaurants who used to have to pay to have waste oil removed, are glad to have it taken away at no cost or charging a small fee.

Compressed Natural Gas – While the market for CNG vehicles in the United States is primarily transit vehicles, Honda does market a vehicle, the GX. While the sales are limited to California and soon-to-be New York, there is a lack of refueling sites across the US which would limit interstate travel and potential sales markets. However, a company is now marketing a home-based solution. Attachment B shows a device that can be connected to a home natural gas line to be used to fuel the CNG vehicles. Once again, there is no mention of how one is to pay taxes on the fuel being used. While this is a limited application, it should challenge fuel tax administrators to think about what their answer will be when they get the phone call asking about how someone is going to pay fuel taxes. Will this be considered a retail location, and be subject to other state laws and regulations? Can similar issues crop up with other alternative fuels?

Propane – This also is a limited market and to this point it seems like propane is generally tracked and taxed by the proper agencies.

Hydrogen – Manufacture and widespread use of the vehicles are still in the future but depending on the delivery method of the fuel there will likely be many of the same issues that affect CNG and Propane.

Electricity – The obvious issue is that this fuel is not delivered as a liquid fuel and thus would have to be measured some other way if an effective method of taxation is used which will assess a tax based on the amount of product used. While the amount of energy in a gallon of gasoline (or other liquid fuel) can be computed for comparison to electricity and make for an assignment of an equal tax rate, the question becomes 'What is the source of the electricity'? If the vehicle can draw from the same source as regular household current, it would be impossible to compute the vehicle usage without some additional metering. Even with that there would be the question of who tracks that portion of the electricity and how is the tax computed and paid. Some states have addressed this issue by having a registration fee in lieu of fuel taxes.

WHAT SHOULD TAX ADMINISTRATORS BE DOING NOW?

The following issues are areas that should be considered in the area of accounting for alternative fuels:

Are they in my state? – While Ethanol and Biodiesel are fairly universal at this point, determine how much product is in your state, and how it gets there.

- Do you have a relationship with the railroads that may travel through your state?
- Is there a state or federal agency that may be able to give you that information?
- Are there fueling locations that may not otherwise be registered with your agency?
- A suggestion would be to look at several websites, including trade groups who are always proud of their market penetration. Their list of retail locations that sell E85 probably will but may not match the information you already have.

- Did a farmer's co-op work to build an ethanol plant in your state and somehow no one every registered it as a fuel manufacturing plant?
- Is there an agency in your state that oversees chemical plants (state EPA)? You may check with them to make sure you know where they all are.

Are people using the fuel in my state?

- Check with the Department of Motor Vehicles in your state to see if they can provide you with summary or detail information on the number of vehicles by fuel type. You may find out that there may be 2 CNG vehicles registered to individuals but there may also be a large bus company with 150 CNG buses domiciled in your state.
- Are you providing information about the registration and reporting requirements through your normal news outlets or through your agency website?
- Anticipate the need for types of registrations and information about how people will have to track their usage and pay any taxes due. If someone walked into your office and said they had an electric vehicle, would you know what you would say to them?

Education

The federal government is mandating that by 2017 there is to be 21 billion gallons of cellulosic biomass fuel produced. Do you even know what that is? How is it produced? How is it distributed? Do you know what fuel cells are and how they are used in a vehicle? Short of a change in the method of taxation for motor fuels, it is important to maintain an equitable method for collecting the proper taxes from every user. It doesn't make a lot of sense that the person driving a vehicle using regular diesel fuel should be paying fuel taxes while his next door neighbor is driving the same vehicle and using French fry oil from the fast food restaurant and not paying any taxes. What information do you have to track these fuels?

It is important to know not only what is out there, but what is on the horizon. You may wish to look on the internet for sites such as the EPA and various Department of Energy pages, including information on their Energy Information Administration portal. Talk to your neighboring states to see if they have information that you may wish to use or to see how they track the fuels.