



ELECTRIC VEHICLE TAXATION POSSIBILITIES Points to Consider Relative to Fuel Tax Administration (2023)

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Chapter 1

Purpose

The current Federal Administration announced intentions to increase the use of alternative fuel vehicles to help lower greenhouse gas emissions and be more environmentally conscious. One of these environmentally friendly options is electric vehicles. Electric vehicles have also been in the news as many major vehicle manufacturers are promising ramped up production and have announced plans to end fossil fuel vehicle production.

Traditionally, fuel taxes have been the source of funding for highways in various states and the Federal Government. With an increase in the fuel efficiency of vehicles along with unregulated and untaxed alternative fuels, the highway fund may be slowly diminishing. Many states are looking at various methods of taxation of these alternative fuel vehicles.

During the Motor Fuel Uniformity Meeting in Orlando, Florida on January 28, 2022, a subgroup was formed to provide a white paper on electric vehicles and possible taxation methods for the energy used to propel those vehicles to help with uniformity among the states.

This subcommittee used Federal Regulations to define various types of electric vehicles that are known today. We also looked at various possible schemes that states may use for the taxation of electric vehicles.

This white paper intends to give a source of information on Electric Vehicles, charging stations and possible taxation options. This white paper is as inclusive of information we could gather from various sources. We also discussed proposed legislation taxation statutes and other thoughts from various state agencies.



Chapter 2

What is an Electric Vehicle?

In 2010, the first commercially available plug-in hybrid was ready for sale, the Chevy Volt. Since then, models have increased to over 70 different options in 2019. Because the automotive industry is currently developing many types of new electric vehicles, current definitions and regulations must evolve to meet these new technologies. The information to follow is current definitions as of the date of this paper.

From information found on several websites, the average daily distance North Americans drive is 26-31 miles. The average Electric Vehicle gets between 3 and 4 miles per Kilowatt Hour (kWh). This means the average electric vehicle will use about 10 kWh of electricity per day.

Federal Definitions

Code of Federal Regulations Title 16, Chapter 1, Subchapter C Part 309 Subpart A defines an **Electric vehicle** (“EV”) as a vehicle designed to operate exclusively on electricity stored in a rechargeable battery, multiple batteries, or battery pack.

Code of Federal Regulations Title 49, Subtitle B, Chapter V, Part 523.2 Definitions, defines an electric vehicle as a vehicle that does not include an engine, and is powered solely by an external source of electricity and/or solar power. Note that this does not include electric hybrid or fuel-cell vehicles that use a chemical fuel such as gasoline, diesel fuel, or hydrogen. Electric vehicles may also be referred to as all-electric vehicles to distinguish them from hybrid vehicles.

Code of Federal Regulations Title 40, Chapter 1, Subchapter C, part 86.1803 01 defines “Hybrid electric vehicle (HEV)” as a motor vehicle which draws propulsion energy from onboard sources of stored energy that are both an internal combustion engine or heat engine using consumable fuel, and a rechargeable energy storage system such as a battery, capacitor, hydraulic accumulator, or flywheel. This includes plug-in hybrid electric vehicles.

Alternative Definitions

The committee discussed the Federal Regulations and decided these would be alternative definitions that are less formal. We would not necessarily suggest that you use these in legislation, but to help staff and the public understand the different types of vehicles.

Hybrid vehicle

A hybrid vehicle is a vehicle that uses two or more distinct types of power.

Hybrid electric vehicle

Hybrid electric vehicles are powered by an internal combustion engine and an electric motor, which uses energy stored in batteries. A hybrid electric vehicle cannot be plugged in to charge the battery. Instead, the battery is charged through regenerative braking and by the internal combustion engine. These run mainly on fuel and let you switch between using your fuel engine and using 'EV' mode at the touch of a button.

Plug-in hybrid vehicle

Plug-in-hybrid vehicles are the bridge between gas only and fully electric. These vehicles are mainly run by electricity but also have a traditional fuel engine, so you can use fuel as a backup as necessary.

Electric vehicle

Electric vehicles function by plugging into a charge point and taking electricity from the grid. They store the electricity in rechargeable batteries that power an electric motor, which turns the wheels.



Chapter 3
Charging Stations

Electric vehicles have several different ways they could possibly charge the battery storage fuel cell in their vehicle. Many models allow you to charge at home and there are many commercially available options that are continuing to grow. Electric vehicles are equipped with a way to plug them in much like all other electronic devices and charge with an electrical outlet.

Charging Station Speed

Charging stations have different speeds and power. The length of time it takes to charge depends on the level of station used (information found from Minos, link provided below).

Level 1

A level 1 charging station is the slowest charging station, but possibly the most convenient. The level 1 can be used in a standard 110-volt electrical outlet in a home. This level of charging takes the longest, approximately 4-5 miles range per hour charged.

Level 2

The level 2 charging station is a 240-volt outlet, like an electric clothes dryer outlet. All known public charging stations in the United States are a level 2. If you want one in your home, it must be professionally wired and installed. A level 2 charger takes about half the time as a level 1.

Level 3 / Direct Charge (DC) Charging Station

A DC charging station is considered a level 3 charge, which is the fastest speed of charging, and the power is higher (Gearhungry, 2022).

Home Charging

Electric vehicle charging can occur at home at level 1 and level 2. Level 2 charging will require some additional equipment installation and wiring due to the higher power that comes with the faster charge.

Possible Challenges

- Charging at home will pose many challenges in applying motor fuel tax based on electricity used.
- Local building codes and other regulations may cause home charging stations to be unavailable or have other regulations. A possible solution would be to work with the areas in your state to monitor this if you choose to tax home charging of electric vehicles. This would allow a taxing agency to collect information of locations of home charging stations to determine the correct tax is being applied.

Commercial Charging

There are several options for commercial charging stations. As this new technology advances charging stations may not be found only at the traditional fuel stations. They may be located at places of employment, hotels, and places where customers go for entertainment, for example, a movie theater or grocery stores.

A typical commercial charging station may or may not be separately wired to the electrical grid. This is usually a result of the economic costs associated with operating a charging station. For example, many times electricity rates are determined by the amount of usage that a location would use. Electric Vehicle charging stations may pull more power and could cause the location to pay a higher rate for all the electricity. The owner may decide to put a separate meter on the charging station, so they do not have to pay higher rates on the electricity used in other areas of the location. Local regulations may also require a charging station to be on a separate meter.



Charging stations may or may not be owned by the location owner. Currently, there are several options for the charging stations ownership.

- The property owner owns the charging station. They will own the equipment, pay for the installation, supply the electric power and determine any charge for use of the charger.
- The property owner may lease area to the owner of the charging station. The owner of the charging station would make lease payments to the property owner. The charging station owner would then install the equipment, infrastructure, and charge for usage of the charging station.
- The property owner and the charging station owner could split the income. This could be done in an infinite number of possible scenarios. In this scenario both the charging station owner and the property owner would be receiving income from the charging station.

Possible Challenges

- The various ways that commercial charging stations can be owned and operated will be a challenge to taxing authorities to administer taxes in a fair and equitable tax structure.

Chapter 4 Possible Taxation Solutions

As the miles per gallon of vehicles increase, there is no doubt that states must find ways to raise more revenue to fund transportation implementation and maintenance. As electric vehicles and hybrids gain in popularity, it makes sense to consider them as part of plans for replacing the revenue. Electric vehicles and hybrid vehicles utilize the roads like gasoline and diesel fueled vehicles. With the increase of electric vehicles and hybrid vehicles, more infrastructure in the form of electrical service will be needed. States have an inherent interest in providing infrastructure to help their citizens utilize this new form of transportation. States also will have a cost associated with providing this infrastructure and may need to find ways to fund the placement and upkeep of this infrastructure.

Any taxation solutions to provide additional funding for roadways and/or possible infrastructure should be constructed to be fairly implemented. No one class of vehicles should have to shoulder a larger share of the tax formula than other similar vehicles.

Section 1 Registration Fee Options

Because of declining fuel tax revenue, additional registration fees for electric vehicles (EV) and hybrid vehicles are added by multiple states to assist in replacing that revenue. Many states' motor fuel tax revenue is mainly used to repair and maintain roads and bridges in their states. As stated previously, many states do not have laws to replace the fuel taxes for alternative fuels. Alternative fuel vehicles may not be adding to the fuel tax revenue but are utilizing the roads and bridges; the fee is used to continue with equity among drivers. As the sales are increasing of these vehicles, some states have decided rather than tax the electricity as a fuel, an additional fee is added to the yearly registration of the EVs and hybrid vehicles. These fees currently range from \$50 to \$200 a year in addition to the other set fees.

Some states have dedicated the additional registration fees for the implementation of an electric vehicle infrastructure fund. This fund will provide more charging stations and upkeep for current stations throughout the states.

Some states may look at registration fees for defined electric vehicles. Many states will use this fee for additional road repairs. States have attempted to equate the additional fee to the estimated amount of fuel taxes that have not been paid by electric vehicles. This is difficult as many electric vehicles are heavier than traditional passenger vehicles. The EVs are heavier because of the additional weight of the batteries, reinforced framework and suspension, and the metal armor around the battery to protect it. This extra weight wears on the asphalt surface more than a traditional internal combustion engine. Wearing of the asphalt causes road



deterioration and the need for additional maintenance when likened to the upkeep of asphalt roads used by comparable internal combustion vehicles.

Advantages & Disadvantages of Electric and Hybrid Vehicle Registration Fees

Advantages	Disadvantages
<ul style="list-style-type: none"> Increase in fuel tax revenue 	<ul style="list-style-type: none"> Can deter people from purchasing the vehicles
<ul style="list-style-type: none"> Additional fees can be added to an electric infrastructure fund to update the existing structures as well as build new structures 	<ul style="list-style-type: none"> For states in which the fuel tax does not support the primary source of funding of roads, this fee can be perceived as a political attempt to not raise taxes on fuel to offset that revenue.
<ul style="list-style-type: none"> This may be an easy tax to administer as most states require annual registration of vehicles. 	<ul style="list-style-type: none"> If electricity is taxed at home, is the EV owner already paying tax for their fuel?

Some states have used this information to determine amount of additional registration fees for electric vehicles.

For a state that is interested in adopting the use of EVs or hybrids to meet emission reduction goals and continue to spur innovation can consider an alternative to the additional set registration fee for these vehicles. As many EV and hybrid drivers are opposed to the additional registration fee, which is claimed to be unfair, other options have been suggested.

1. Slowly phase in the fee. Do not implement the fee at one time. Allow the taxpayer to graduate to pay the final price of the fee.
2. Implement a mileage use tax that requires the EV owner to pay for the actual miles driven. User fees are currently considered in many states and pilot programs have been implemented in others. These programs can be used as a basis for the EV and/or hybrid vehicle miles traveled.
3. Another suggestion is to alter the fee to a formula of justification:

MJF= Maximum Justifiable Fee:

MJF = Average Vehicle Miles Traveled / Average Consumer Use x State Gas Tax and fees if applicable

$$MJF = \frac{\text{Average Vehicle Miles Traveled}}{\text{Average Consumer Use}} (\text{State Gas Taxes and Fees})$$

To arrive at a general rate for an annual registration fee, data was collected from the Average Annual Fuels Use by Vehicle Type report from the U.S. Department of Energy from 2016/2017 (pre-COVID and far less electric fuel vehicles during this time). The average fuel usage for Light Trucks/Vans was

660 gallons/year and Cars were 474 gallons/year. By using a simple average of the two (567 gallons/year) and multiplying that by the average motor fuel gasoline tax for all the states in January 2022 – 29.1 cents/gallon – we concluded that a fair electric vehicle registration price may be about \$165.00. Notably, motorcycles have a much lower average annual fuel usage rate (53 gallons/year), and it may be suggested that electric motorcycles



have a lower annual registration rate or consider a separate rate for all three (3) of these vehicle classes. States may easily tailor their registration fees to replace lost fuel tax revenue using similar data as it fits.

VEH. TYPE	AVG U.S. FUEL USAGE
Transit Bus	13329
Class 8 Truck	11818
Refuse Truck	10089
Para. Shuttle	4157
Delivery Truck	1899
School Bus	1937
Light Truck/Van	660
Car	474
Motorcycle	53

Average Consumer Use	567	(2016/2017 rates)
Average Total Tax/Gallon	<u>0.290849</u>	(2022 rates)
Average Fuel Tax		

revenue per consumer vehicle/year \$164.91

Section 2 Fuel Tax Options

Most states currently have fuel taxes collected somewhere in the normal fuel supply chain, pursuant to statute, the normal fuel supply chain is from a refinery/pipeline/barge to a terminal, then to suppliers/distributors/wholesalers to an end retail location and ultimately the end consumer.

A possible solution is to tax electricity used for electric vehicle operation in a similar manner, such as, a state may choose to charge a motor fuel tax on electricity put into the storage batteries of an electric vehicle. Electric vehicles use kilowatts as their fuel, combustion engines use fuel in their fuel tanks. This would require reporting the kilowatt hour from an electric grid that were transferred to the battery of an electric vehicle. The state would need to determine who must report those kilowatts.

A taxation point would be having the electric distributor or electric company report the kilowatts used to power electric vehicles. This can be done through the use of an average based on vehicle manufacturers information. Another possibility is to have the electric company or consumer install smart meters in the homes that are using electric vehicle charging stations to record exact kilowatt hour through the charging station. The advantages to this is it is very similar to the combustion vehicle in practice and depending on the taxation point, will lower the number of possible licenses needed to report the tax. A disadvantage could be the electric companies or distributors do not traditionally collect tax.

Section 3 Vehicle User Fee Options

A pilot study in the Eastern United States (was expanded to most states) studying mileage-based user fees. From the website for The Eastern Transportation Coalition's "Mileage Based User Fees" (MБУF) study: "Right now, most funding used to maintain our transportation system comes from a tax we pay on each gallon of fuel when we fill up at the pump. As fuel efficiency increases and more electric vehicles are on the road, the amount motorists pay to use our transportation system becomes more linked to the amount of fuel purchased versus the



number of miles they drive. The MBUF model provides a different approach: “pay for what you use.” The link to the coalition’s study can be found in the reference section.

The study is using commercial vehicles that travel interstate to track the miles they travel. The study then applies a per-mile tax rate based on the weight of the vehicle. Currently, there are no dollars being paid for this study. This study is trying to determine if this fee is equitable to the current tax structure.

The advantages of this study would be that each vehicle is going to pay based on the usage of the highways and roads within a state. Since it is based upon the weight of the vehicle, it should have a direct correlation to estimated wear and tear that vehicle could be causing.

Some disadvantages are the average consumer does not track mileage based on the state they drive. Also, there is currently no mechanism to gather this data on noncommercial motor carriers or citizens.

Section 4 Combination

A state could implement a combination of vehicle registration fees, fuel tax fees and vehicle user fees. Some of the first states to enact legislation on electric vehicles have done this. For example, Iowa is charging an additional registration fee on electric vehicles in combination with a fuel tax fee for publicly available charging locations.

An advantage of this is it is easier to administer and has many of the components needed already in statute. A disadvantage of this is that registration fees are higher for electric vehicles which could be challenged as unfair taxation practice. It also could be construed that home vehicle electric charging stations are not taxed as motor fuel when they are using the roadways.

See the Motor Fuel Information by State book for each states’ taxation information of electric vehicles. This is located on FTA’s website at: [Motor Fuel Uniformity Project \(taxadmin.org\)](http://taxadmin.org).

Chapter 5

Summary / Closing

As alternative fuel vehicles increase in production and become more common, the fossil fuel taxes being contributed to the highway funds are decreasing. We discussed in this white paper methods of possible taxation to replenish those taxes by the taxation of electric vehicles. When looking at each method, there are multiple factors to consider beginning with the type of electric vehicle, weight, and the administration of a fair taxation structure. There are several different kinds of electric vehicles that require different amounts of electric power so they may not fall under the exact same level of taxation. When considering these multiple factors, a state also needs to consider who are we making a taxpayer, how many taxpayers are we creating and how the state will create infrastructure to implement this new tax structure.



Tax Solution	Advantages	Disadvantages
Registration Fees	<ul style="list-style-type: none"> • Easy to implement as most states have a registration fee structure. • Doesn't create a new form of tax administration. 	<ul style="list-style-type: none"> • May deter people from purchasing EVs due to large up-front cost annually. • Does it affect current federal highway fund matching (is this a motor fuel tax)?
Fuel Tax	<ul style="list-style-type: none"> • Specific to the user of the electric fuel. • Many states have fuel tax administration in place already. 	<ul style="list-style-type: none"> • Depending on point of taxation, may create a large number of taxpayers. • May have new industries collecting and remitting fuel taxes that have not historically done so.
Vehicle User Tax Fees	<ul style="list-style-type: none"> • Federal/state studies are ongoing. • Tax is based on use of roadways. 	<ul style="list-style-type: none"> • No current tax administration structure to collect or remit these taxes. • Average vehicle users do not track mileage daily or in different states.
Combination	<ul style="list-style-type: none"> • Allows several different sources of taxation. • Will spread the taxation across many areas. 	<ul style="list-style-type: none"> • Could be construed as unfair and overbearing. • May be harder to implement due to multiple taxation sources and legislation required to implement.

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