



County Road Association
OF MICHIGAN

101 S. WASHINGTON SQUARE, STE. 200
LANSING, MI 48933-1143

White Paper on Policy Options for Road Funding in Response to Widespread Electric Vehicle Adoption

Introduction: Recently General Motors declared that they would stop selling new gasoline-powered cars and light trucks by 2035 and pivoting instead to battery-powered or electric vehicles (EVs). Ford and other automakers are also phasing out sales of internal combustion engines (ICE) by introducing dozens of new electronic models in the years ahead. Battery prices are plummeting, the technology is improving, and the charging infrastructure is ramping up making this seismic transportation shift more of a reality every day. While EVs currently represent less than 2% of new vehicle sales nationwide, these numbers are projected to rise quickly.

Since EVs don't use motor fuels, which provides about 50% of road funding for the State of Michigan from these fuels, how can policy makers ensure funding for Michigan's 121,000 miles of roads and bridges? The purpose of this white paper is to examine what alternative road funding policies other states are currently exploring in response to the expected widespread adoption of EVs. What are the pros and cons of these road funding policy options and what is a reasonable timeline to consider making policy changes regarding road funding?

Section 1: Michigan's Current Road and Bridge Funding Picture

Fuel Taxes. Based on a 2019 report by David Zin and Michael Siracuse at Michigan's Senate Fiscal Agency, the current Michigan tax on both gasoline and diesel fuel is 26.3¢ per gallon. This tax is constitutionally dedicated for the Michigan Transportation Fund (MTF) and shared by those entities who draw from it. According to a recent report from the University of Michigan's Center for Sustainable Systems, the average fuel economy for a 2018 model year vehicle was 25.1 mpg (30 mpg for a new passenger car, and 22 mpg for a new truck/SUV). The Federal Highway Administration calculates that Michigan drivers travel about 14,307 miles per year on average.

Thus, the average vehicle uses about 570 gallons of fuel per year. Given the current tax of 26.3¢ per gallon, the average Michigan driver pays \$149.91 in state fuel tax annually.

Of course, Michigan drivers also pay sales tax on each gallon of fuel, and a federal tax, bringing their overall tax per gallon to about 64¢ per gallon at today's (September 27, 2021) gasoline price of about

\$3.23 per gallon for regular gas (26.3¢ Michigan tax + 18.3¢ federal tax + 19¢ Michigan sales tax), or about 2.5¢ per mile, on an average of 14,307 miles driven each year.

EVs avoid paying this \$149.91 to the MTF since they use no gasoline or diesel fuel. **Plug-in hybrid EVs** typically get much better mileage than standard vehicles, but they still consume some fuel. Given that their mileage is two to three times higher than a traditional vehicle, **hybrids** pay on average about \$75 annually in state fuel tax.

Registration Fees. That said, EVs and hybrid EVs currently both pay a premium on their registration fees to help fund the roads in addition to their ad valorem plate fee. According to the Michigan Secretary of State, the **hybrid EV** premium fee (for vehicles weighing 8,000 lbs. or less which is typical of most passenger vehicles) is \$47. That fee rises to \$117 for **hybrid EVs** over 8,000 lbs.

Full EVs <8,000 lbs. (the vast majority of EVs) currently pay a registration premium of \$135 (\$235 for **EVs** >8,000 pounds).

The Gap. Given these numbers, are EVs and hybrid EVs paying their fair share to use the roads? Since the average Michigan driver of traditional vehicles pays about \$150 in fuel tax to the MTF, and EVs pay \$135 in additional registration fees, there is a \$15 shortfall annually for full EVs. Of course, that gap grows when motorists drive more than the average of 14,307 miles per year.

Hybrid EVs pay about \$75 annually in state fuel tax, and a registration premium of \$47 for a total of \$122 making their shortfall \$28 annually.

As state fuel taxes rise because they are indexed to inflation, the gap may continue to grow. However, it should be noted that fuel economy in traditional gas vehicles is also improving which could slow the gap between EV and non-EV vehicles in terms of gas tax they pay to the MTF.

A final perspective on the gas tax shortfall gap relates to the overall tax of vehicles. EVs do not pay state sales taxes and federal fuel taxes. At about 64¢ in total taxes per gallon, the average driver (again using about 570 gallons of fuel) spends about \$364.80 per year in state fuel/sales/federal tax at the pump making the overall tax deficiency gap for EVs about \$229.80 annually.

While Michigan is almost covering the state fuel tax gap with a surcharge on registration fees for EVs and hybrids, it is not close to covering the other taxes drivers pay at the pump, potentially reducing revenue sharing for municipalities, police and fire.

Section 2: Policies that Other States are Considering to Replace Fuel Taxes

Registration Fees. *Consumer Reports* (CR) conducted a study in 2019 comparing existing or proposed vehicle registration policies that require surcharges for EVs and hybrid EVs that are intended to make up for transportation revenue lost at the pump. The CR study found that 28 states have laws requiring a special registration fee for EVs, including Michigan. Some states, like Missouri, Arizona, Texas, Arkansas,

Wyoming and Minnesota are charging EVs registration premiums above what Michigan is charging. Other states have no additional registration premiums for EVs or hybrid EVs, or their premiums are considerably less than what traditional vehicles pay at the pump.

Mileage-Based User Fees (MBUF). In 2015 **Oregon** launched OReGO as a voluntary road use charge program. When participants sign up, they agree to pay for the miles they drive as monitored by their vehicle's GPS (Global Positioning Satellite) system. Any type of vehicle can sign up for OReGO. They agree to pay 1.8¢ per mile. For traditional vehicles, the taxes they pay at the gas pump are credited back to their accounts up to the limit of the registration fees they pay for their vehicle.

Utah has a program that sets a per-mile rate of 1.5¢ per mile for EVs until the accumulated total matches the annual flat fee, which is currently \$120 (which UDOT says is equivalent to about 8,000 miles of driving a traditional vehicle).

Since January 2020, owners of EVs participating in the **Oregon** MBUF program are not required to pay the extra registration fees for EVs, and instead pay 1.8¢ per mile. There is some talk in Congress about a national MBUF pilot program to address the loss of the 18.3¢ federal gas tax from EVs.

Eastern and Western Coalition. According to a report from the **Maryland** Department of Transportation, five eastern states have formed an Eastern Coalition that are experimenting with MBUF (beginning with **Delaware** and **Pennsylvania** and expanding to **North Carolina**, **New Jersey**, and **Virginia**). A Western Coalition of states has also formed to run MBUF pilot programs including Idaho, Montana, North Dakota, Arizona, New Mexico, and Texas. **Washington** state has adopted recommendations that will gradually transition them from gas taxes to MBUF. Pilot programs have also been completed in **Nevada**, **California**, **Colorado**, and **Minnesota**. Some of these programs use smartphones and plug-in devices to monitor mileage.

New Hampshire is implementing MBUF for all vehicles based on EPA estimates of a traditional vehicle's miles-per-gallon (mpg) range. Specifically, vehicles that get less than 20 mpg pay a \$10 premium with their registration fees. Vehicles that get from 20-30 mpg pay \$25 premium, 30-40 mpg pay a \$50 premium, 40-50 mpg pay a \$75 premium, >50 mpg pay a \$100 premium, and vehicles that use no fuel pay a \$125 premium. Trucks and other vehicles that do not receive EPA ratings pay a \$10 fee. **New Hampshire** still has a gas tax at the pump.

Per Kilowatt Hour Fee (PKHF). A third approach to recovering lost EV fuel taxes is a PKHF system that charges drivers for the electricity used to charge their vehicles, which is analogous to the per-gallon taxes at the pump. When this system was proposed in **Vermont**, the utilities testified that most charging occurs at home, and it is difficult to determine how much electricity is used only for an EV.

Certainly, an EV owner could install an embedded meter just for the vehicle (if the utility provides one), but that installation would be voluntary with no incentive to do so. And, many drivers could simply plug their EVs into any regular 120 V outlet to charge, even though it may take much longer than the separate high-voltage fast charger.

Establishing a PKHF for non-home charging stations is feasible but would require agreements (and likely new legislation) with the private companies and public utilities providing them, and the development of an extensive infrastructure to collect the data. Since it appears that most charging for EVs is done at home, this investment may prove problematic, particularly as EVs become more efficient. At present, the many EV charging stations on government property and commercial sites (e.g., Meijer) remit no tax to the MTF.

Another possibility related to PKHF would involve having the EV track its own charging history and then charge the owner at some rate for the power that the EV consumes. This charging data could then be sent automatically to a central database that would then invoice the registered owner at some rate. This process of recording the charging history of a vehicle was not discussed in any other articles but may be an alternative to tracking vehicle mileage.

Section 3: What are the Pros and Cons of these Policy Changes?

Registration Fees. While increasing the registration surcharge for EVs is one option, a recent report from the University of California Institute of Transportation Studies said that the registration fee itself is not adequate to fund the infrastructure needed to recharge and service these vehicles. For example, **Alabama's** HB 2 (2019) requires that \$50 of the \$200 fee for EV registration be used to pay for new EV chargers. The University of California study also concludes that the fee may discourage some drivers from adopting zero-emission technologies by as much as 20%. The **California** model assumes mostly public space recharging; **Vermont** assumes mostly at-home charging.

MBUF Programs. For MBUF monitoring, the two most significant concerns about implementing this kind of system are privacy and fairness. Regarding privacy, many individuals simply don't want the government tracking their activities. This is a significant barrier, potentially politically-charged.

Oregon addresses this issue by making their MBUF voluntary and purging the driver data within 30 days of payment processing. Clearly, states implementing these programs will need to take steps to build citizen confidence in the ability of the program to protect their privacy. In the face of cyber hacking and as new case law is developed, many questions linger about data security

With respect to fairness, citizens may have concerns about regressiveness of a MBUF tax for the poor. The current gas tax structure is regressive in that everyone pays the same tax at the pump regardless of income. The RAND Corporation found that a well-designed MBUF will not have a disproportionate impact on the poor since per-mile fees could be adjusted for income. Similarly, a study of eight states conducted by Stanford University found that rural and lower income citizens might actually pay less in taxes under MBUF than under the current gas tax structure given that rural residents drive more miles, and their vehicles tend to be older and less fuel efficient. A fixed fee per mile could offer a cost savings.

A recent report from the **Vermont** DOT cites several challenges in shifting to MBUF including how to enroll vehicles and collect revenues; how to collect revenue from non-residents travelling in their state

(which is significant with tourism being Michigan's 3rd largest industry); how to develop the functional/technical system requirements; and the need for authorizing legislation. VDOT estimated that the administration costs for this kind of system would be about 1% of total tax revenues.

Other issues, such as tracking out-of-state mileage and double taxation (paying per mile, plus paying taxes at the pump as the **North Carolina** system requires) must be considered by legislatures thinking about MBUF programs.

PKHF Systems. According to a report by Plug In America, a non-profit EV advocacy group, utilities have algorithms to disaggregate the household load dedicated to EV charging from all other uses. Yet there are significant software and staff-time costs for this process of between 3-4¢ per kWh. And, the ability to monitor charging an EV from a 120 V outlet is not possible. The point is that any home-based PKHF system would require the EV owner's cooperation through an incentive system.

Other issues with PKHF are that collecting data from vehicles or manufacturers through various technologies is costly, politically difficult (getting utilities and manufactures to cooperate) and often results in unreliable data. And, according to a report by the California Institute of Transportation Studies, it is possible that EVs will become more efficient over time resulting in decaying revenue to the MTF.

Alternative Fuel Vehicles. Another consideration needed in adopting a system for **Michigan** that prevents the deterioration of the MTF is that a growing number of vehicles, particularly in the commercial sector, are using other fuels, such as hydrogen, that are not taxed. This fleet is currently not large and unlikely to overtake the popularity of EVs.

Section 4: Conclusions

Timing. When should policy changes be considered to make a smooth transition to alternative road funding streams? The consensus among the reports reviewed for this white paper is that when electric vehicle penetration in a state is between 10-15%, then the state should have in place systems that can fairly tax EVs. Currently, Michigan is just above 1% in EV registrations, lagging states like California that are just above 7% adoption due to cultural environmental values.

Current Consensus. The consensus among most reports reviewed for this white paper is that MBUF is the most practical, fair and effective strategy for ensuring steady and manageable transportation funding. The view is that this system creates a long-term solution based on the same user-pay principle underlying the current fuel tax structure. It considers improvements in EV efficiency and can be adjusted to inflation. And, it can be adjusted to income making it less regressive than the current fuel tax. The administration costs for the system would likely be much less than the current administration costs from petroleum companies.

The major challenges for adopting this program include costs related to creating an easy, reliable system to administer the MBUF program that requires special hardware; a fee collection infrastructure; and the ability to manage political considerations.

Since several states are currently piloting these programs, a great deal more information will be available to address these issues in the next 24 months or so when these pilots have been completed. Then Michigan will be in a better position to guide its future policy initiatives to ensure stable road funding.

Section 5: CRA Action Steps

Governor’s Council on Future Mobility & Electrification. At its November 10-11 strategic planning session, the CRA Board asked staff to secure a position on this Council as there is apparently no voice for nor consideration of the ramifications of the EV transition on MTF, Michigan sales tax on fuel nor federal gas tax.

Develop Statewide Coalition to Advance Discussion on EV Funding for Transportation Infrastructure. Given the discussed negative EV ramifications for MTF, Michigan sales tax on fuel and federal gas tax, the CRA Board requested that staff begin forming a coalition of other organizations impacted by these revenue losses including municipalities, townships, police/fire, schools and others. The comment was made that Michigan should have a pilot revenue stream in place by now to begin working out issues such as fee collection, administration software/platforms required and other considerations.

If you wish further reading on the Governor’s Council on Future Mobility & Electrification, here are links to their recent Annual Reports:

2021 Annual Report:

https://www.michigan.gov/documents/leo/CFME_Report_2021_738091_7.pdf

2020 Annual Report:

https://www.michigan.gov//documents/leo/CFME_Report_FINAL_717478_7.pdf

Reports prior to 2020 (2017-2019) were created by Gov. Snyder’s Council on Future Mobility and may be found at https://www.michigan.gov/leo/0,5863,7-336-94421_102840---,00.html

References

A Study on Replacing Motor Fuel Tax Revenues Not Collected from Plug-In Electric Vehicles. Vermont Department of Transportation. Conducted pursuant to Section 28 of Act 12 of 2013.

Assessing Alternatives to California's Electric Vehicle Registration Fee. Institute of Transportation Studies, University of California Davis, December 2018.

Electric Vehicle and Hybrid-Electric Vehicle Registration Fees. Issue Review, Fiscal Services Division, January 3, 2018.

Fees for License Plates, Registrations and Titles. Secretary of State Jocelyn Benson, Official Website of Michigan.Gov. 2021

Fuel Economy, Electric Vehicles, and The Future of US Infrastructure Funding. Master of Science Thesis, Javier Andres Gotschlich Praus, Massachusetts Institute of Technology, June 2019.

How Will We Fund our Roads? A Case of Decreasing Revenue from Electric Vehicles. Transportation Research Part A 74 (2015) 136-147.

Mileage-based User Fees for Transportation Funding: A Primer for State and Local Decisionmakers. Rand Corporation, Fall, 2012.

Motor Fuel Prices, Motor Fuel Taxes, and Transportation Revenues. State Notes: Topics of Legislative Interest. Michigan Senate Fiscal Agency, Summer 2019.

Planning for State Transportation Revenue in a Coming Era of Electric Vehicles. National Governors Association, 2020.

Potential Impacts of Alternative Fuel Vehicles on Transportation Revenue in North Carolina. North Carolina Clean Energy Technology Center, April 2019

Report on Electric Vehicles. Maryland Department of Transportation, 2020.

Rising Trend of Punitive Fees on Electric Vehicles Won't Dent State Highway Funding Shortfalls but Will Hurt Consumers. Consumer Report, September 2019.

Road Usage Fee Revenue Potential and Equity Implications. New Hampshire Department of Transportation, February 14, 2020.

Special Fees on Plug-In Hybrid and Electric Vehicles. National Council of State Legislatures, December 1, 2020.

11/16/2021