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Mileage Based User Fee Funding and Deployment Planner for State Transportation Funding Agencies

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ABSTRACT

The current motor fuel tax (MFT) system in the US does not generate sufficient revenue for infrastructure development. To make up for the lack of revenue and to keep up with expenditures, states have begun to explore alternatives such as mileage-based user fees (MBUF).

Using federal and state level data and Pennsylvania as a case study, we demonstrate the difference and importance of revenue-neutral versus revenue-needed when determining a rate for MBUF and argue that rates should be based on revenue-needed. The Pennsylvania MFT generated $2.1 billion in 2019, translating to a 1.3¢ per mile revenue neutral rate for passenger vehicles. Under the revenue-needed rate, the revenue needed to be replaced is the MFT, miscellaneous, and appropriations from general funds and other state imposts, totaling to $3.8 billion in 2019. This translates to a 2.3¢ per mile rate for passenger vehicles, which is an 81% increase from revenue-neutral rates.

This same method can be used to support rate setting and revenue collection decisions in other states.

1. INTRODUCTION

The motor fuel tax (MFT), commonly known as the gasoline tax, or gas tax, generates revenue to fund road upkeep and maintenance in the United States. The system currently does not generate sufficient revenue for state Departments of Transportation (DOT) due to improved fuel economy, increased adoption of electric vehicles, and overall increased road expenditures. To make up for the lack of revenue and to keep up with expenditures, states have begun to explore alternatives such as mileage-based user fees (MBUF).

Assuming that MBUF will fully replace the gas tax, this paper aims to demonstrate that more consideration needs to be given to MBUF rate setting if states want MBUF to be a source of transparent and sustainable funding.

MBUF afford an opportunity to return to the user pays principle. States can charge users the right rate for the damage they do to the roads. Apart from the mentioned EV example, another example of this would be charging trucks more as they deal more damage to the roads. By tying the amount drivers are charged to the damage they do to roads while driving, instead of gas consumption, MBUF can create a charging scheme that will work for the long term. MBUF also present an opportunity to make up for the backlog of deferred maintenance that states have built up recently.

However, rates must be set at the right level the first time for this policy to succeed at raising the revenue states desperately need. If rates are set to be revenue neutral, meaning that they raise the same revenue as the gas tax, states will again have to dip into general funds to pay for their roads. Without equitably set rates, MBUF may end up breaking the user pays principle, much like current gas taxes. States may also be forced to raise rates or cut spending, neither of which are likely to be acceptable to the public.

In this paper, we determine the difference between revenue neutral and revenue needed rates. Revenue neutral assumes that MBUF rates will be set such that MBUF revenue will generate the same amount of revenue as current gas tax revenue. Revenue needed assumes that MBUF rates will be set such that MBUF revenue will replace current gas tax revenue, money appropriated from general funds for roadway usage, and other state revenues used for roads.

2. BACKGROUND

2.1 The Gas Tax

The motor fuel tax is the main source of road funding in the United States. This funding is necessary for road upkeep and maintenance. MFT, more commonly known as the gas tax, has two components - federal and state. While the MFT also includes diesel, the term “gas tax” is used colloquially to refer to the MFT in general. The gas tax is modeled under a user pays principle: users of the system primarily pay for it. It is generally viewed as the fairest way of funding transportation infrastructure.

In the U.S., users currently pay the gas tax at the pump. The price at the pump includes both state and federal MFTs, as well as any associated sales tax. MFT is based on gallons of gas sold and does not change with the price of gas. This system does not require user identification. The tax is collected from a relatively small number of fuel wholesalers, keeping administrative costs low.

The federal gas tax is priced at 18.4¢ per gallon. (EIA, 2021). It is not indexed for inflation. The average state gas tax is priced at 30.06¢ per gallon as of Jan 1, 2021, varying from 13.77¢ per gallon in Alaska to 62.47¢ per gallon in California. (Davis, 2019; Cammenga, 2020) As of June 2019, 22 states have implemented variable-rate gas taxes structures, allowing the tax rate to rise over time. (Davis, 2019)The other states have kept fixed-rate gas taxes. The state gas tax is one of the main revenue streams for states’ Departments of Transportation and is primarily used for transportation infrastructure development and

maintenance. (Nguyen-Hoang and Bogin, 2017) 26 states have constitutional or statutory provisions mandating that fuel tax revenue can only be used for highway and road purposes. (Nguyen-Hoang and Bogin, 2017) Combined, state gas taxes, the federal gas tax, and user fees only cover 24.3%, 18.6% and 7.8% of road expenditures respectively. These percentage estimates are national averages. (Bishop-Henchman, 2013) The remaining 49.3% is covered by other general revenues such as state or income taxes.

The federal MFT has not risen since 1993, and many state gas taxes are also stagnant. (Davis, 2018; EIA, 2021) This is a major issue for cash-strapped state DOTs, who need the money for their ailing infrastructure, as we discuss more in Section 2.2.

2.2 Areas of Concern with a Gas Tax

The American Society of Civil Engineers has rated the United States' roads and bridges at consistently low grades. (ASCE, 2021) Responsibility to maintain civil infrastructure typically falls onto state DOTs, which have been struggling as the current road funding situation is untenable and unsustainable. Even considering the U.S. government's plan to invest $115 billion in repairing critical roads and bridges, current sources of infrastructure funding are insufficient. (The White House, 2021) Current road expenditures are increasing, and states are unable to bring in enough revenue to complete the necessary infrastructure projects. As an example on the state level, Michigan estimated in 2016 that the state has an annual gap of $2.7 billion in transportation. (21st Century Infrastructure Commission, 2016)

The national total deferred maintenance cost of infrastructure is estimated to be at least $1 trillion, with the cost of making deferred repairs at the state level estimated at $873 billion. (Zhao, Fonseca-Sarmiento and Tan, 2019) While these estimated costs cover all types of infrastructure, capital projects in transportation make up a relatively higher percentage of spending compared to other sectors. For example, in California, transportation service represents 91% of total capital projects spending. (Brown, 2017) The increased cost in highway construction capital projects is attributed to the higher price of construction materials, such as asphalt. (Davis, 2018)

One of the gas tax's major drawbacks as a primary component of transportation funding is that as electric and hybrid vehicle (EV) sales trend upwards, the gas tax is generating less revenue for state DOTs. (Woodward *et al.*, 2020) Research estimates that there will be a projected total revenue shortfall—to federal, state, and local governments—of $200 million annually in 2025 only from the expected adoption of EVs in the US. (Jenn, Azevedo and Fischbeck, 2015) Some have argued that these vehicles should not have to pay the gas tax so that drivers are incentivized to purchase EVs. However, such a system would have users not paying for the upkeep and maintenance roads need. More importantly, this situation is expected to worsen in the future, as sales of hybrids and electric vehicles are expected to increase. (Woodward *et al.*, 2020) Even without the widespread adoption of EVs, gas vehicles' fuel economy has been improving, increasing by 29% since 2004. (EPA, 2020) Given a stagnant federal gas tax rate since 1993, an increase in fuel economy results in a decrease in federal gas tax revenue. States face the same problem as the federal government, as none of their gas tax rates are tied to fuel economy.

In recent years, state DOTs have increasingly had to rely on general revenues or issuing bonds to make up the difference between gas tax revenues and disbursements. Examining the Federal Highway Administration's Highway Statistics data from 2019, the scope of this problem is evident. States spent This 40% mostly comes from issuing bonds and general revenues. (FHWA, 2020)

The current setup for transportation-related revenues and disbursements does not feature a direct tie between revenues generated from road users and money spent on roads. As a result, when states need more funding for roads, they appropriate from general funds rather than raising the gas tax. States are breaking the user pays principle in their transportation systems. Funds spent on the roads do not necessarily originate from revenue generated by road users.

2.3 Mileage-based User Fees

Mileage-based user fees, sometimes referred to as Road User Charges (RUC) or Vehicle Mile Traveled fees (VMT fees), have been proposed as an alternative to the gas tax. This initiative would address the indirect tie between fuel consumption and road funding, by directly charging users a per mile rate. Charging road users directly means electric and hybrid vehicles would begin to pay their fair share.

The federal government has completed numerous studies on MBUF but has not taken large-scale action. (Feigenbaum and Stuart, 2020) No federal pilot has been commissioned, despite arguments from some that the federal government is best suited to develop MBUF due to concerns about drivers' mileage being tracked across state borders. However, given increased recent interest from the USDOT, a federal pilot may be on the way. Various states' DOTs have done pilot projects to test the concept in their own environment.

The pilots have generally focused on testing the technical feasibility of a MBUF program, i.e., whether data can be collected from vehicles and mileage costs calculated. Other considerations have included public perception and rate setting. Pilots have primarily been conducted by state DOTs. Two state coalitions have been formed, RUC West for western states and the Eastern Transportation Coalition (formerly the I-95 Corridor Coalition) for eastern states. Figure 1 shows the progress of research in MBUF and funding alternatives to MFT as of July 2020. Oregon and Utah have created permanent MBUF programs. States labeled in orange participated in a pilot program led by the Eastern Transportation Coalition. Most of the drivers in the coalition's pilots were residents of Delaware and Pennsylvania. (The Eastern Transportation Coalition, 2020) MBUF owed are typically calculated using an onboard device that tracks users' mileage automatically, by odometer readings at yearly inspections, or through other means.

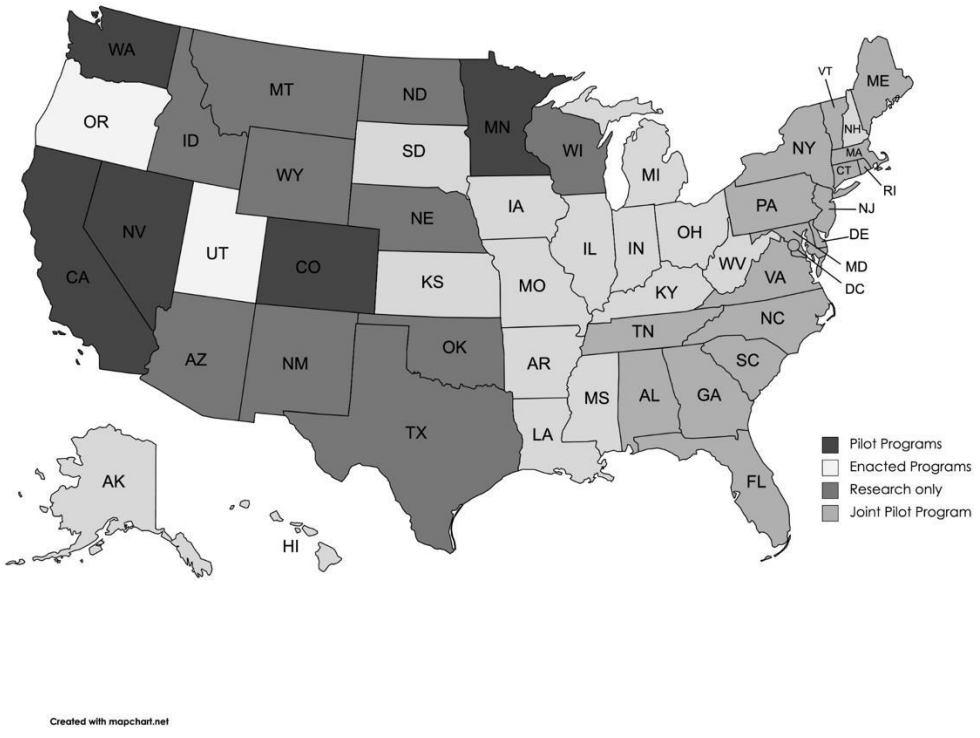

Figure 1. Research Progress in MBUF and Funding alternatives to MFT (Washington State Transportation Commission, 2020)

2.4 Rate Setting with MBUF

Rate setting (i.e., determining the price to charge for each mile driven) is an important consideration for states thinking about switching to a MBUF system. Users are not likely to respond positively to a rate that is hiked immediately after the program is established if the initial rate was not set appropriately. Most state and coalition pilot programs have not investigated what a good rate would be, instead choosing "revenue neutral" rates as a default, and not delving much into the topic after describing this setup. Revenue neutral here means that pilots have operated under the assumption that revenue generated by MBUF would replace the revenue generated by the gas tax. As such, pilots have often chosen a per mile rate that aims to approximate the per mile rate that users pay under the fuel tax. (Hanley and Kuhl, 2011; Rephlo, 2013; CH2M, WSP and PRR, 2017; Jones, Bock and Oregon Department of Transportation, 2017; The Eastern Transportation Coalition, 2021) This can be done by dividing the fuel tax revenue in the state by the total vehicle miles traveled by gas powered passenger vehicles. It can also be done by dividing the fuel tax rate by the fuel economy of an average vehicle. This revenue-neutral approach rate implicitly assumes that the fuel tax revenue is sufficient for states. However, as shown above, various states are using funds beyond state fuel taxes to pay for highways.

Some pilots have had rate structures that deviated from using averages. Some states varied their rate based on vehicle fuel efficiency to get the MBUF rate closer to the fuel tax rate for individual vehicles. (Hanley and Kuhl, 2011) Minnesota's program found its baseline rate using the same method as other states. It then created a rate schedule, with rates slightly under the baseline and slightly over it to encourage certain driving behaviors. Participants were charged 3¢ per VMT for peak time metro driving and 1¢ per VMT for all other driving in-state. If participants turned off their location tracking device for a trip, they were charged the higher rate of 3¢ per VMT, regardless of whether they were in-state or out of state. This was designed to encourage location tracking to remain on for more accurate data collection. (Rephlo, 2013)

Pilot programs have not tested variable mileage rates based on vehicle class, but studies have suggested increasing and varying rates as alternative solutions to decrease agency cost. States have considered a

rate structure that could vary fees based on factors like location, time of day, vehicle age and fuel economy, vehicle weight, etc. (Hanley and Kuhl, 2011; CH2M, WSP and PRR, 2017) For example, a study completed by Purdue University recommended a user price of 1.21¢ per VMT for automobiles, 9.18¢ per VMT for single unit trucks, and 23.54¢ per VMT for combination trucks. (Oh and Sinha, 2008; Rephlo, 2013) No program has implemented this permanently.

MBUF rates have the potential to vary significantly depending on what revenues and disbursements states choose to replace. The report from Minnesota's pilot program states that rate setting is "probably one of the largest challenges when it comes to deploying MBUF." (Rephlo, 2013)

3. METHODOLOGY

We look at two different rate options for Pennsylvania and Oregon to determine the differences in rates for revenue neutral versus revenue needed. We focus on determining rates for two categories, light duty passenger vehicles and all other vehicles, to limit the scope of our analysis. Rates were determined using data from the Federal Highway Administration's Highway Statistics data series, which has been collected by the US DOT for all states for many years. (FHWA, 2020) Implicit in our calculations is the assumption that administrative costs for a MBUF system would not be significantly greater than MFT administrative costs. This is not necessarily true, and an area of ongoing research, but we make this simplifying assumption for illustrative purposes.

We evaluate our home state of Pennsylvania. Pennsylvania has the second highest state gasoline tax rate at 58.7 cents per gallon and is the fifth most populous state. (Tax Foundation, 2021) With both a high gas tax rate and a large population, it stands to generate much revenue from the gas tax.

We also evaluate Oregon, which already has an MBUF program in place. This allowed us to compare our calculated rates to Oregon's actual rates.

We have chosen revenue data from 2019 for two main reasons. First, 2019 was pre COVID-19 pandemic - revenue streams such as sales tax or gas tax were not affected by mass stay at home orders. Second, Pennsylvania's gas tax was raised in 2017 from 50.4 cents per gallon to its current rate of 58.7, the last phase of gas tax raises as mandated by the Comprehensive Transportation Funding Plan (Act 89). (PA General Assembly, 2013) Therefore, 2019 revenue streams are reflective of the new status quo in gas tax revenue.

To calculate the revenue neutral rate, where MBUF would generate the same amount of money as the gas tax, we divide the state annual Motor Fuel Tax revenues in the Table "Revenue Used by States for State-Administered Highways - 2019 (SF-3)" in the Highway Statistics dataset, by the annual VMT in the state of Pennsylvania. We did not base estimates on the Table "Revenue Used by States for Highways - 2019 (SF-1)".

Looking at the Table "Revenue Used by States for State-Administered Highways - 2019 (SF-3)", we see that there are three main sources of revenue for DOTs paid by highway users: MFTs, motor-vehicle and motor-carrier taxes, and road and crossing tolls. There are three additional sources of revenue not paid directly by users - appropriations from general funds and other state imposts, bond issuing, and payments from other governments, such as the federal government.

We believe that to fund the roads, MBUF will need to replace appropriations from general funds and other state imposts so that states can return to the user pays principle. MBUF need not replace state issuing of bonds assuming that states are borrowing at a sustainable rate in the present. In addition, we assume that MBUF would not replace current road tolls, so these would continue to generate revenue for the state. This is because most states seem to want to replace MFT, rather than road tolls, with MBUF.

Table 1 shows a summary of how we use the 2019 reported values from the HS SF-3 in our calculations. (The "x" indicates whether we are using the revenue source category for calculating a revenue-neutral rate, a revenue-need rate, or both rates).

Table 1. Highway statistics SF-3 PA 2019 values used in calculations

Revenue source		**Value reported ($ thousands)**	**Revenue Neutral Rate**	**Revenue Needed Rate**
Highway-user Revenues	Motor Fuel Taxes	2,090,086	x	x
	Motor-vehicle and Motor Carrier Taxes	583,090		
	Road Crossings and Tolls	1,676,464		
Appropriations from general funds		1,145,814		x

Other state imposts	23,343		x
Miscellaneous	550,393		x
Issue of bonds	1,101,460		
Payments from other governments	1,862,747		

As shown by the "x" labels in Table 1, the only overlap in revenue source for the revenue-neutral and revenue-needed rate are the "Motor Fuel Taxes". For the revenue-needed rate, in addition to existing MFT revenue, we assume that revenue sources are "appropriations from general funds, other state imposts and miscellaneous" revenue.

We posit that there should be different rates for different classes of vehicles following the user pays principle; light duty vehicles deal much less damage to the roads than trucks. However, for simplicity in our calculations on passenger vehicle rates, we assume that there are only two high level classes: passenger vehicles and all other vehicles.

Note that this is a general method focusing on the gas tax. States can adjust this method to incorporate fixed costs (e.g., registration fees) or other revenue sources described in Table 1 into an MBUF rate as well.

Inspection of the Pennsylvania turnpike rate schedule for different classes indicates that trucks (class 5 and above) pay approximately three times the rate of passenger vehicles (class 1). As such, we assume that the non-passenger vehicle MBUF rate will be three times that of passenger vehicles. This assumption is described by Equation 1.

$$r_{trucks} = 3\, r_{PV} \tag{1}$$

Where

r_{PV} = MBUF rate for passenger vehicles

r_{trucks} = MBUF rate for non-passenger vehicles

As previously discussed, we know the revenue the rates would need to generate from Table SF-3 in the Highway Statistics data source. We also know that the total revenue generated from a MBUF program would be given by Equation 2 below. We use these two pieces of information to determine the rates for passenger and other vehicles.

$$R = r_{PV}\, VMT_{PV} + r_{trucks}\, VMT_{trucks} \tag{2}$$

Where

R = total revenue

VMT_{PV} = VMT of passenger vehicles

VMT_{trucks} = VMT of non-passenger vehicles

Substituting Equation 1 into 2 yields Equation 3. Knowing two distinct total revenue values (revenue needed and revenue neutral), we can solve for the MBUF rate of passenger vehicles.

$$R = r_{PV}\,VMT_{PV} + 3r_{PV}\,VMT_{trucks} \quad (3)$$

According to the Federal highway statistics data, Pennsylvania's state MFT revenue was $2.1 billion in 2019. This corresponds to the revenue reported by Pennsylvania's DOT in their 2019 annual report. (PennDOT, 2020a) Oregon's state MFT revenue was $198 million in 2019. These values are used to calculate the revenue neutral rate. The aggregate revenue sources that MBUF should replace for the revenue needed rate generated $3.8 billion for Pennsylvania and $311 million for Oregon in 2019.

According to Table "Vehicle-miles of travel, by functional system - 2019 (VM-2)" in the Federal Highway Administration's Highway Statistics data series, the total VMT in Pennsylvania in 2019 was 103 billion. This was cross checked against the Pennsylvania DOT's Highway Statistics data and was found to be consistent. (PennDOT, 2019) Table VM1 in the federal Highway Statistics dataset tells us that approximately 69% of VMT in the United States are done by light duty vehicles. Assuming this is approximately true for Pennsylvania, we estimate that light duty VMT in Pennsylvania in 2019 was about 71 billion. This is roughly consistent with the figure for passenger cars found in the Pennsylvania DOT's Highway Statistics Data, which is about 72 billion. Additionally, we include turnpike mileage in calculating our rates.

For our calculations, we included Pennsylvania's turnpike VMT in our total VMT number. We did not include toll roads revenue, as we are not assuming that implementation of MBUF would phase out toll roads.

4. **RESULTS**

Based on our analysis of Pennsylvania's revenue sources as reported by the 2019 Federal Highway Administration's Highway Statistics data, we calculated three types of rates for two rate-setting scenarios (revenue neutral versus revenue needed), resulting in six total estimates for Pennsylvania's MBUF rates. Here, revenue neutral denotes a rate set to replace only the gas tax's revenue, while revenue needed denotes a rate set to replace the gas tax's revenues as well as states appropriations from general funds, other state imposts, and miscellaneous revenue sources.

Table 2 shows the estimated MBUF rates for Pennsylvania for revenue-neutral and revenue-needed respectively. For both scenarios, we found a rate assuming the MBUF rate was the same for all vehicle classes. We also found the rates for passenger vehicles and trucks assuming the MBUF rate differed by vehicle class.

Table 2: Calculated MBUF rates for Pennsylvania in 2019 (cents per mile)

Scenario	Pennsylvania MBUF rates		
	Rate is the same for all vehicles	Rates change by vehicle class	
		Passenger Vehicle	Trucks
Revenue Neutral	2.0	1.3	3.9
Revenue Needed	3.7	2.3	7.0

If the MBUF rate is equal for all vehicles (i.e., we base the MBUF rate on total VMT in Pennsylvania), we estimate that the rate would be 2.0¢ per mile and 3.7¢ per mile for the revenue-neutral and revenue-needed cases respectively.

If the MBUF rate changes depending on the vehicle class (i.e., MBUF rates are dependent on the vehicle class' VMT in Pennsylvania), under the revenue-neutral case, we estimate the rate would be 1.3¢ per mile for passenger vehicles and 3.9¢ per mile for trucks. Under the revenue-needed case, we estimate the rate would be 2.3¢ per mile for passenger vehicles and 7.0¢ per mile for trucks.

For Pennsylvania, the revenue needed rate in both cases (rate stays the same or differs based on vehicle type) is a 77-85% increase from the revenue neutral rate.

Turning to another state, Oregon faces a similar situation. We followed the same methodology we used to estimate Pennsylvania's rates in 2019 but applied it to Oregon's data in 2019. Table 3 shows the revenue neutral, and revenue needed rates for Oregon.

Table 3: Calculated MBUF rates for Oregon in 2019

Scenario	Oregon MBUF rates (cents)		
	Rate is the same for all vehicles	Rates change by vehicle class	
		Passenger Vehicle	Trucks
Revenue Neutral	0.55	0.34	1.0
Revenue Needed	0.86	0.54	1.6

In the revenue neutral case, we find that if all vehicles were to be charged the same rate, Oregon would need to set a rate at just above 0.5¢ per mile. On the other hand, in the revenue needed case, Oregon would need to set a rate at about 0.86¢ per mile to fully meet its road disbursement demand and return to the user pays principle. OReGO, their MBUF program, currently uses 1.8¢ per mile and is slated to increase to 1.9¢ per mile in 2022. (ODOT, 2021) The difference between our calculated revenue-needed rate (0.86¢ per mile) versus their current rate (1.8¢ per mile) could be due to administrative costs.

Looking at the rates broken out by vehicle type, we see that in the revenue neutral case, passenger vehicles would have to pay about 0.34¢ per mile, while trucks would have to pay about 1¢ per mile. On the other hand, in the revenue needed case, passenger vehicles would need to pay about 0.54¢ per mile and trucks would have to pay about 1.6¢ per mile. For Oregon, the revenue needed rate in both cases (rate stays the same or differs based on vehicle type) is a 56-60% increase from the revenue neutral rate.

5. CONCLUSIONS

MBUF provides a path for underfunded DOTs to close budget gaps. However, states need to consider their actual funding needs rather than simply aiming to replace the gas tax. Using the Federal Highway Administration's Highway Statistics data series, we calculated Pennsylvania's MBUF rates for two scenarios: one assuming equal distribution across all vehicles and the other varying the rate depending on vehicle class. If the MBUF rate changes depending on the vehicle class (i.e., MBUF rates are dependent on the vehicle class' VMT in Pennsylvania), under the revenue-neutral case, we estimate the rate would

be 1.3¢ per mile for passenger vehicles and 3.9¢ per mile for trucks. Under the revenue-needed case, we estimate the rate would be 2.3¢ per mile for passenger vehicles and 7.0¢ per mile for trucks. Our case study of Pennsylvania in 2019 demonstrates that the alternative is to raise rates or continue to break the user pays principle.

Examining our estimated rates for Pennsylvania and Oregon, the revenue-needed rates are over 50% increases compared to the revenue-neutral case. This percentage difference highlights the importance of rate setting. A 1¢ per mile difference in rates snowballs and can greatly impact the revenue generated. Considering that road expenditures, and thus DOT expenditures, are expected to increase, as well as the expected administrative costs for MBUF, states should take care to set the correct rate from the outset or they risk confronting users with skyrocketing rates later.

6. DISCUSSION

The Federal Highway Administration's Highway Statistics data is a useful resource as it provides us with both state revenue and state VMT data. However, their data on VMT is not divided up by vehicle class; future research should look for a reliable data source to disaggregate VMT data so a state can generate a rate for each class of vehicle.

Future research should also consider the deferred maintenance costs taken on by states. For example, following our case study and looking at Pennsylvania, in 2010 Pennsylvania's transportation system was underfunded by $3.5 billion and it was estimated that underfunding would grow to $6.7 billion by 2020. (PA General Assembly, 2013) Current estimates by PennDOT show that revenue streams have decreased further, as Pennsylvania now has approximately $8.1 billion in unmet needs for the statewide highway and bridge system. This is forecasted to grow to $12.6 billion over the next 10 years. (PennDOT, 2020b, 2021) With the deferred maintenance consideration, the MBUF rates would increase even further. The key here would be to find a tradeoff between charging drivers a reasonable MBUF rate and generating enough revenue to cover both increased DOT expenditures and deferred maintenance needs.

Another area to consider is the rate structure mechanism for MBUF. While we have discussed a rate at a high level, costs will likely keep rising due to inflation. As such, any new road funding mechanism should account for that, whether that is by indexing the rate to inflation or tying it to fuel economy.

State pilots have determined the technical feasibility of MBUF, and permanent programs have shown that it is a viable solution to our current road funding predicament. Rate setting remains an area that should be given further consideration, especially since MBUF is intended to be a long term, sustainable solution.

List of Publications, Activities, and Outcomes for this Project:

Paper submitted to Hong Kong Society for Transportation Studies (HKSTS), 2020 and 2021.

Presentation to Transportation Research Board subcommittee on Mileage Based User Fees, Jan 14, 2021.

MBUFA Radio Podcast, March 9, 2021. http://www.mbufa.org

Published OpEd piece: https://www.post-gazette.com/opinion/Op-Ed/2021/03/23/Nothing-is-certain-except-for-the-death-of-fuel-taxes/stories/202103230017

Scott Matthews Interview with Jon Delano on KDKA Television, March 10, 2021.

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