Alternative Funding for Transportation

This paper is based on work completed as part of The University of Minnesota's Transportation Futures Project. More information about The Transportation Futures Project can be found on the project homepage.

Transportation infrastructure is costly to build and maintain and requires ongoing revenue from taxes and other user fees to pay for maintenance and upkeep of the system. Different countries and states use different revenue-collecting mechanisms to pay for their transportation systems, each with pros and cons for both the traveling public and the responsible agencies. Generally speaking, the argument for pricing strategies in transportation is based in a desire to charge users of the transportation system based on the overall demand for the same facility.[1] Understanding existing revenue collection methods and future trends can help to further illustrate the current transportation funding picture in the United States and in Minnesota specifically.

EXISTING PRICING STRATEGIES

By and large, pricing strategies that collect revenue for use on highway system expenditures in the United States rely on two sources – fuel excise taxes and toll monies collected from travelers using toll roads. Further analysis of existing revenue-collection methods sheds light onto the advantages and disadvantages of their use.

Gas Tax

Revenues collected by the government from the use of transportation systems or transportation-inputs date back to 1932, when the US Federal government imposed a temporary 1-cent-per-gallon tax on gasoline to help pay off deficits incurred during the Great Depression.[2] The Federal gas tax was preceded by a 2-cent-per-gallon fuel tax in Minnesota which was put into place in 1925.[3] Federal gas taxes were not completely dedicated to transportation purposes until the creation of the Highway Trust Fund in 1956, at which point the federal gas tax was raised to 3 cents per gallon (the equivalent of 26 cents today). Today, the federal gas tax is 18.4 cents, and has not been changed since 1993.[4] Minnesota's fuel excise tax is 28.6 cents per gallon of gasoline.[5]

The Highway Trust Fund provided stability for roadway expenditures in the United States for a number of decades through the collection of fuel taxes. Fuel taxes are a form of user fee; people who drive more miles or less fuel efficient vehicles will use more gasoline and pay more in gasoline taxes for transportation funding purposes. Despite this, the entire roadway system is also heavily funded by local property taxes. The gasoline tax at current levels does not address some important changes facing the transportation system today:

- Cost of inflation in the construction and maintenance of roads
- Improvements in vehicle fuel efficiency
- The costs of air pollution and crashes, which are imposed on individuals through worsened health outcomes and society through health care system costs
- Alternative fuel vehicles that do not use gasoline
- Recovery of costs of pavement damage caused by heavier vehicles
- Funding sufficient to address congestion

[1] FHWA, 2008
[2] McCormally, 2014
[3] Wright County MN
[4] American Petroleum Institute, 2016
[5] Ibid

Changes to the amount of taxes collected or the ways in which taxes are distributed could allow the gasoline tax to remain a viable user fee into the future, though many of the changes would be politically unpopular. Accounting for inflation would require that gasoline taxes be indexed. Addressing pollution and greenhouse gas emissions would require a portion of the gas tax to be dedicated as a pollution/carbon tax or higher rates for more polluting vehicles. Appropriate charges for alternative fuel vehicles and congestion costs are difficult, if not impossible to account for through a gas tax.[6] Figure 1 shows historic gas tax levels in Minnesota.[7] Figure 2 shows historic gas tax levels adjusted to 2015 Dollars.

Figure 1: Combined fuel excise (gas) tax per gallon in Minnesota (cents)

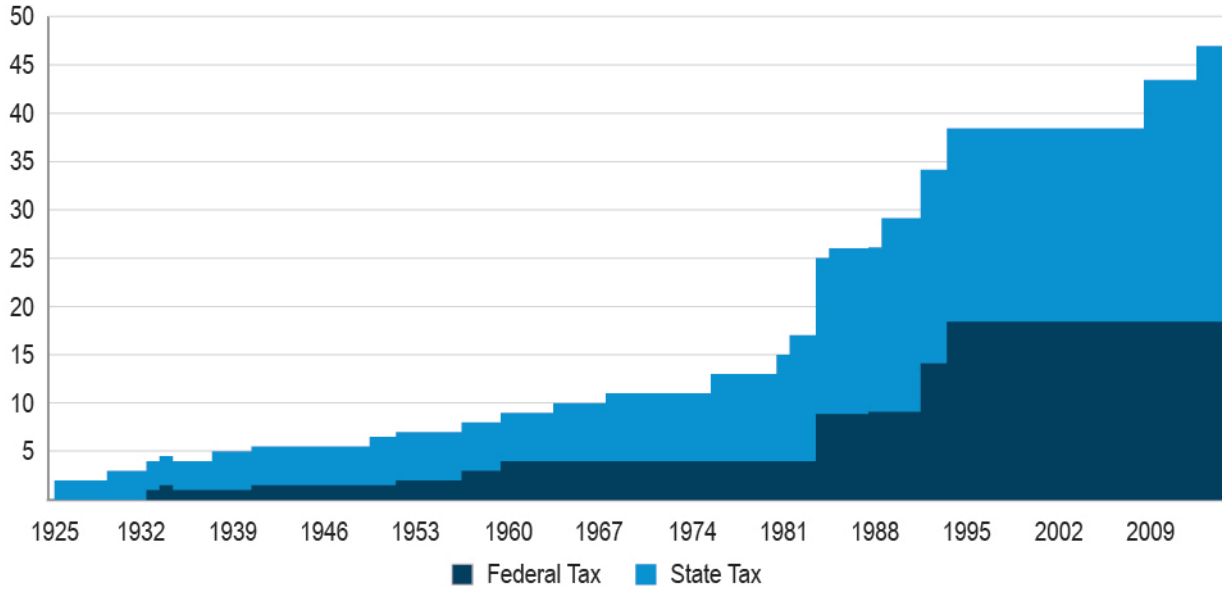
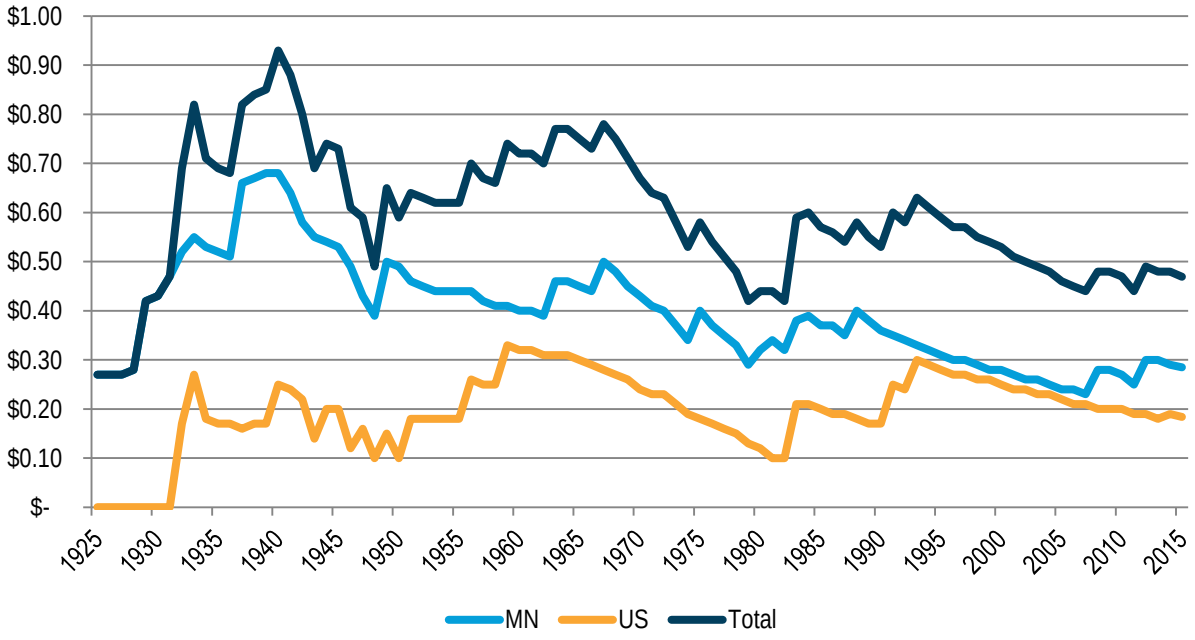


Figure 2: Historic fuel excise (gas) tax per gallon in Minnesota adjusted to 2015 Dollars



[6] Levinson et. al., 2015
[7] Federal Taxes; State Taxes

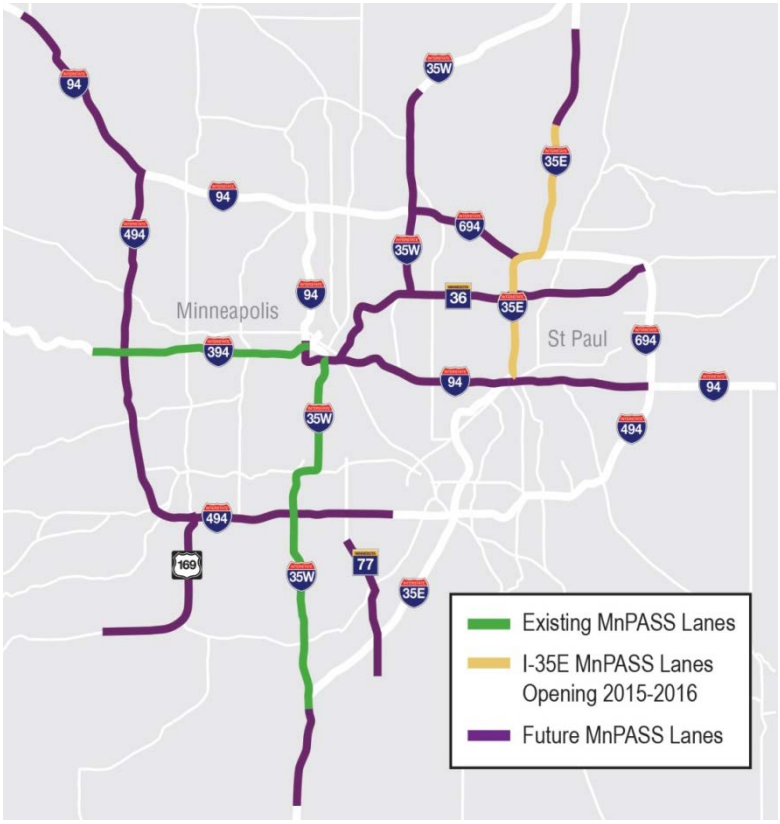
Toll Roads

Toll roads have long been used to fund transportation, beginning in 1792 with the construction of the Philadelphia and Lancaster Turnpike in Pennsylvania.[8] While this route was without a doubt much different than toll roads today, the concept remains the same. Users of the road pay a fee to assist with maintenance and upkeep activities on the toll road system.[9] Minnesota is not home to traditional road tolling as can be found on tollway systems in Illinois, Indiana, Florida, and other states in the U.S. Geographically speaking, the closest toll road system to Minnesota is the Illinois Tollway system, limited to the northeastern portion of Illinois. Nationally, toll roads makes up less than seven percent of total transportation revenue.[10] A number of toll bridges used to serve the needs of traveling Minnesotans, but only one remains – the Fargo-Moorhead Toll Bridge which will soon be transferred to public ownership.[11]

High Occupancy Toll Lanes

High Occupancy / Toll (HOT) Lanes are separate lanes with variable pricing based on time-of-day or real-time traffic conditions while giving some level of discount to high-occupancy vehicles.[12] Minnesota's highways now feature three installations of HOT lanes in the Twin Cities under the brand "MnPASS." MnPASS lanes have been in operation on I-394 since 2005, on I-35W since 2009 and on I-35E since 2015. The MnPASS system allows transit, vehicles with two or more occupants and motorcycles to use the lanes free of charge during peak periods; solo drivers can use the lanes during peak periods by paying a congestion-based variable fee.[13]

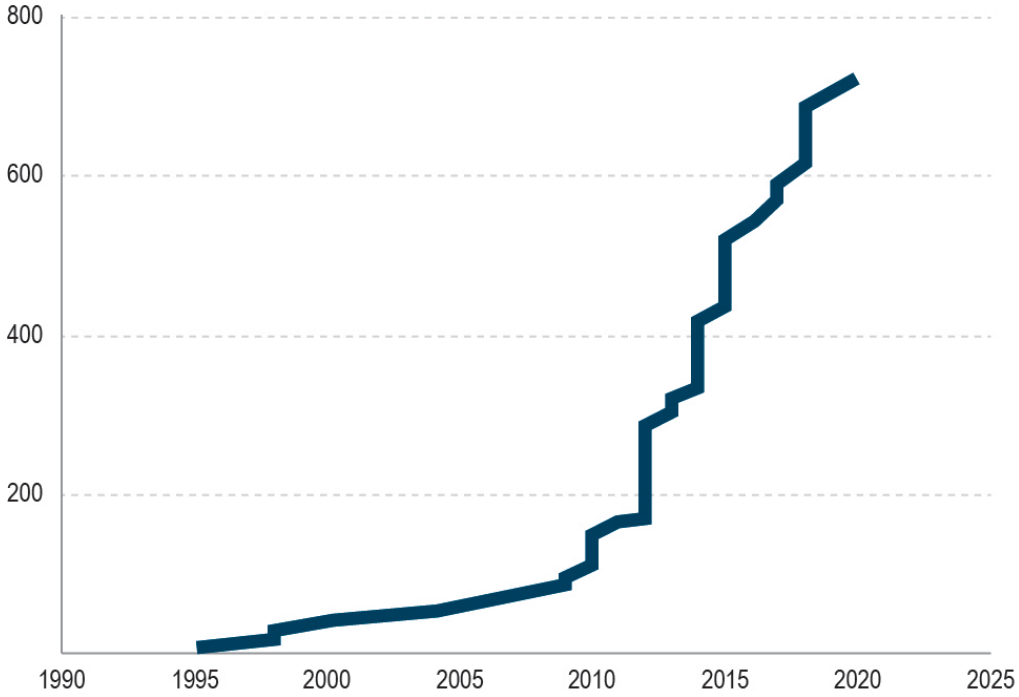
Figure 3: Map of existing and potential future MnPASS system



[8] FHWA
[9] Levinson et. al., 2015
[10] Ibid.
[11] Forum News Service, 2014
[12] Ibid.
[13] MnPASS, 2013

Further build-out of the MnPASS system in the Twin Cities is funding-dependent. A MnPASS system study completed in 2010 established a tiered prioritized list of corridors for future build out based on a variety of metrics and cost-benefit calculations.[14] Currently, MnDOT has funding identified in its 10-year plan to expand the MnPASS system on two additional corridors, as well as extend the MnPASS lanes on two exiting corridors. Additional funding will be needed to fully complete the MnPASS system.

Figure 4: Lane miles of High Occupancy Toll Lanes in the United States[15]



Parking Pricing

Many major cities in the United States use pricing zones to adjust the cost of parking based on demand. Both Minneapolis and Saint Paul charge varying rates for public parking that depend on day-to-day demand, and on occasion, the presence of special events.[16] Event rate adjustments in the Twin Cities are mostly limited to sporting events. Other local governments that control large amounts of public parking in downtown areas have the ability to adjust the cost of parking based on events or other changes in demand as well.

DYNAMIC PARKING PRICING

Many cities in the United States now adjust their metered parking rates dynamically based on overall demand, much in the same way that MnPASS adjusts user fees based on levels of congestion. San Francisco was the first city in the country to explore this approach through a pilot project conducted in coordination with the USDOT's Urban Partnership Program.[17] The pilot project used occupancy data from in-ground sensors to adjust rates based on the overall occupancy rate within specified parking districts, with a target of maintaining 60-80 percent occupancy.[18] The project was a success and has been continued beyond the end of the pilot project timeline. Other cities that utilize dynamic parking pricing strategies include New York, Los Angeles, and San Diego.[19]

[14] Ibid.
[15] Levinson et. al., 2015
[16] Minneapolis Parking Meters; Saint Paul Parking Meters
[17] SFMTA, 2014
[18] Ibid.
[19] FHWA, 2015

Cordon-based Congestion Pricing

Some cities have implemented cordon-based congestion pricing strategies to charge private vehicles that access the urban core during selected periods. The two most notable examples worldwide include Singapore and London.[20] Despite the environmental and safety benefits that cordon-based congestion pricing have brought to Singapore and London, it is unlikely that a similar style of congestion zone would be implemented in the Twin Cities.[21] Many cities in the United States with far worse congestion have studied the idea, including New York, San Francisco, and Washington DC, but have decided to use adjustments in parking fees as an alternative to reducing private vehicle trips into cities.[22]

POTENTIAL FUTURE STRATEGIES

Given the political unpopularity of gasoline tax increases and other challenges associated with the gas tax, researchers and other state governments have looked into alternative methods for funding transportation. One potential funding strategy involves charging mileage-based user fees that consider a variety of different factors when assessing the rate charged per mile, while others look to further deploy on-road tolling, bonding, or public-private partnerships.

Mileage-Based User Fees

Mileage fees have the potential to solve some of the challenges posed by the traditional gas tax, as charges can be varied to reflect geography, congestion, vehicle type, time of day, and more. A number of states have looked into the use of mileage-based user fees (MBUFs), but only one has begun deployment beyond small test groups. The most frequently-raised concern about administering MBUFs is that they would be impractical to administer on a large scale.[23] Other concerns included technology and administrative issues, concerns about out-of-home-state travel, privacy, and equity-related concerns not limited to large lump-sum payments on a recurring basis.[24]

OReGO

Oregon's "OReGO" program is the most advanced mileage-based user fee program in the United States today.[25] The program launched in earnest in July of 2015 when the OReGO program was initially made available to up to 5,000 cars and light-duty commercial vehicles.[26] The State of Oregon has studied various mechanisms for funding road maintenance for the better part of the last.[27]

Participants in the OReGO program select from one of the approved account managers who are highly-vetted, third-party companies that tabulate and submit mileage driven to ODOT.[28] Drivers in the OReGO program are charged 1.5 cents per mile, and are reimbursed for fuel taxes paid when purchasing gasoline.[29] Location data is tracked by account managers to limit charges to miles driven only in Oregon; however, location data is not passed from account management companies to ODOT, and data is destroyed on a scheduled basis to protect driver privacy.[30] A driver who drives 12,000 miles each year and has a vehicle that gets 30 miles per gallon would pay $120 in state fuel taxes and $180 in the OReGO program.[31]

MnDOT & MBUFs

[20] FHWA, 2014
[21] Levinson et. al., 2015
[22] Ibid.
[23] NCHRP Synthesis 487
[24] Ibid.
[25] Ibid.
[26] Oregon Department of Transportation
[27] Ibid.
[28] Oregon Department of Transportation
[29] Oregon Department of Transportation
[30] Oregon Department of Transportation
[31] Oregon Department of Transportation

MnDOT has also studied the use of mileage-based user fees as part of the Minnesota Road Fee Test published in February of 2013.[32] The goals of the project were to answer the following questions:

- How would the public react to a mileage-based fee?
- How would the public feel about privacy issues?
- What kind of administrative & operational support would be required in an MBUF program?
- What information would the public need to be accepting of alternative funding mechanisms?
- How would the public respond to "value-added" services like in-vehicle safety signage?

In the end, the Minnesota Road Fee Test laid the foundation for advanced testing of an MBUF system in Minnesota. The project simulated a robust test deployment and provided answers to the questions laid out above, but also uncovered a series of additional questions about implementation of a real-world MBUF program. Generally, drivers reduced their total trip mileage slightly, were more likely to participate if they were familiar and comfortable with technology use, and agreed that implementing a MBUF represented a good way to replace fuel taxes.[33] Further research must be done into how to best communicate information about an MBUF program with other transportation stakeholders and the traveling public, how the system could incorporate commercial vehicles, and the ability to manage the vast amounts of data created through the use of an MBUF program.[34]

[32] Rephlo, 2013
[33] Rephlo, 2013
[34] Ibid.