Context and Considerations of a Mileage Fee for Michigan

Prepared by

SMART - Sustainable Mobility & Accessibility Research & Transformation at the University of Michigan

for the

Michigan Environmental Council

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SMART, Sustainable Mobility & Accessibility Research & Transformation, is a multi-disciplinary initiative of the University of Michigan that undertakes and catalyzes research, tech transfer (living labs), education, and global learning exchange on a range of issues related to transportation’s role in a sustainable future locally and globally. It is a project of the Taubman College of Architecture and the University of Michigan Transportation Research Institute. Visit http://www.um-smart.org/blog/ to learn more.

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This report explores and explains options related to a potential mileage fee for Michigan. Mileage fees, (also called vehicle miles traveled [VMT] fees or road usage charges), are distance-based fees levied on motorists for use of a defined network of roadways (U.S. Department of Transportation Federal Highway Administration [FHWA], 2012). In other words, they are a simple market-based fee for service. Mileage fees can also include time, geography or congestion levels. Instead of continuing to raise fuel taxes to pay for transportation infrastructure, a mileage fee could more fairly allocate costs based on the number of miles driven, the time of day, the route taken, and the weight of the vehicle.

A mileage fee has a number of other advantages. It can:

- improve transportation efficiency and access,
- reconcile transportation funding shortages,
- increase public and institutional cost effectiveness and accountability,
- address institutional waste, and
- support environmental sustainability.

Recognized worldwide as a hub of transportation technology and ingenuity, Michigan has the opportunity to play a leading role in a growing nation-wide movement toward a mileage fee and other innovative market-based financing mechanisms. Such a system could improve economic stability of state transportation systems, facilitate fairer and more responsive fee structures, reduce the need for tax increases, and promote more efficient travel behavior.

This overview includes:

- potential economic, social and environmental benefits and challenges;
- practical options for data collection and fee collection;
- financing models and potential costs; and
- implementation and phasing options and strategies.

The purpose of this report is to inform a constructive dialogue about the benefits and challenges of a mileage fee for Michigan.

Michigan’s transportation system mirrors a widespread phenomenon of under-invested systems at the state and federal levels. Rising fuel economy reduces fuel consumption and, accordingly, per-gallon taxes collected. Combined with resistance to tax increases, the effectiveness of the fuel excise tax as a transportation funding mechanism has declined.

The Michigan Department of Transportation (MDOT) estimated in 2010 that an additional $12.1 billion dollars was needed to establish a transportation system that supports a
competitive economy and an improved quality of life in Michigan (Michigan Department of Transportation, 2010). That figure has since increased and will continue to do so until necessary investments are made.

Although increased transportation funding has been on Governor Rick Snyder’s agenda since 2011, both long- and short-term funding and solutions remain inadequate. Even if a significant increase were passed, it would not address the embedded shortcomings of current transportation funding mechanisms.

The State of Michigan is at an opportune moment to rethink how its transportation system is funded and managed. A mileage fee approach is one option.

This report draws from a variety of professional and academic sources, as well as from mileage fee pilot projects and policies in the United States and abroad. It incorporates views and concerns of thought leaders, policy experts, advocates, and practitioners from Michigan and beyond. Its aim is to inform dialogue and policy-making on sustainable and responsible transportation funding and financing mechanisms for Michigan.
An entrepreneur in Detroit finishes her coffee, types the address for her first meeting into her smartphone’s navigation system, and checks her email as she rushes out the door. She receives her monthly mileage bill via email and pays it with a single click. Her car is loaded with the mileage data collection technology so the day’s travel information will be automatically updated to her online mileage profile. Since she’s able to view her travel behavior through her online profile, she adapts her trips accordingly and consolidates meeting locations and times to decrease travel.

A retired veteran from rural Benzie County boards a bus to Traverse City for a medical appointment and to meet his granddaughter for coffee. The bus route expanded service since the implementation of a mileage fee stabilized funding for public transit. The retiree enjoys the freedom that expanded transit options provide. During their coffee meeting, his granddaughter tells him that she recently purchased a new car, which came equipped with mileage data collection technology. After they are finished visiting, she drives her grandfather home and on the way back she checks the mail and sees that her monthly mileage bill has arrived in the paper form she requested.

An engineer at MDOT meets with a project team to discuss traffic management strategies for state trunk lines in downtown Lansing. A state mileage fee policy adopted three years ago has provided sufficient funding to fix potholes and stabilize aging bridges across the state. The engineer explains that there is now funding available to develop more robust and high-tech infrastructure improvements. He presents research on similar projects in Minnesota and Illinois, and is excited to bring Michigan to the forefront of transportation engineering and technology.
Several states and public institutions are studying the potential for a mileage fee policy, including Texas, Minnesota, Florida, Wisconsin, and Nevada. Oregon recently adopted a Volunteer Road Usage Charge Program (FHWA, 2014). Overseas, distance-based user charges are already in place for trucks in Germany, Austria, Switzerland and the Czech Republic (Slone, 2009). The policy is also being studied at the University of Iowa and elsewhere (FHWA, 2014). Below are examples of mileage fee research projects underway.

**Pilot Projects and Volunteer Road Usage Charge Legislation in Oregon**

Oregon is leading the nation in mileage fee research and policy. A task force was created in 2011 that completed a Road Usage Charge Pilot Program in 2007 to better study a potential Road Usage Charge Program, and completed a second pilot project in 2012 to refine the details (Oregon Department of Transportation [ODOT], 2014). After successful completion of the second pilot project, the Oregon legislature authorized the Oregon Department of Transportation to establish a Volunteer Road Usage Charge Program for 5,000 vehicles which is set to begin on July 1, 2015 (ODOT, 2014).

The Oregon pilot projects have used the following technologies, which could potentially be used in their Volunteer Road Usage Charge Program:

- an in-vehicle diagnostic board,
- a GPS device with location differentiation,
- a Bluetooth device that sends signal through a mobile phone, and
- vehicle telematics, which utilize technologies already equipped in newer vehicles.

**An Exploratory Report for the State of Texas**

The Texas Transportation Institute at Texas A & M University has completed an extensive exploratory study in partnership with the Texas Department of Transportation and the Federal Highway Administration. It examines the potential for a vehicle mileage fee in Texas (Baker, 2011). The report, published in January 2011, evaluates vehicle mileage fees as a funding mechanism to meet the state’s long-term transportation needs. Researchers held focus groups with stakeholders and the general public, and prepared a decision matrix to outline potential benefits and challenges of the policy (Baker, 2011).
The Texas study revealed the following challenges and opportunities (Baker, 2011):

**Challenges:**
- Privacy
- Cost of administration
- Enforcement
- Lack of public understanding about current transportation funding mechanisms
- Fairness concerns among rural and low-income drivers

**Opportunities:**
- Mileage fees are a sustainable option to supplement or replace the fuel tax
- Policy design can address any major public acceptance issues

The Texas study recommends a pilot project that focuses on electric vehicles, various payment options, administration and enforcement options, and includes both a low-technology deployment option, such as odometer readings, and a high-technology alternative that incorporates Global Positioning System (GPS) receivers (Baker, 2011).

The Texas study used a combination of public participation and traditional research methods to understand the potential benefits, challenges, and impacts of a mileage fee.

**A National Evaluation of a Mileage-Based User Charge from the University of Iowa**

The University of Iowa’s Public Policy Center completed a two-year study in 2010, evaluating mileage-based charges for drivers at the national level. The study consisted of 2,650 volunteers from 12 geographically diverse areas across the country (Hanley, 2011). It used onboard computers (OBCs), which contained GPS receivers with the ability to differentiate between the taxing jurisdictions in which the vehicles traveled (Hanley, 2011). The study aimed to measure both the technology and the user perception of the policy (Hanley, 2011). For this study, 92.5 percent of all miles were successfully measured by the system and 71 percent of participants had a positive view (Hanley, 2011). The study also revealed that allowing participants to audit their travel behavior, in the form of detailed monthly invoices, increased their level of acceptance (Hanley, 2011).

The Public Policy Center is conducting a second study investigating and testing a new approach for data and fee collection for a road user charge (The University of Iowa Public Policy Center, 2014). This study focuses on testing the OBC technology and understanding user accessibility and acceptability for the technology itself as well as for a mileage-based road user charge.
OVERVIEW OF THE BENEFITS

Increased Economic Sustainability and Fairness
A mileage fee policy is a long-term, sustainable, and fair way of assessing use on the transportation system because road damage is a function of the amount of travel and weight per axle of vehicles (Coyle, 2011). A pricing system that takes into account both of these variables as well as road type, time of day, and congestion costs has the ability to adequately compensate the system for use. Such an approach is particularly attractive because it allows a fairer funding of roads between rural, suburban, and urban residents (Coyle, 2011; Moradi, 2012). Forming a direct relationship between use of the system and fees assessed improves economic fairness, provides adequate funding, and captures externalities that are not addressed through the fuel excise tax (Moradi, 2012).

Increased Road Use Efficiency
Efficiency is another inherent benefit of a mileage fee. When a mileage fee is designed to behave like a user fee and capture the multiple costs of road usage, it reduces use and alters driver behavior in a way that the fuel excise tax does not (Coyle, 2011; Moradi, 2012). Studies reveal that drivers adapt their travel behaviors to visible pricing signals (Coyle, 2011). Although the current fuel excise tax provides a similar user fee effect, a mileage fee is a more direct measure of vehicle impact to roads. Increased fuel efficiency alters this direct relationship. For example, a compact car and an SUV pay different amounts for driving the same distance because of differences in their respective fuel efficiencies.

Specifically, if individuals understand the cost of their driving through an easily accessible breakdown of the different variables impacting their assessed fee, they can alter the amount of miles they travel, time of travel, type of vehicle they purchase and mode choice to help them save money (Coyle, 2011; Moradi, 2012).

Decreased Congestion
The fuel excise tax doesn’t account for the cost of congestion. A mileage fee can be priced according to variation in travel time and location to capture externalities like congestion. Congestion costs arise from additional fuel consumption, travel delay, total miles traveled, and vehicle weight. For example, Detroit ranks tenth in the nation in the cost of congestion among large US cities -- more than $2.4 billion in 2007 (Texas Transportation Institute, 2009). A policy that incorporates a premium for travel on certain roads during peak hours would allow people to adjust their travel patterns in response to this premium.

Increased Use of Other Modes of Transportation
A mileage fee can encourage a greater balance between personal automobile travel and other modes of transportation (Coyle, 2011). When users better understand their cost impacts on their own wallet, they become better equipped to understand the benefits and savings.
associated with other modes of transportation such as public transit, walking, biking, carpooling or telecommuting (Coyle, 2011). Michigan, which widely lacks reliable and convenient public transit options, would benefit from allocating some of the increased revenue to improving the quality, accessibility and reliability of alternative travel options.

All successful congestion pricing policies have been linked to a robust transit component. Drivers are much more likely to switch modes if significant improvements to alternative modes have been made (Coyle, 2011). For example, when Singapore introduced a congestion pricing system, it also invested in bus and rail transport and saw a 27 percent increase in public transit use over the 30 year period (Coyle, 2011). Understanding and reacting to the cost of one’s driving could influence travel time, route, and frequency -- but not mode if there is no reliable and efficient alternative.

**Data That Informs**
An indirect benefit of a mileage fee policy is the ability to better understand, and therefore, better invest in the transportation system. Data collected about travel behavior will help planners and engineers better understand trends in the transportation system and allow them to more strategically invest in maintenance and improvement projects.

**Environmental Impacts**
Many of the benefits described above translate to reduced impacts on the environment. A decrease in vehicle miles traveled lowers greenhouse gas emissions, reduces conventional pollution and can help reshape land use choices as the price of sprawl is reflected directly in costs to drivers.
OVERVIEW OF THE CHALLENGES

Public Acceptance
One of the most significant barriers to a mileage fee policy is public acceptance (Baker, 2011). Shifting from a relatively invisible tax structure (the fuel excise tax), to a highly visible user fee assessed on a regular basis will require intense public outreach and facilitation. Officials with the Oregon Department of Transportation (ODOT) underscored the importance of public outreach, promotion, and education. ODOT facilitated many public participation meetings and outreach sessions throughout the process and continues to do so as they move into the implementation phase of the volunteer program.

Administrative Costs
Implementing an entirely new system will require significant investment, especially at inception. Pilot projects and additional research will be a key to understanding and weighing technology, data collection, and fee options. The Oregon pilot projects revealed that administrative costs are expected to range from 5-11 percent of total revenue. Such a cost range is generally acceptable for a program, and cost will vary based on whether it is administered by a government department or a private sector company, as well as the types of technologies and other options used. Typically under private sector partnerships, there is potential to minimize administration costs at or below 5 percent (ODOT, 2013).

Privacy Concerns
Privacy issues will be at the forefront of this kind of policy. Public outreach and education efforts will be important to address these concerns. Privacy concerns will vary based on technology options and policy design. There are many opportunities to mitigate privacy concerns. They include providing multiple data and fee collection options and engineering privacy protections into the system.

Through public input, the Oregon Road Usage Charge Program addressed privacy concerns in several ways. These included incorporating clear restrictions about the release of personal information and using a marketplace approach for technology options, which allows drivers to choose a technology option that is compatible with their privacy concerns.

Enforcement
A potential challenge for a mileage fee policy is program enforcement. Data collection devices could be linked to odometer readings to minimize the potential for manual device disconnection.

Payment enforcement is another variable that could challenge the policy. A simple solution would be to tie vehicle registration to mileage fee bill payments. For example, an individual would be unable to renew his or her vehicle registration with the state if their mileage fee bill is not current. Further research and pilot projects would likely reveal other opportunities and challenges to program enforcement.
IMPLEMENTATION OPTIONS & APPROACHES

Technology

Mileage Fee Technologies Are Simple to Deploy
There are minimal technological challenges for implementing a mileage fee and collecting associated data. While low-tech options such as odometer readings could be used, simple high-tech solutions would be ideal for collecting comprehensive travel data, allowing individuals to audit their transportation behaviors and creating data for planners and engineers to work with. Low-tech options, such as odometer readings, would be unable to account for travel outside of the state or for miles traveled in Michigan by out-of-state drivers. Such shortcomings could pose a significant threat to the long-term viability of the system.

When technologies record mileage data, it is transmitted electronically to a data collection center. The center converts the data into a readable format where it is sent to a processing center (ODOT, 2013). The processing center calculates mileage fees. From the processing center, fees are assessed to drivers and an accounting system records and manages billing and payments (ODOT, 2013).

The key to a successful mileage fee program is allowing drivers to choose the data collection and payment method that best fits their lifestyle. There are several Michigan-based companies that could facilitate a private marketplace for a mileage fee program. These include, but are not limited to, Accenture, Accretive Solutions, Alix Partners, BRTC, Boston Consulting Group, EquaTerra, Genesis 10 Consulting, ICF International, McKinsey & Company, and Wipro. Below is a sample list of data and fee collection options that could be implemented.

Data Collection

1. Flat Rate Fee or Low-Tech Options
One of the simplest options for is to charge drivers based on an average rate. Drivers who chose this option would be assessed a yearly fee based on estimated mileage for the vehicle class. For example, under the Oregon program, drivers who do not want to install mileage devices in their cars are allowed to participate in the flat fee program where drivers are assumed to drive 35,000 miles per year (ODOT, 2013). This option would allow individuals who prefer not to utilize mileage tracking devices or other technologies to easily participate in the program.

Other data collection options could be implemented without technologies being installed into the car—such as self-reporting, annual check-ups, and mileage estimates based upon fuel consumption (Duncan, 2013). However, these options have proved prohibitively expensive in several pilot programs.
2. Gas Pump Reporting and Collection

There are two options for gas pump reporting and collection. One option requires vehicles to be equipped with an automatic vehicle identification (AVI) device that transmits vehicle fuel economy rating to the fuel pump (RAND, 2011). The fuel economy rating is then multiplied by gallons purchased to estimate mileage, and the resulting fee is added to the price of the gas.

A second option for uses an on-board computer (OBC) to collect mileage data. Whenever the driver pumps gas, a shortwave radio would transmit mileage data to the fuel pump service system where both the cost of gas and the mileage fee were included distinctly in one bill (Slone, 2009).

3. Smartphone Applications

The widespread popularity of smartphones provides an easy solution for data collection through GPS-based technologies which are already enabled within most smartphone devices (Wired, 2011). Smartphones can be activated to differentiate mobility and location in a vehicle and thereby determine the appropriate mileage fee (ODOT, 2013). It is also important to acknowledge that the promise of Smartphone applications will not be an accessible option for drivers without smartphones.

4. GPS (including vehicle telematics)

Finally, and perhaps the most straightforward option for mileage data collection is GPS and vehicle telematics technologies. Almost all vehicles manufactured since 2010 contain vehicle telematics which have the ability to report the distance, location and time that a vehicle is driven (often used with services such as OnStar and FordSync) (D. Berdish, personal communication, 2014). This system could easily be enabled to collect travel data.

GPS can also be easily integrated into older vehicles through attaching a transponder, about the size of an ink cartridge, to the vehicle’s computer system (J. Whitty, personal communication, 2014). This technology has been tested in Oregon’s pilot project. It also is used by auto insurance companies that offer discounts for safe driving habits such as Progressive Insurance Company and Allstate Insurance Company through their respective “Snapshot” and “Drivewise” discount programs (Progressive Casualty Insurance Company, 2014; Allstate Insurance Company, 2014).
Utilizing this technology would be beneficial because it could allow drivers to better understand their driving behavior and respond accordingly (to lower their mileage fee, for example) and collect more dynamic information about the location and time drivers traveled which would allow for dynamic pricing opportunities.

Below is a table that summarizes the tradeoffs in technology in terms of the level of information the technology can collect, and its adaptability to changing conditions. It is important to note that the issue of adaptability should be considered seriously in order to better capture travel behavior externalities and be flexible with policy changes. Technologies with a high ranking of adaptability are able to record and transmit more detailed travel information, such as location and time, under different circumstances.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Amount of Info. Collected</th>
<th>Adaptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat Rate Fee</td>
<td>LOW</td>
<td>LOW</td>
</tr>
<tr>
<td>Gas Pump Reporting and Collection</td>
<td>LOW</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>Smartphone Applications</td>
<td>MEDIUM / HIGH</td>
<td>HIGH</td>
</tr>
<tr>
<td>GPS / Vehicle Telematics</td>
<td>HIGH</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

**Fee Collection**

Regardless of the level of technology, there is also a variety of payment method options. These options are listed below:

**1. Pay at the Pump**
Fees can be paid at one particular location or through a periodic billing process. For example, mileage data can be sent electronically via radio frequency to gas stations where drivers pay fuel and mileage costs together at the pump.

**2. Mail or Online Payment**
Fees could also be generated separately where they are billed and paid online or by mail. Third-party administration may be incorporated, where private companies manage fee collection and transfer revenues to the appropriate government department, or it could be administered publicly through the Secretary of State.
3. In-person Payment - Secretary of State
A mileage fee policy could include an option for in-person payment. This would allow people to pay their mileage bill with cash, check or using a bank card at the Secretary of State or at a location administered by private contractors. Bills could be structured so that drivers could pay in person every month or pay annually when they renew their vehicle registration.

Pricing
The challenge of creating a fee formula will likely require comprehensive research and pilot projects to create an equation that is both fair and provides necessary revenue generation. Fees may comprise several factors beyond vehicle miles traveled, such as the rate of inflation, weight of the vehicle, time, or location of travel.

A successful policy would also be designed so that legislative action is not necessary to make incremental changes in fee rates so that the same political barriers that exist to raising the current fuel excise tax are not re-created with a mileage fee policy.

Policy
A Variety of Options
A mileage fee policy can be designed to allow users to choose among many different options for data and fee collection as well as opportunities to lower costs through travel behavior changes. Pilot project reports from Oregon and in studies from the University of Iowa and Texas A&M University suggest that opportunities for users to choose their preferred methods for data and fee collection are a strong indicator of overall acceptance and success of a mileage fee policy (Baker, 2011).

Balancing Privacy and Technology
Policies and technologies must address privacy concerns to gain public acceptance. Through a marketplace, drivers could be informed of technology options and how those technologies protect privacy (ODOT, 2014).

Another essential balancing force between privacy and technology will be private/public partnerships. The public sector could ensure compliance with privacy rules and the private sector could ensure the reliability of the technology and the mileage fee marketplace. The incorporation of the private sector could also lower costs. A third party administrator could also ameliorate any issues associated with government intrusion into private information.
Additional research, in-depth pilot projects, and an extensive public outreach campaign will be necessary to learn more about the policy option of a mileage fee and to find the best potential ways to introduce it as a mechanism to fund Michigan’s transportation system.

**Additional Research**
The first step in assessing a potential mileage fee policy would be a comprehensive study analyzing the policy at a deeper level beyond the scope of this report. For example, the Michigan Department of Transportation could complete an internal study, the Michigan Legislature could work with the Legislative Services Bureau to complete research, or either of these groups could commission a study with one of Michigan’s research universities or a policy consultant.

Additional research could include taking a closer look at the data for vehicle miles traveled, minimum revenue needs, and public acceptance. Other important topics for additional research that were not incorporated into this report include:

- implications for heavy trucks,
- opportunities for connected vehicle technology or automated vehicle technology,
- urban and rural differentiators,
- implications for electric and hybrid vehicles, and
- social justice impacts.

**Mileage Task Force**
A mileage fee task force could be an immediate next step for the legislature or the Michigan Department of Transportation. A task force could include transportation policy experts, legislators, researchers, local elected officials, urban planners, and engineers. This group could be responsible for commissioning studies, initiating outreach efforts, communication between stakeholders, and administering pilot projects.

**Pilot Projects**
Pilots would be essential to test potential policy options and public acceptance. They could be implemented through a partnership between the Michigan Department of Transportation and Michigan research universities or private consultants. Pilot projects would allow a group of volunteer drivers to participate in a mileage fee program using potential technologies and payment methods. After each pilot period, researchers and policy makers would assess issues associated with the technology, policy design, and public acceptance. Multiple pilot projects could ease out any program issues until a more finalized policy is developed for large-scale implementation.
Public Outreach
An essential component to moving forward with this policy option would be crafting a public outreach strategy that is accessible, educational, and constantly developing as the research and pilots develop. Public outreach could include hosting community meetings, creating informational documents, participating in social media, sending traditional mailings, or sponsoring television commercials. Public outreach could be coordinated by a potential mileage fee task force, the Michigan Department of Transportation, Michigan legislators, research teams or a combination of all of these actors. Creating a clear and streamlined outreach strategy would be key to soliciting public feedback and understanding concerns.

Phasing
A phasing strategy would likely be required as part of an implementation strategy. This process would consider the possibilities of an immediate rollout or a mandate that requires drivers to enter the program over time. Additional research, other precedents, and intense pilot projects would likely develop potentials; however, phasing options could include introduction to the program based on birth date so that all vehicle registrants will enroll in the system over a period of one year. Another option would be to first introduce the program on a volunteer-only basis and gradually mandate enrollment based on another standard. For example, the Oregon road User Charge Program will begin the process of phasing by first creating a mandate for vehicles that are model year 2015 and older or have a fuel efficiency rating of 55 miles per gallon or above. Voluntary vehicles that do not meet these criteria may also participate, but the volunteer program is limited to a maximum of 5000 participants (ODOT, 2013).

As a statewide policy is gradually phased in, program enrollees could receive a bill or reimbursement based on the relationship between fuel excise taxes paid and their accrued mileage fees. Policies also need to address the costs incurred from out-of-state drivers traveling in Michigan who would not be enrolled in a mileage fee program. After all drivers are phased in to the program, the state fuel excise tax could be eliminated and drivers would pay the full amount of their mileage fees.
CONCLUSION

This paper was designed to provide a foundational understanding of how a mileage fee might work in Michigan; and more importantly, to enrich the conversation at the state level about the opportunity to provide a long-term, efficient, fair, and sustainable funding mechanism for Michigan’s transportation system, and to move away from a less and less sustainable fuel excise tax system. Next steps in the exploration could begin right away. A mileage fee task force could be established to undertake further research, work with key stakeholders, and where appropriate, initiate pilot projects.

The longer any state waits to reform its transportation funding system, the more expensive the fix will be. As a leader in transportation technology and innovation, Michigan has an opportunity to lead the nation in transforming the currently outdated transportation funding mechanisms to one that is more fair, sustainable, and self-sufficient.


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