

Vehicle Miles Traveled (VMT) Tax: An Alternative To the Gas Tax for Generating Highway Revenue

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KEY SEARCH TERMS:

Vehicle miles of travel

Distance based fares

Highway user taxation

Distance-based tax

User charges

Research Synthesis Bibliography No. 19

Research Synthesis Bibliographies (RSBs) are distillations of relevant transportation research on current topics of interest to researchers, engineers, and policy/decision makers. Sources cited are available for loan (or available through Interlibrary Loan) to VDOT employees through the VDOT Research Library.

As Traditional Fuel Taxes Fail to Meet Revenue Needs, Transportation Professionals Explore the VMT Tax as an Alternative Funding Mechanism

Fuel taxes have been the primary means of collecting revenue to finance construction, operation and maintenance of US highways since the 1920s. With increasing use of hybrid and fuel efficient vehicles, aging transportation infrastructure, rising construction costs and inflation, transportation budgets are strained. The fuel tax alone is expected to be inadequate to meet public highway finance requirements within the next 20 years.

The National Chamber Foundation, a public policy think tank affiliated with the U.S. Chamber of Commerce, estimates that between 2006-2015 Highway Trust Fund revenues will fall \$23 billion short of the amount needed to maintain the present U.S. highway system and \$48 billion short of the revenue needed to improve the existing system. (Innovation Briefs, March/April 2006)

From 1970 to 2003, the gasoline tax revenue in Oregon had declined by half in 'cents per vehicle mile traveled' (after adjusting for inflation). "The gasoline tax is failing the purpose for which it was originally intended – funding the operation and maintenance of Oregon's road system." (Whitty, 2007). Many other states now recognize that for political and economic reasons fuel tax revenues will not keep pace with improvement in vehicle fuel efficiency, which is identified as the leading cause of declining fuel tax revenues in the future.

One alternative widely proposed to the fuel tax is a "Vehicle Miles Traveled" (VMT) tax. Under this system, drivers pay a fee based on miles traveled rather than a tax on the amount of fuel used. The VMT tax concept can serve broader policy aims as well, by enabling policy makers to set variable fees in different network areas to reduce congestion during peak travel times, a critical and worsening issue in some metropolitan areas.

Potential challenges to implementation of a VMT tax were addressed recently by the Oregon Department of Transportation in a pilot study of a VMT-type tax. Oregon DOT encountered issues of the efficiency and reliability of the technology required, the cost associated with fitting vehicle-monitoring equipment, public acceptance of the new system, increased burden on the private sector to collect fees, the cost of the new fee collection systems and the associated security and privacy issues involved in tracking miles traveled. The Oregon Pilot Study ultimately found, however, that the VMT tax is "workable and practical, a genuine alternative to the gasoline tax." (Whitty, 2007).

States and Countries Exploring VMT Taxation		
Domestic		Foreign
Alabama	Michigan	Canada
California	Minnesota	Denmark
Iowa	Utah	United Kingdom
Indiana	Washington State	Germany
Kentucky		

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OVERVIEW

Research Synthesis Bibliographies (RSBs) are selected lists of resources on current topics of interest to VDOT employees or divisions. When available, links to online documents are provided.

RSBs are “selective listings,” organized and distilled from the larger universe of research materials to save the researcher’s time. Selection criteria used by library staff include authority, relevance, and timeliness.

GETTING RESOURCES LISTED HERE

Full text copies of most resources listed in this document are available in the VDOT Research Library’s collections, or through Interlibrary loan, through the Library. In many cases, the Library owns both virtual and hard copies of documents, as well as formats such as CD-ROM.

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Vehicle Miles Traveled Tax Reports and Initiatives by State/Country

The following sources are listed on a state-by-state basis, and consist of journal articles, research reports, and other documents etc. are listed in alphabetical order by title.

ALABAMA

Alternate Financing Sources for Alabama Highways.

CITATION: Virginia P. Sisiopiku, Johnnie C. Waid, Tarek Rizk, et al.2006. University of Alabama, Birmingham; University Transportation Center for Alabama. Pg 78.

ABSTRACT: Building and maintaining an effective highway system is important to safeguard the mobility and safety of the traveling public, as well as to support economic growth. Aging infrastructure and the continuing increase in vehicle miles traveled, coupled with increased construction and maintenance costs, place added burdens to already strained transportation funding resources. To make things worse, declining transportation funding is a reality that is faced by most states across the country and is a concern of the Federal Highway Administration. To address such issues this study investigated both traditional and innovative highway financing options and assessed their potential for securing funding for highway related projects in the near- and long term. Options considered include: (a) vehicle mileage road user fee, (b) heavy truck road user fee, (c) public toll roads, (d) private toll roads, (e) privatization of highway projects, (f) private funding using bonds, (g) inspection fees, and (h) increase in the fuels tax. For each option, implementation requirements, institutional issues, and anticipated costs and benefits from adoption were identified and assessed. The evaluation of alternative revenue sources performed in this study was based on revenue potential, equity, efficiency, and political acceptability to tax payers and government decision makers. Based on the comparison of alternative revenue generating options considered, recommendations were offered on financing solutions with the best potential for implementation. The review and evaluation of available options indicated that, for the immediate future, the most desirable solution to funding Alabama's highways with respect to efficiency and effectiveness is to increase the fuel tax to at least \$0.27 per gallon. However, as the gasoline tax revenue declines, additional options should be considered and future plans made to implement alternative financing solutions to complement or replace the fuel tax revenue. The most promising options include inspection fees, toll collection, and reallocation of funds generated from vehicle registration fees and title fees.

DATABASE: Transportation Research Board

ACCESS: http://utca.eng.ua.edu/projects/final_reports/05114fml.pdf

The Potential of the Vehicle Mileage Road User Fee as an Alternate Financing Option for State Highways.

CITATION: Sisiopiku, Virginia P. PhD. 2006.

ABSTRACT: Building and maintaining an effective highway system is extremely important to the quality of life of the citizens and the local economy. Projections of decreased revenue for highways in many states come at a time when current revenue sources are already strained. This creates a need for innovative ways to be considered to secure funding for highway projects. As a case study, this paper investigates current and future options for financing highway-related projects in the state of

Alabama. Currently, approximately 70 percent of income for Alabama's Highway Fund is generated through the gasoline and motor fuels taxes. However, changes to the present system may be required to account for the increase in fuel efficient vehicles on Alabama's roadways. As the number of these vehicles increases, revenue collected by the state from gas taxes is expected to decrease, which may further hinder the ability of the state to finance the construction or maintenance of roadways. Therefore, it is imperative that the state identifies, evaluates, and adopts alternative financing solutions to ensure sustainability of highway funding. The objective of this research is to determine alternative and innovative solutions to fund Alabama's highways in the near- and long terms. In this paper, the vehicle mileage road user fee is evaluated as an alternative revenue source, based on its revenue potential, equity, efficiency, and political acceptability to the tax payers and decision makers in Alabama. The findings from the case study can be very useful to local officials as well as to decision makers in other states that are seeking alternative sources of highway financing.

ACCESS:

http://www.dot.state.co.us/StateWidePlanning/PlansStudies/Blue_Ribbon_Reading_Material/Potential_of_VMT_as_Financing.pdf

CALIFORNIA

Transportation Pricing Strategies for California: An Assessment of Congestion, Emissions, Energy, and Equity Impacts.

CITATION: E. Deakin, G. Harvey, R. Pozdena, et al. 1996. United States. Pg. 406.

ABSTRACT: This study investigated five categories of transportation pricing measures - congestion pricing, parking charges, fuel tax increases, VMT fees, and emissions fees. Advanced travel demand models were used to analyze these measures for the Los Angeles, Bay Area, San Diego, and Sacramento metropolitan areas. The analyses indicate that transportation pricing measures could effectively relieve congestion, lower pollutant emissions, reduce energy use, and raise revenues. Because auto use and its impacts are quite inelastic to price, sizable increases in revenue can be obtained with relatively little effect on travel; conversely price increases must be large to obtain sizable reductions in travel and its externalities. Note: Compiled and Distributed by the NTIS, U.S. Department of Commerce.

ACCESS: <http://www.uctc.net/papers/434.pdf>

Where the Rubber Meets the Road: Reforming California's Roadway System.

CITATION: Randall J. Pozdena. 1995. Reason Public Policy Institute.

ABSTRACT: The current system of roadway pricing and finance in California primarily employs fees applied to retail motor fuel sales. Consequently, most users of roadways pay a price for road use that is in proportion to fuel consumed, rather than in a manner that corresponds to their individual imposition of costs on the particular roadways actually used. The lack of correspondence between actual roadway costs and prices paid for using roads can be linked to both the poor operating characteristics of California roads and the deterioration in the financial competence of the road finance system. This paper discusses a reform of California's roadway finance process that seeks to avoid the degenerative consequences of the current, non-cost-based system. The paper first reviews briefly the key issues raised by the current system of

pricing and finance, the broad trends in roadway use and finance, and the current structure of roadway finance. The paper then identifies opportunities for cost-effective reform of the current structure and discusses how a more robust road pricing scheme might be implemented. The paper concludes with discussion of the public administrative issues in implementing such a reform.

DATABASE: National Transportation Library, Research Paper

ACCESS: <http://www.reason.org/ps191.html>

COLORADO

Transportation Pricing Strategies for California: An Assessment of Congestion Colorado Transportation Finance and Implementation Panel 2008.

CITATION: Colorado Gov. Bill Ritter established the 32-member Colorado Blue Ribbon Transportation Finance and Implementation Panel in 2007. The group and its technical advisory council met numerous times and completed a final *Report to Colorado* in January 2008. The Governor also directed the panel to draft specific proposals to be considered during the 2009 legislative session. The panel's work was initially completed November, 2007 (note: Governor Ritter subsequently extended the panel). In its *Final Report to Colorado* (2008), the Panel documents a \$51 billion gap in the state's current funding versus the 2030 "cost to sustain" its infrastructure; the gap between current revenues and the state's transportation 2030 transportation vision was twice that large. The panel's preferred alternative would produce a \$1.5 billion increase in annual revenue for transportation. The Colorado panel considered 39 revenue options, including VMT taxes. Although the Colorado panel did not endorse VMT fees as an immediate priority, they did endorse a pilot program of VMT fees for the state. In doing so, the panel said that it recognized that reliance of fuel taxes might not make for sustainable funding. The panel also concluded that VMT fees had great potential for improving the efficiency of the network and spreading demand (Colorado Transportation Finance Panel, 2007)

ACCESS:

http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobheadername1=Content-Disposition&blobheadername2=MDT-Type&blobheadervalue1=inline%3B+filename%3D442%2F774%2FCDOT_BPRFullReportFNL.pdf&blobheadervalue2=abinary%3B+charset%3DUTF-8&blobkey=id&blobtable=MungoBlobs&blobwhere=1191379297417&ssbinary=true

INDIANA

Implementation and Evaluation of Self-Financing Highway Pricing Schemes: A Case Study.

CITATION: Jung Eun Oh, Samuel Labi and Kumares C. Sinha. Transportation Research Record: Journal of the Transportation Research Board 2007. Transportation Research Board. No.1996, pp-25-33.

ABSTRACT: With the current and projected shortfalls in revenue vis-a-vis increasing needs, many transportation agencies are increasingly seeking alternative funding sources to supplement income from the motor fuel tax. One promising alternative, the fee for vehicle miles traveled (VMT), entails payment by drivers on the basis of their

actual share of facility usage. This paper uses economic theory and travel demand and highway expenditure data from the State of Indiana as a basis to establish efficient VMT fee rates under various expenditure and funding scenarios. The authors have found that a VMT fee of 2.9 cents per mile, plus federal aid, would cover current expenditures for state-administered highways in the absence of any other revenue source, and that a fee of 2.2 cents per mile would be sufficient if revenue from vehicle registration was maintained. To cover the expenditures supported only by state-generated funds, the fee would be 1.3 cents per mile with vehicle registration revenues and 2.0 cents per mile without. This paper also establishes equitable fee structures that ensure self-finance of each facility class, as well as an alternative uniform-rate fee structure that entails cross-subsidy across facility classes. For the latter, it was found that the urban highway system would subsidize the rural system, the rural Interstate system would subsidize the rural non-Interstate system, and the urban non-Interstate system would subsidize the urban Interstate system. Different VMT fee structures could be established on the basis of desired levels of equity across the facility or user classes and technical feasibility of the implementation of VMT fees.

DATABASE: Transportation Research Board
ACCESS: Available through Interlibrary Loan to VDOT employees.

IOWA

The University of Iowa's "National Evaluation of a Mileage-Based Road User Charge" Study

CITATION: The University of Iowa's Public Policy Center initiated this four-year evaluation study to more fully test and refine VMT charges, following its earlier (2002) completion of a Part I study. The Part I study involved the Federal Highway Administration (FHWA) and 15 state departments of transportation. The Part II study is intended to evaluate the appropriateness of the technology developed in Part I and to fully assess user acceptability (Public Policy Center, 2007). The research team's objective at the end of two additional years of field testing is to have developed a fully operational system to enable a VMT tax to be implemented. Six test sites have been identified for the Part II study, including two in the mid-Atlantic region (Baltimore, MD and the Research Triangle of NC). The sample of participants for the Part II study at all six locations is projected to be 2700. Monthly questionnaires for participants will allow the researchers to track study participants' reactions to the VMT charges over time, and to further evaluate performance of the on-board equipment (Public Policy Center, 2007).

ACCESS: http://ppc.uiowa.edu/dnn4/Portals/0/OverviewNov_1_07.pdf

KENTUCKY

Review of Highway Cost Allocation Methodologies. Final report.

CITATION: J. A. Deacon, J. G. Pigman and N. Stamatiadis. 1992. University of Kentucky, Lexington; Kentucky Transportation Cabinet; Federal Highway Administration. Pg. 202.

ABSTRACT: The objectives of the current cost allocation study, the fifth in a series begun in 1982, include the following: 1) to evaluate current cost allocation

methodologies and identify possible changes to Kentucky practices; and 2) to determine the 1991 fiscal year levels of cost responsibility and revenue contribution for each of several classes of highway users. Additional objectives include an evaluation of the equity of tax proposals advanced by the Kentucky Motor Transport Association, a preliminary determination of the revenue and cost implications of the Extended-Weight Coal Haul System, and an evaluation of the efficiency with which certain highway user taxes have been collected. As was the case in other recent cost-allocation studies, incremental cost assignment has been replaced with various highway use measures including vehicle-miles of travel, axle-miles, passenger-car-equivalent miles, and equivalent-single-axle-load miles. Results from the analysis indicate that cost responsibility was borne most heavily by passenger cars and motorcycles (44.2%). Other cost responsibilities were 24.6% for heavy trucks; 20.4% for pickups and vans; and 10.8% for all other groups. When compared to revenue for each vehicle class; cars, pickups and vans, and heavy trucks exceeded their cost responsibility, while medium trucks fell significantly short. From a limited examination of the Extended-Weight Coal Haul System, it was found that an estimated \$2 million are lost annually from the Road Fund because fewer trucks are registered. Heavier weights of coal-decal trucks add approximately \$9 million annually to pavement overlay costs. It was found that the weight-distance tax was collected at an efficiency of about 70% and other user-reported fuel taxes of 75 to 77%.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

MICHIGAN

Transportation Funding: A Critical Economic Issue for Southeast Michigan Proceedings of the Transportation Funding Discussion Series.

CITATION: 2006.

ABSTRACT: This document describes the presentations and discussions that took place at Transportation Improvement Program Development Committee meetings in 2004 and 2005 surrounding issues on transportation funding. Those discussions also focused on the importance of the transportation system to the regional economy. The relationship of the transportation system and the economy is established, thus making adequate funding critical to ensuring a healthy economy. Based on these discussions, the TIPDC arrived at a set of conclusions and made recommendations for action to the Executive Committee. These are described here.

ACCESS: www.semco.org/WorkArea/downloadasset.aspx?id=1376

MINNESOTA

Road Finance Alternatives: An Analysis of Metro-Area Road Taxes.

CITATION: B. Ryan and T. F. Stinson. 2002. United States. Pg. CD-ROM.

ABSTRACT: Minnesota policymakers have a variety of tax options available to fund state and local roads. The current tax system uses both fixed fee mechanisms, like the vehicle registration tax, and taxes that vary with system use, like the motor fuels tax. Property taxes are an important source of road revenues, but they are hidden from the traveler's perspective, as are income and sales taxes, which find their way into

road funding through general fund transfers. Variable tax mechanisms send road users a clearer price signal about the true cost of travel. Alternative road taxes, like a vehicle mileage tax or congestion fee, bring about better travel decisions by factoring weight, distance, or time into the tax price. Concerns for improving system efficiency, however, must be balanced with tax fairness and administrative ease. Nearly \$1 billion of road-related taxes were collected in the seven-county Twin Cities metropolitan area during 1996. These taxes were levied and collected by federal, state, city, and county governments, and then redistributed in a series of intergovernmental transfers. Setting aside federal highway aid and local special assessments, four revenue sources define current road tax policy in the region. The state motor fuels tax raised \$240 million, and vehicle registration taxes generated another \$245 million. Local property taxes and state general purpose aids provided \$242 million and \$105 million respectively. Of these revenues, 71 percent are from fixed or hidden taxes and are unrelated to travel behavior. The way we pay for roads affects household budgets and creates location incentives. This study models the budget impact for a set of representative households, identifying the tax cost from an increasing work commute by moving the households further and further from the central cities.

ACCESS: Available through Interlibrary Loan to VDOT employees.

OREGON

Development and Performance Evaluation of a Revenue Collection System Based on Vehicle Miles Traveled.

CITATION: J. David Porter, David S. Kim, Hector A. Vergara, et al. Transportation Research Record: Journal of the Transportation Research Board. 2005. Transportation Research Board. No. 1932, pp 9-15.

ABSTRACT: The State of Oregon is heavily dependent on fuel tax revenues to maintain roads. Several technological developments, including the introduction and use of more fuel-efficient vehicles, will have a dramatic effect on fuel tax revenues in the near future. In response to these trends, Oregon House Bill 3946 mandates that the Oregon Department of Transportation (ODOT) begin implementing pilot systems to test alternatives to the current system of taxing highway use through fuel taxes. The Road User Fee Task Force (RUFTF) was created as part of the bill with the mission of developing a revenue collection design funded through user pay methods, acceptable and visible to the public, that ensures a flow of revenue sufficient to annually maintain, preserve and improve Oregon's state, county and city highway and road system. One alternative being considered by the RUFTF employs a fee based on vehicle miles traveled (VMT). This paper describes the development of two working VMT-based prototype technology configurations. This development effort was necessary because commercial-off-the-shelf technology with the functionality required by RUFTF was not available. Multiple concepts for on-vehicle mileage collection devices (using both odometer and Global Positioning System technology) and systems for fee calculation and collection were developed, integrated, and tested as part of the two prototype technology configurations. Results indicate that a VMT-based fee collected via radio frequency communications at service stations is technologically feasible.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

Oregon Officials will test per-mile fuel charge concept.

CITATION: K. McFall and A. Cho. ENR, 2005. McGraw-Hill Information Systems Company. Vol. 254, No. 14, Pg. 16.

ABSTRACT: The Oregon Dept. of Transportation (ODOT) is trying out a pay-as-you-go approach in an attempt to maintain fuel tax revenue levels for transportation funding. Motorists faced with higher gasoline prices are considering switching to fuel-efficient cars, thus impacting the availability of fuel tax revenues. Researchers at Oregon State University have designed an in-vehicle system that uses a smart odometer paired with wireless technology for calculating how many miles a vehicle travels before needing to be refueled. A fee, rather than a gasoline tax, would then be added to the cost of gas when refueling. In an effort to halt privacy concerns, researchers have made it clear that the system only receives location data and logs only the number of miles since the last refueling. In order to ensure accuracy, the proposed system uses Global Positioning System (GPS).

DATABASE: Transportation Research

Oregon's Mileage Fee Concept and Road User Fee Pilot Program Final Report.

CITATION: James Whitty. 2007.

ACCESS: <http://www.oregon.gov/ODOT/HWY/OIPP/docs/2005LegislativeReport.pdf>

Oregon's Road User Fee Pilot Program.

CITATION: Lisa Conley. 2006. Texas Senate Research Center. Research Spotlight.

ACCESS: <http://www.senate.state.tx.us/SRC/pdf/SL-Road-User-Fee-web.pdf>.

Oregon's Mileage Fee Concept and Road User Fee Pilot Program. Report to the 73rd Oregon Legislative Assembly.

CITATION: James M. Whitty and Betsy Imholt. 2005. Oregon Department of Transportation. Pg. 65.

ABSTRACT: This document reports on progress made since previous reports to the State Legislature in September 2002 through May 2005 by the Oregon Department of Transportation (ODOT) Office of Innovative Partnerships and Alternative Funding (OIPAF) in fulfilling the mandate of Oregon House Bill 3946 (2001). That legislation directed the Governor, Senate President and Speaker of the House to form a Road User Fee Task Force (Task Force) with the charge to design a revenue collection strategy that can effectively replace the gasoline tax in order to provide a long-term, stable source of funding for maintenance and improvement of Oregon's road system. The legislation also requires ODOT to staff the Task Force and to develop, design, implement and evaluate Pilot Programs to test the fuels tax alternatives identified by the Task Force. This report details important milestones along the way to developing an implementable alternative road revenue system and related Pilot Program, along with sufficient supporting analysis and explanation of outstanding technical and policy issues, to permit legislators to make their own assessment of program efficacy. The task force determined that a new road revenue system based on a properly designed per-mile charge would not be vulnerable to motorists obtaining increasingly fuel

efficient vehicles in response to rising prices at the gasoline pump. As administrator of the task force, the Oregon Department of Transportation determined that a per mile charge could be collected efficiently (through modern technology) and inexpensively. The task force agreed and concluded the per-mile charge to be a real, practical alternative to the current road revenue system. This document reports what the task force and ODOT have learned since issuance of its first report to the 2003 Oregon Legislative Assembly. This report has several purposes. First, it makes a case for developing a new funding mechanism for Oregon's road system, an ultimate replacement for the gasoline tax (Chapter 2). Second, it fully describes the Oregon mileage fee concept for the first time in print and lays out numerous policy choices for alternative mileage fee configurations (Chapter 3). Third, this report satisfies the statutory obligation to describe the progress on development of a Pilot Program for demonstrating the feasibility of the Oregon mileage fee concept (Chapter 4).

DATABASE: Transportation Research Board

ACCESS: <http://www.oregon.gov/ODOT/HWY/OIPP/docs/2005LegislativeReport.pdf>

Oregon's Road User Fee Pilot Project: Report on Start-Up.

CITATION: Anthony M. Rufolo, Lois Bronfman and Thomas J. Kimpel. Appearing in: Transportation Research Board 86th Annual Meeting, 2007. Transportation Research Board. Pg. 13.

ABSTRACT: Oregon is in the process of testing a GPS system that is capable of recording the zone in which a vehicle is being operated and is connected to a data port on the vehicle where mileage data from the odometer is obtained. Information on mileage by zone is then transmitted to the fuel pump when the vehicle is fueled at a participating station. The system has been installed in over 250 vehicles and two service stations. As part of the test participants agreed to be surveyed three times; and the owner and managers of the service stations agreed to be interviewed regarding their experience with the program. This paper reports on experience with the start-up both from the perspective of the participants and the service stations. The system will test the feasibility of mileage-based charges as a replacement for the gas tax. It is designed to be compatible with the gas tax and phased in over time. The only information collected is the total number of miles driven by zone. In its simplest form, the zones are simply in-Oregon and out-of-Oregon, but more complex zones are also being tested. Because of the need to be located near the participating stations and various restrictions on the vehicles eligible for participation, the participants are all volunteers. In addition to information on the installation and functioning of the system, the surveys give information on household characteristics and attitudes.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

Performance evaluation of an RFID-based vehicle-miles-travelled revenue collection system.

CITATION: J. D. Porter, D. S. Kim, H. A. Vergara, et al. International Journal of Radio Frequency Identification Technology and Applications, 2007. Inderscience Enterprises. Vol. 1, No. 2, Pg. 164-86.

ABSTRACT: In 2001, Oregon State University (OSU) in collaboration with the Oregon Department of Transportation and the Road User Fee Task Force (RUFTF) began

investigating a vehicle miles travelled (VMT) based alternative to the fuel tax. The culminating phase of this five year effort is the execution of a pilot test involving approximately 280 volunteer drivers. A specific VMT-based technology, referred to as the pilot test technology configuration (PTTC) will be used in the pilot test. This paper discusses the lessons learned in the design and development of the PTTC, especially the challenges faced with the use of RFID technology to identify and collect VMT data from equipped vehicles.

ACCESS: Available through Interlibrary Loan to VDOT employees.

Public Involvement and Road User Charge Development: Oregon's Experience.

CITATION: Jim Whitty, Jack Svadlenak and Darel F. Capps. 2006. Oregon Department of Transportation. Pg. 51.

ABSTRACT: In 2001, the Oregon Legislature created a Road User Fee Task Force with the charge to design a revenue collection strategy that can effectively replace the fuels tax in order to provide a long-term, stable source of funding for maintenance and improvement of Oregon's road system. The need to search for a fuel tax replacement stems from two causes. First, there is a growing perception that fuel taxes have little to do with road programs, and are therefore just another tax. Second, the fuel economy of new vehicles is soon expected to dramatically improve. This will cause fuel tax revenue, along with road program funding, to plummet. The Road User Fee Task Force and the Oregon Department of Transportation (ODOT) have jointly examined many ideas for replacing the fuels tax and analyzed many of the issues with potential replacements. As a result of work thus far, ODOT is pilot testing one potential concept for implementing a distance-based fee, which includes a distance-based congestion pricing component. This has been a small, but high profile, program. It's been managed in a very open manner, with a large amount of public outreach effort, considering the program's size. It has both supporters and opponents. Opponents concerns are focused on privacy issues, the potential for rewarding the least fuel efficient vehicles, and the belief that distance-based fees would be in addition to the fuels tax, not a replacement. Early in this process, opponents were quite vocal. However, as ODOT continued to focus on the problems with fuel taxes, as ODOT and the Task Force specifically addressed opponents concerns about distance-based fees, as hybrid-electric vehicle sales continue to rise, and as oil prices have risen dramatically, opposition has become almost silent. The Oregon Department of Transportation's (ODOT's) process, distance-based fee conclusions, and public involvement observations are detailed.

DATABASE: Transportation Research Board

ACCESS: <http://www.oregon.gov/ODOT/HWY/OIPP/docs/UKReportMarch2006.pdf>

Road User Fee Pilot Program Results Summary.

CITATION: 2001.

ABSTRACT: The 2001 Oregon Legislature established the Road User Fee Task Force "to develop a design for revenue collection for Oregon's roads and highways that will replace the current system for revenue collection." After considering 28 different funding ideas, the task force recommended that the Oregon Department of Transportation (ODOT) conduct a pilot program to study two strategies called The

Oregon Mileage Fee Concept: (1) the feasibility of replacing the gas tax with a mileage based fee collected at fueling stations and (2) the feasibility of using this system to collect congestion charges. ODOT launched a 12-month pilot program in April of 2006 designed to test the technological/administrative feasibility of this concept. It included 285 volunteer vehicles, 299 motorists, and 2 Portland service stations.

ACCESS: <http://www.oregon.gov/ODOT/HWY/RUFPP/docs/RUFPPsummary.pdf>

Statewide Distance-Based User Charge: Case of Oregon.

CITATION: Lei Zhang and B. Starr McMullen. Appearing in: Transportation Research Board 87th Annual Meeting, 2008. Transportation Research Board. Pg. 22.

ABSTRACT: Concerned about the declining purchasing power of gas tax revenue due to inflation, public opposition to tax increases, and improved fuel efficiency of new vehicles, the 2001 Oregon Legislature created the Road User Fee Task Force (RUFTF) to make recommendations regarding a potential replacement for the gasoline tax. Partly funded by the Federal Highway Administration (FHWA) Value Pricing Program, the RUFTF commissioned a series of studies in the past five years exploring theoretical, technological, institutional, and practical issues involved in a vehicle miles traveled (VMT)-based revenue collection system. A pilot study is currently being conducted in the Portland region with state-wide implementation expected following the 2009 Oregon State Legislature. These past and on-going studies have examined a range of important issues associated with this innovative revenue mechanism, including its socio-economic, regional, energy-use, and environmental impacts, on-board VMT tracking and communication systems, data transmission options at fee collection centers, pilot study design, policy deployment and implementation, public relations, and institutional options. Estimates on the distributional impacts of a flat-rate VMT fee on Oregon households based on income and location suggest the VMT fee is slightly more regressive than the gasoline tax. However, much of the tax burden is shifted from rural to urban households. Alternative rate structures for the actual vehicle mileage fees have also been considered in Oregon, including revenue-neutral flat rate, graduated rates based on fuel efficiency, total mileage, level of congestion, location, time of day, income, and vehicle types. This paper summarizes findings of these previous studies in Oregon as there appears to be increased interests in mileage-based direct user charges from federal and other state transportation authorities, and in the research community. Since the general rationale and theory of this innovative financing option is well known, the discussion focuses on the political, technological, and practical hurdles and solutions with regard to vehicle mileage fees.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

Techniques for Assessing the Socio-Economic Effects of Vehicle Mileage Fees.

CITATION: B. Starr McMullen, Kyle Nakahara, Smita Biswas, et al. 2008. Oregon State University, Corvallis; Oregon State University, Corvallis; Oregon Transportation Research and Education Consortium; Oregon Department of Transportation; Federal Highway Administration. Pg. 108.

ABSTRACT: The purpose of this study was to develop tools for assessing the distributional effects of alternative highway user fees for light vehicles in Oregon. The analysis focused on a change from the current gasoline tax to a vehicle miles traveled

(VMT) fee structure for collecting highway user fees. A static model and a regression model were developed and used to assess the impact of such a change on households by income and by location (rural/urban). A discrete-continuous choice model was explored for addressing the more complex issue of how the change in policy would affect vehicle choice decisions in the long run and the resultant distributional impacts. Results confirmed the regressive nature of the gasoline tax and showed that a change to a revenue neutral VMT fee of 1.2 cents per mile would result in a very small increase in regressivity (less than one percent for the lowest income group) in contrast to the five percent increase in regressivity caused by the increase in the price of gasoline between 2001 and 2006. The impact of a change to a VMT fee on rural areas was found to be opposite to that suggested by conventional wisdom. On average a household in a rural location would pay less under the revenue neutral VMT fee than under the gasoline tax, whereas those in urban areas would pay slightly more. Findings from the static and Ordinary Least Squares (OLS) models suggested that a change to a VMT fee is not likely to create a significant disincentive to purchase more fuel efficient or hybrid vehicles. The discrete-continuous model offered an appealing approach from a theoretical point of view to further address this question; however, the authors were not able to refine it enough to produce robust results. Given that the impact on income groups was virtually identical in both the static and the more complex OLS regression models, it may be best for policymakers to use the simpler model, as it is easier to explain.

DATABASE: Transportation Research Board

ACCESS: http://www.oregon.gov/ODOT/TD/TP_RES/docs/Reports/2008/ODOT-VMT_Fee_Impacts.pdf

Technology Evaluation of Oregon's Vehicle-Miles-Traveled Revenue Collection System: Lessons Learned.

CITATION: Jim Whitty, John Svadlenak, Norman C. Larsen, et al. Appearing in: Transportation Research Board 87th Annual Meeting, 2008. Transportation Research Board. Pg. 14.

ABSTRACT: A large percentage of states in the U.S. rely on fuel taxes to maintain roads. In 2005, 80 percent of Oregon's road revenues depended either directly or indirectly on fuel taxes. However, Oregon has seen this flow of revenue slowly decline over the last 30 years. It is envisioned that further improvement of automobile fuel efficiency will have an even more dramatic effect on fuel tax revenues in the near future. In 2001, the Oregon Legislative Assembly passed House Bill 3946 mandating the Oregon Department of Transportation to examine alternatives to the current system of taxing highway use through fuel taxes. Since 2003, Oregon State University in collaboration with the Oregon Department of Transportation and the Road User Fee Task Force has investigated a vehicle miles traveled based alternative to the fuel tax. The design, development and testing of the VMT-based solution was broken down into several phases, the last of which required the execution of a pilot test from June 19, 2006, to March 25, 2007, involving approximately 250 volunteer drivers. The main objectives of this paper are to present the technology performance results of the VMT-based solution gathered during the pilot test, and to share the lessons learned from its subjective evaluation. DATABASE: Transportation Research Board
ACCESS: Available through Interlibrary Loan to VDOT employees.

UTAH

Exercising a vehicle miles traveled tax to control mobile-source pollution: a study on reducing PM 2.5 in Cache County, Utah.

CITATION: Jordan Carroll-Larson. 2007. Dissertation: Thesis (M.S.) -- Utah State University, Dept. of Economics, 2007; OCLC; WorldCat

ACCESS: Available through Interlibrary Loan to VDOT employees.

WASHINGTON

Road Relief: Tax and pricing shifts for a fairer, cleaner, and less congested transportation system in Washington State.

CITATION: T. Litman, C. KOMANOFF and D. Howell. 1998. Energy Outreach Center. Pg. 63.

ABSTRACT: This report examines ways to improve our transportation system. It investigates better ways to manage our transportation system by changing how we pay for motor vehicle costs. The report shows how these changes will improve our economy, reduce congestion, air pollution and traffic deaths, and make transportation more affordable for the average household and for the State of Washington. In this report the authors evaluate nineteen specific pricing strategies for their impacts on vehicle travel, energy consumption, emissions, household transportation expenditures, and state tax revenue. They also examine taxes that could be reduced with any additional government revenues that would be generated by these pricing options. Based on this analysis, they recommend three packages that they believe are technically feasible, cost-effective, and offer tremendous potential benefits to the people of Washington State. The recommended strategies in their proposals fall into three major categories. The first involves converting vehicle insurance premiums and the state Motor Vehicle Excise Tax into mileage-based fees. The second involves charging vehicle users directly for the costs of local roads and parking, when feasible, rather than continuing to pay for such facilities indirectly through general taxes and hidden subsidies. Third, they offer options that impose special charges for some of the more pronounced social and environmental costs of automobile use, including emission fees and congestion relief pricing. These options are designed to give drivers incentives to reduce their contribution towards transportation problems while generating revenues to reduce other taxes.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

CANADA

Road pricing issues and experiences in the US and Canada.

CITATION: Robin Lindsey. 2003. University of Alberta.

ACCESS: http://www.imprint-eu.org/public/papers/IMPRINT4_lindsey-v2.pdf.

DENMARK

A distance-dependent road pricing scheme: concept and effects.

CITATION: J. Kildebogaard. Appearing in: 8th World Congress on Intelligent Transport Systems, 2001. ITS America. Pg. 9.

ABSTRACT: The growth of traffic in Denmark in recent years has created increasing interest in using financial incentives to control the extent and distribution of traffic. In 1997, the Danish Transport Council published a report on road user charging concluding that the optimal charging scheme would be a road pricing system by which drivers pay a tax per kilometre, depending on where and when they drive. In order to gain more knowledge about the advantages and disadvantages of such a system, the FORTRIN Programme was launched in June 1998 with a three years time horizon. One of the core objectives of the FORTRIN Programme was to analyse the impacts of a distance-dependent pricing system. This paper describes the concept of the scheme and summarizes the main findings and conclusions of the programme. Note: Full conference proceedings available on CD-ROM.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

UNITED KINGDOM

Is it feasible to introduce a distance based road user tax for the haulage industry in the UK?

CITATION: P. Blythe. Appearing in: 9th World Congress on Intelligent Transport Systems, 2002. ITS America. Pg. 2.

ABSTRACT: Following the publication of the UK Government's White Paper on Integrated Transport in July 1998 and a shift in emphasis by Local Authorities away from road building to demand management techniques, the current trend is to a balanced approach, where the use of road-space may be charged to vehicle drivers, i.e. road users pay to use (at least some) roads, just as public transport passengers pay each time they travel. Key to this is the introduction of some form of system to support road-user charging or vehicle access control. In urban areas this may be achieved using paper licenses (as in Singapore, 1975-1998), electronic (microwave) tags and transponders (as in Trondheim and Oslo, Norway, and in Singapore since 1998) or by the use of automatic video-based numberplate recognition (ANPR) as being implemented in London in 2003. Indeed the Transport Act 2000 empowered local authorities to introduce either road-user charging schemes of workplace parking schemes and significantly allowed the local authority to retain the raised revenue to invest in the local transport network, infrastructure and most importantly provision of high quality public transport. This carrot and stick approach to transport has led to at least 20 UK Cities and regions to seriously consider the implementation of some form of Road User Charging, with the first scheme in Durham going live in the summer of 2002. Note: Full Conference Proceedings available on CD-ROM.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

OTHER RELEVANT REPORTS

The following sources represent other relevant research reports, articles and other publications dealing with VMT taxation. They are listed in alphabetical order by title.

National Surface Transportation Policy and Revenue Study Commission 2007

CITATION: This high-level Federal study commission was established in the SAFETEA-LU reauthorization, and conducted its work over a 20-month period, completing its final report in 2007. It offered revenue recommendations for the mid-term (2010-2015) and the longer term (after 2015). In addition to its *Final Report* (2007), the Commission's website provides numerous technical briefing papers on a wide range of topics. The Commission concluded that significant increases in surface transportation investment were essential. VMT fees were identified as a promising option for the longer term, with the caveat that a number of technological, privacy, and collection cost issues could be satisfactorily resolved. Nevertheless, the Commission concluded that the fuels tax would continue to be a viable revenue source through at least 2025. The Commission also recommended a Federal container fee on freight passing through the nation's ports, increases in state fuel taxes and other fees, and flexibility for states to toll new interstate capacity. Giving states the flexibility to implement congestion pricing on both new and existing interstate lanes in urban areas with populations of 1 million or more was another of the Commission's recommendations (National Commission, 2007). National Surface Transportation Policy and Revenue Study Commission, United States Government. 2007. *Transportation for Tomorrow: Report of the National Surface Transportation Policy and Revenue Study Commission*.

ACCESS: http://transportationfortomorrow.org/final_report/

1997 Federal Highway Cost Allocation Study Summary Report.

CITATION: 1997. U.S. Department of Transportation.

ABSTRACT: The primary objective of this study is to analyze highway-related costs attributable to different highway users as a basis for evaluating the equity and efficiency of current Federal highway user charges. This is consistent with objectives of previous Federal HCASs, although the current study examines certain items in greater detail than was done in previous Studies. The STAA explicitly limited the scope of the 1982 Federal HCAS to examining Federal highway program costs paid from the HTF and the equity of Federal user charges. There is no similar legislative direction for this study, but the extent to which Federal user fees paid by different vehicle classes correspond to Federal highway costs attributable to those vehicles remains an important policy issue and is a principal focus of the study. However, several other emerging highway policy issues including the responsibility of different vehicle classes for social highway costs are considered in this study. The relevance of study findings to investment and regulatory decisions also is discussed.

ACCESS: <http://www.fhwa.dot.gov/policy/hcas/summary/index.htm>

Addendum to the 1997 Federal Highway Cost Allocation Study.

CITATION: 2000. Federal Highway Administration. Pg. 21.

ABSTRACT: The Addendum includes analyses of air pollution costs attributable to motor vehicle travel that could not be completed in time for inclusion in the 1997 Federal Highway Cost Allocation Study (HCAS). It also updates analyses comparing Federal highway user fees paid by different classes of motor vehicles with their share of Federal costs to construct, maintain, and operate the Nation's highway system. Since the 1997 Federal HCAS was completed, two legislative changes have been

enacted that affect highway cost allocation. First, the Taxpayer Relief Act of 1997 directed that 4.3 cents per gallon of Federal fuel tax that previously had gone for deficit reduction be deposited in the Federal Highway Trust Fund for highway and related purposes. This changes both the level and distribution of user fees paid by different vehicle classes. Second, changes in authorization levels for different program areas enacted in the Transportation Equity Act for the 21st Century had a very small effect on the relative cost responsibility of different vehicle classes. For ease of comparison, this report is organized similarly to the Summary Report of the 1997 Federal HCAS. The analysis year continues to be 2000, and the same vehicle classes, vehicle miles of travel, and other vehicle characteristics are used.

DATABASE: Transportation Research Board

ACCESS: <http://ntl.bts.gov/lib/17000/17900/17913/PB2001105045.pdf>

Alternative Transportation Revenue Sources.

CITATION: L. Clary, C. Hand, R. Creamer, et al. Appearing in: Second National Conference on Transportation Finance, Conference Proceedings 24, 2001. Transportation Research Board. Pg. 137-144.

ABSTRACT: As the supply of petroleum-based fuel declines over the next 20 to 30 years, increasing the negative effect on revenue collections resulting from petroleum-based fuel taxes, alternative sources of revenues to maintain and improve transportation infrastructure will become necessary. In this resource paper, brief summaries are given of alternative sources of transportation revenues that could be phased in over a period of time to replace revenues lost as the current method of tax revenues based on motor and diesel fuel decline or become obsolete. The fees are identified either as vehicle-related or as non-vehicle-related revenue sources. The vehicle-related revenue sources include tolls, value pricing, licensing, vehicle miles of travel fees, weight-distance fees, vehicle and parts sales fees, vehicle property fees, alternative-fuel taxes, vehicle use fees, emission fees, and carbon or Btu taxes or ad valorem taxes on fuels and value-added fees on vehicles and vehicle parts. The non-vehicle-related revenue sources include leasing of airspace and right-of-way, public private partnerships, private facilities, rest area privatization, and road branding.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

Alternatives to the motor fuel tax final report SR561.

CITATION: Anthony Rufolo. 2001.

ABSTRACT: The National Highway Cooperative Research Program (NCHRP) published its Report 377, Alternatives to Motor Fuel Taxes for Financing Surface Transportation Improvements, in 1995. Increased fuel efficiency and the use of alternative fuels were seen as potential threats to future road finance due to the heavy reliance on fuel taxes. Much has happened since 1995. Technological progress in vehicle fuel-efficiency, alternative fuel vehicles, and methods of collecting alternative types of revenue, has been substantial. This research project focused on updating the work of NCHRP Report 377 to better evaluate the potential for alternatives to motor fuel taxes. The project maintained a primary focus on passenger vehicles and on the issues that must be addressed in designing an alternative. The project consisted of a literature review, an analysis of the economic issues related to fuel tax alternatives, and an

analysis of the technological issues related to fuel tax alternatives. Several conclusions and recommendations for further research are offered. In addition, the report outlines several issues that policy makers will have to address as they explore alternatives to dependency on fuel tax revenue.

ACCESS: <http://www.oregon.gov/ODOT/HWY/OIPP/docs/561report.pdf>

Defining the Legacy for Users: Understanding Strategies and Implications for Highway Funding.

CITATION: Jeffrey Short, Sandra Shackelford and Daniel C. Murray. 2007. American Transportation Research Institute. Pg. 89.

ABSTRACT: There is little question that highway congestion presents a significant threat to the economy. Estimates for traffic growth measured in vehicle miles traveled suggest increases exceeding 70% by 2025. Exacerbating the congestion issue is the condition of the U.S. surface transportation system, where demand exceeds capacity and maintenance needs continue to increase. On a system that carries over 68% of the nation's freight, the impending crisis must be addressed. However, the requisite funding to maintain and improve the system is also facing its own shortfalls. While much research has been devoted to the issue of paying for highway infrastructure, very little has addressed critical funding and infrastructure issues from the transportation system user perspective. This study attempts to address this gap in the research by providing rational benefit-cost assessments for transportation investment levels and priorities. The central objective of this research is to define and understand the current state of transportation needs and finance in the United States, with particular attention paid to the financing of highway infrastructure maintenance and expansion. A variety of data was collected and analyzed with an emphasis on publicly available data sources including state and federal DOT datasets, as well as academic and private sector datasets. Using the literature, data and expert input, analyses were conducted on the current transportation funding environment, system needs and a range of finance methods. Through this approach, the research team sought to determine true cost and benefit assessments of existing funding mechanisms, new alternative finance strategies, and their relative impacts on transportation system revenue and users. The resulting analysis identifies the existing infrastructure revenue collection method - the motor fuels excise tax - as the most efficient approach. Also identified are a number of revenue enhancements which can be achieved by eliminating motor fuel tax exemptions, transportation trust fund diversions and realigning transportation priorities. In examining alternative financing approaches, the research highlights the inefficiencies and equity issues inherent in a move toward increased tolling and privatization of our infrastructure.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

Designing Alternatives to State Motor Fuel Taxes.

CITATION: Rufolo, Anthony M. and Bertini, Robert L. 2003. Transportation Quarterly. Vol. 57, No. 1, Pg. 33.

ACCESS: Available through Interlibrary Loan to VDOT employees.

Distance-Based Pricing.

CITATION: Todd Litman, 2007. Victoria Transport Policy Institute.

ACCESS: www.vtppi.org/tdm/tdm10.htm

Estimating benefits from mileage-based vehicle insurance, taxes, and fees.

CITATION: Patrick DeCorla-Souza. Transp. Res. Rec., 2002. National Research Council. No. 1812, Pg. 171-178.

ABSTRACT: Mileage-based pricing involves variabilization strategies, that is, strategies such as pay-as-you-drive insurance or car-sharing that are aimed at converting the fixed charges for driving to variable charges. They do not directly involve pricing of highway facilities. They nevertheless can reduce congestion by inducing some drivers to change their mode of travel or drive shorter distances. Variabilization strategies are particularly promising since about 80 % of the user cost of driving is fixed. Once a vehicle has been purchased and taxes, fees, and insurance have been paid, there is little financial incentive not to use it heavily. How effective are variabilization strategies relative to highway facility pricing strategies, such as pricing of added highway capacity? The congestion reduction and other economic benefits of policies to variabilize fixed vehicle charges are estimated, and they are compared with conventional highway facility expansion and a pricing strategy involving adding a lane and pricing it for free flow. The analysis suggests that a nationwide variabilization policy that adds 10 cents per mile to the variable user cost of vehicle use (without an increase in total vehicle user costs) could produce a 20-year stream of benefits conservatively estimated at over \$44 billion.

ACCESS: Available through Interlibrary Loan to VDOT employees.

Estimation of Revenues From Use Charges, Taxes, and Other Sources of Income.

CITATION: D. Gillen. Appearing in: Information Requirements for Transportation Economic Analysis, CONFERENCE PROCEEDINGS 21, 2000. Transportation Research Board. Pg. 44-46.

ABSTRACT: Fuel tax receipts and motor vehicle registration fees account for more than three-quarters of the total revenues available to spend on highway investments. Many states and local governments align future expenditure levels with anticipated revenues, meaning the receipts and expenditures tend to track quite closely with one another. Although revenues tend to be quite stable from one year to the next at the national level, significant annual fluctuations are common at the state level. Fuel tax and registration fee receipts can vary by 25% or more from one year to the next, which can make it difficult for decision makers to set spending targets. The quality of both available data and modeling techniques must be improved so that economists can better understand the dynamics underlying such volatile revenue streams. For example, to predict fuel tax revenues, analysts need better ways to measure relevant input variables, such as vehicle miles traveled and fuel efficiency, as well as the attributes of those variables. In particular, it would be helpful to have a better understanding of commercial vehicle miles traveled, as most research to date has focused on passenger vehicles. Better analytic tools are needed as well, and particularly ones that can anticipate behavioral responses to changes in fuel prices and other relevant factors. Also, as states lo to new types of revenue streams, such as

tolls and impact fees, policy makers will begin to demand better forecasts of future receipts deriving from these alternative mechanisms for financing transportation infrastructure. Following this presentation are the findings of a working group that developed a list of 7 research proposals on the topic of revenue forecasting.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

Evaluation of VMT Charges as a Transportation Revenue Source.

CITATION: Rand Corporation. 2007.

ABSTRACT: This paper is part of a series of briefing papers to be prepared for the National Surface Transportation Policy and Revenue Study Commission authorized in Section 1909 of SAFETEA-LU. The papers are intended to synthesize the state-of-the-practice consensus on the issues that are relevant to the Commission's charge outlined in Section 1909, and will serve as background material in developing the analyses to be presented in the final report of the Commission. This paper presents information on the concept of direct tolling based on the number of vehicle miles traveled (VMT tolling), an idea that has gained increasing attention as a potential replacement for state and federal motor fuel taxes. While motor fuel taxes have been a major source of revenues for highway maintenance and construction since the early 1900s, the fact that they are commonly levied on a per-gallon basis means that periodic tax hikes are required to offset the combined effects of inflation and improved fuel economy. The idea of increasing taxes has become increasingly unpopular in recent decades, however, and fuel tax revenues – measured in real dollars per mile of travel – have been allowed to wither at the federal level and in most states. This trend has stimulated significant interest in VMT tolling, a revenue instrument that could in principle overcome many of the challenges facing fuel taxes. The basic idea behind VMT tolling is to outfit vehicles with equipment capable of tracking the number of miles traveled by jurisdiction (e.g., by state). Fees would then be collected on a per-mile basis, and the revenues would be distributed among jurisdictions based on the amount of travel in each. A key rationale for VMT tolling is that the amount of revenues collected would not depend on the fuel economy of the vehicle. For that matter, it would also remain effective even as new alternative-fuel vehicles are introduced. Inflation would still be an issue, although the per-mile fees could certainly be indexed to increase with inflation. Another potential benefit of VMT tolling is that the required onboard equipment would enable other forms of pricing that could help combat congestion, pollution, or excessive road wear. For example, the per-mile charges could vary by time of day, by the emissions class of the vehicle, or by the axle load for heavy trucks. Such precisely targeted user fees would not be possible with traditional motor fuel taxes, even if they were to be raised considerably.

ACCESS:

http://www.transportationfortomorrow.org/final_report/pdf/volume_3/technical_issue_papers/paper5a_07.pdf

Federal Highway Cost Allocation Study.

CITATION: James March.1998. Federal Highway Administration (U.S. Department of Transportation).

ABSTRACT: The U.S. Department of Transportation completed and sent to Congress the 1997 Federal Highway Cost Allocation Study. An important objective of the study was to evaluate the equity and economic efficiency of the federal highway user-fee structure. The study also examined how changes in the composition of federal highway program costs, the user fees that support that program, and other factors have affected the equity and efficiency of highway user fees paid by different classes of vehicles since 1982. Highway-user fees paid into the Federal Highway Trust Fund (HTF) by different vehicle classes were compared with HTF expenditures for pavement, bridge, and other highway-related improvements attributable to each vehicle class. Marginal costs of highway use by different vehicle classes were compared with the user fees they paid to evaluate the efficiency of the highway user-fee structure. In general, it was found that the overall equity of highway user fees has improved since 1982. However, improvements within and among vehicle classes could be realized with changes to the current user-fee structure.

ACCESS: <http://www.tfrc.gov/pubrds/janpr/cost.htm>

Financing Local Roads: Current Problems and New Paradigm.

CITATION: David J. Forkenbrock. Transportation Research Record: Journal of the Transportation Research Board, 2006. Transportation Research Board. No. 1960, pp-8-14.

ABSTRACT: Local governments are changing the ways that they finance streets and roads. As the motor fuel tax becomes less productive, the states and the federal government have been devolving the responsibility for financing these vital facilities to local governments, which in turn have relied on general fund revenue and have increasingly adopted local option taxes. Generally, these local taxes have no direct relationship to actual road use and thus tend to be inequitable and inefficient. Without policy innovations, the dependence on non-use-related financing of local roads will increase as new vehicle propulsion systems such as electric hybrids and hydrogen fuel cells penetrate the market. Several possible policy directions to increase the role of direct road user charges are evaluated. A mileage-based user charge is found to have considerable potential both as a financing mechanism and as a means for implementing road pricing. Among the policies that can be supported are congestion pricing, privately operated tollways, use of environmentally friendly vehicles, and improved travel demand analyses. Above all, more of the financing burden for local roads can be shifted from those paying property and sales taxes to actual users of the roads within a community.

DATABASE: Transportation Research Board

ACCESS: <http://dx.doi.org/10.3141/1960-02>

The Fuel Tax and Alternatives for Transportation Funding, Special Report 285.

CITATION: Reno, A., and J.R. Stowers. 2006. TRB.

ACCESS: <http://onlinepubs.trb.org/onlinepubs/sr/sr285.pdf>

Fueling Transportation Finance: A Primer on the Gas Tax.

CITATION: Puentes, Robert, and Ryan Prince. 2003.

ACCESS: Available through Interlibrary Loan to VDOT employees.

Funding Analysis for Long-Term Planning: Final Report.

CITATION: de Cerreno, Allison L.C. 2003.

ABSTRACT: In existence since 1956, the Highway Trust Fund (HTF) is the source of nearly all Federal highway funding and roughly four-fifths of all Federal transit funding. The Highway Trust Fund is integral to the long-term transportation planning of all 50 States. However, recent Congressional Budget Office forecasts show that at the current baselines (i.e. spending at currently enacted levels with adjustments for inflation within the context of current tax policies), the Highway Account of the HTF would be depleted by 2006 and the Mass Transit Account would fall to \$0 three years later.¹ These projections have been made in the midst of discussions regarding the reauthorization for surface transportation and the looming national needs in transportation that require an estimated average annual investment from all levels of government of between \$90.7 billion and \$110.9 billion just to maintain the system and between \$127.5 billion and \$169.5 billion to improve it.

ACCESS: Available through Interlibrary Loan to VDOT employees.

Future Financing Options to Meet Highway and Transit Needs.

CITATION: Dec 2006. Transportation Research Board

ACCESS: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_w102.pdf

Impact of Fuels and Technology on Transportation Revenue and Finance.

CITATION: G. Bemis, M. Mintz, L. Clary, et al. Appearing in: Second National Conference on Transportation Finance, Conference Proceedings 24, 2001. Transportation Research Board. Pg. 110-116.

ABSTRACT: Fuel taxes currently account for approximately 90% of all revenues to the Federal Highway Trust Fund. Fuel taxes are also a major source of state transportation funding. Although the fuel tax has been the mainstay of the nation's system for funding transportation infrastructure for many years, analysts are starting to recognize that new technological developments may undermine the value of this financial resource. In particular, the advent of vehicles powered by alternative fuels and improvements in the fuel economy of gas- and diesel powered vehicles pose a threat to the tax base. Although technological substitution is not rapid, projections that lo as little as 20 years into the future indicate that new types of vehicles and methods of propulsion are likely to make a dent in transportation revenues. A consideration of alternatives will demand a substantial research effort as well as a shift in national policy, suggesting that now is not too soon to begin the discussion; certainly no one wants a funding crisis to sneak up. Researchers and policy analysts are already examining a number of alternatives to existing excise taxes on gasoline and diesel fuel; a few of the options include taxes based on fuels' carbon or energy content and taxes based on movement (such as VMT) rather than the method of propulsion.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

Implementing a Mileage-Based Road User Charge.

CITATION: David J. Forkenbrock. Public Works Manage. Policy, 2005. Sage Publications, Incorporated. Vol. 10, No. 2, Pg. pp-87-100.

ABSTRACT: This article explores a series of issues related to implementing a mileage-

based road user charge. This user charge is intended to eventually replace the motor fuel tax, which is certain to become increasingly less productive as gains in fuel mileage occur and as electric hybrid and eventually hydrogen fuel-cell vehicles enter the market. Before so great a change can occur as to how roads in the United States are financed, a series of policy and operational considerations must be addressed. The article first presents an overview of a mileage-based road user charge approach, then examines a variety of issues related to its implementation, and concludes that substantial benefits from implementing this new form of user charge are possible.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

Improving Efficiency and Equity in Transportation Finance.

CITATION: Martin Wachs. 2003. The Broings Institution Series on Transportation Reform.

ABSTRACT: A complex partnership between many governmental bodies, continually influenced by numerous private, corporate, and civic interests, finances our nation's transportation system. But the nature of the partnership is changing. Originally offset by a variety of user fees, such as tolls and fuel taxes, the burden of financing transportation programs is gradually being shifted to local governments and voter-approved initiatives. This shift to local transportation taxes raises interesting issues for public policy. This brief dissects the arcane and complicated system of transportation funding by describing the relationships that define the federal, state and local roles. It summarizes the most pressing problems facing the transportation network, and argues that expanded reliance on user fees remains the most promising way to promote equity and efficiency in transportation finance.

ACCESS:

http://www.broings.edu/~media/Files/rc/reports/2003/04transportation_wachs/wachstransportation.pdf

Improving the Performance of the Surface Transportation System: Revenue Options.

CITATION: John Horsley.2007. Note: Testimony of the Executive Director of to the American Association of State Highway and Transportation Officials (AASHTO) to the National Surface Transportation Policy and Revenue Study Commission.

ACCESS:

http://www.transportationfortomorrow.org/pdfs/commission_meetings/0307_field_hearing_washington/031907_fh_aashto_testimony1.pdf

Institutional options for VMT data and fee collection centers: final report.

CITATION: Anthony M. Rufolo, Oregon, Dept. of Transportation, et al. 2002. Oregon Dept. of Transportation, Research Group. Salem, OR. Pg. 32.

Note: viii; 28 cm.; Note(s): "November 2002."/"Report No. FHWA-OR-VP-03-05"--Documentation page./ "CS370002"--Documentation page./ Includes bibliographical references (p. 23-26)./ Also available online.; Other Titles: Institutional options for Vehicle Miles Traveled data and fee collection centers :; Final report; Responsibility: by Anthony M. Rufolo ... [et al.] for Oregon Dept. of Transportation Road User Fee Task Force and Federal Highway Administration

DATABASE: WorldCat

ACCESS: <http://www.oregon.gov/ODOT/HWY/OIPP/docs/RufoloFinalReport.pdf>

Leasing the interstate: States ready to enact pay-as-you-go plan by using smart car technology.

CITATION: W. M. Wilkins. Roads & Bridges, 2004. Scranton Gillette Communications, Incorporated; PSA Group LLC. Vol. 42, No. 11, Pg. 18.

ABSTRACT: Gas stations could be the next tollbooths for getting much needed road taxes. Oregon's Department of Transportation plans to roll out a mileage-based user fee pilot program this fall, and Congress has created special committees to analyze alternatives to the motor fuels tax as the primary revenue source for improvements to transportation infrastructure. Currently on deck is a wireless device that would be attached to new cars. Every time the new car drove into a gas station and filled up, the cars mileage would be reported to the government and the owner billed for how much the car had been driven.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

The Long and Taxing Road. The Gas Tax is Dying. Will Drivers Pay for Highways by the Mile?

CITATION: Kathleen Hunter. Governing, 2007. Congressional Quarterly, Incorporated. Vol. 20, No. 10, pp-48-50.

ABSTRACT: In most states, drivers are taxed by the amount of gasoline they pump into the tanks of their vehicles. Recently, new technology has allowed some state highway agencies (SHAs) to actually count how many miles cars travel and charge different rates based on where those miles have been driven, thus allowing states to tax motorists based on exactly how much they use certain roads. This is an important innovation as the gas tax--the nation's main tool to finance highways--is in a crisis. The purchasing power of the gasoline tax continues to erode with inflation (it's been over a decade since most states have increased their fuel taxes) making it more and more difficult for states to pay for new roads or maintain existing ones. This article discusses possible ways to resolve the structural financing problems facing SHAs today, focusing on solutions such as letting the private sector build roads and charge tolls on them or using more technologically complex methods to calculate the gas tax.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

Mileage-based road user charge concept.

CITATION: David J. Forkenbrock. Transp. Res. Rec., 2004. National Research Council, Washington, DC 2007, United States. No. 1864, Pg. 1-8.

ABSTRACT: A new approach is presented for charging vehicles that travel on public roadways. This approach applies intelligent transportation system technology to the problem of assessing road user charges, enabling these charges to be fairer, more stable, and more flexible. The approach is amenable to alternative forms of vehicle propulsion systems. Though very simple in concept, the new approach has required that a number of institutional and technological issues be resolved. Key to this approach is a simple onboard computer that stores a record of actual road use

charges. Periodically this record is uploaded and transmitted to a data processing center, referred to as the collection center. The center bills a vehicle owner and reimburses the states, counties, and cities operating the roads on which the vehicle has traveled. The onboard system is simple, secure, and capable of protecting the user's privacy. Importantly, the onboard system enables a variety of user charge conventions. In its simplest form, this approach can be used to assess a vehicle-miles-traveled (VMT) user charge. With a VMT user charge, the computer can calculate road mileage actually traversed and compare this mileage with that obtained through an odometer feed. It then applies appropriate user charge rates to the mileage traveled in each jurisdiction. Note: Compilation and indexing terms, Copyright 2008 Elsevier Inc. ACCESS: Available through Interlibrary Loan to VDOT employees.

Mileage-based road user charges.

CITATION: P. F. Forkenbrock D.J. Hanley. Public Roads, 2008.

ABSTRACT: The motor fuel tax which has been a mainstay of highway finance in the United States for almost a century is becoming unsatisfactory as improvements to vehicle fuel efficiency are being sought by major car manufacturers. This calls for a need for new solutions to road financing. State and local governments could consider several policy directions that would increase the role played by user charges, including increasing the motor fuel tax, assessing development impact fees, implementing tolls more aggressively, and developing an entirely new approach based on vehicle miles traveled. In future years, policymakers will need to evaluate options such as these for characteristics including: fair distribution to cost burdens, ability to provide a long-term stable source of revenue, and capacity to support other social and economic initiatives that local governments may wish to pursue.

ACCESS: Available through Interlibrary Loan to VDOT employees.

Mileage-Based User Fee Public Opinion Study.

CITATION: Fichtner, Robert and Nicole Riggelman. 2007.

ABSTRACT: A panel of select "key experts" expressed their opinion that the fuel tax is viewed as an accepted, efficient option for funding transportation, and that it will continue to be for the next 15 to 20 years. Mileage-based fees are a solution that will likely not be necessary nor feasible for at least 10 years according to the experts. It is imperative that transportation authorities clearly identify the objectives of the mileage-based user fee as a first step for determining structure/design of the concept and how to communicate it. These experts proposed that a mileage-based user fee should be used to supplement, rather than replace, the current motor fuel tax. Focus group participants (n = 10 groups) did not fully grasp the amount of tax dollars they spend per year on the transportation system, nor do they easily recognize the sources through which these monies come. After discussing the current and projected funding shortfalls from the motor fuel tax and hearing a brief description of a usage tax based on mileage, participants were generally comfortable with the idea of paying their "fair share" based on how much they use the roads. Varying a mileage-based fee based on size and/or weight of the vehicle was seen as logical, and not do so would unfairly penalize those who have chosen to drive fuel-efficient or hybrid vehicles. The congestion pricing model was seen as less fair because it would negatively impacts those drivers who need to travel for work during standard "rush hours." These

participants were skeptical of the claim that the information would not be tracked, and being watched by "Big Brother" was mentioned frequently. Many believed that mileage-based user fee technology would be expensive to implement and maintain, and suggested that, if additional funds were needed, simply increase the existing fuel tax or registration fees. As qualitative research, these findings are not projectable to either of the segments researched.

ACCESS: Available through Interlibrary Loan to VDOT employees.

National Transportation Vision.

CITATION: John Horsley. 2006. Note: Presentation to AASHTO Annual Meeting, Portland, Oregon, October 2006.

ACCESS:

http://www.transportationfortomorrow.org/pdfs/commission_meetings/1006_field_hearing_portland/horsley_presentation_1006_hearing.pdf

A new revenue generating method for transportation funding: The vehicle miles traveled fee.

CITATION: E. D. Guderian. 2003. Texas Transportation Institute; Southwest Region University Transportation Center. Compendium: papers on advanced surface transportation systems, 2003, Pg. 28-54.

ABSTRACT: Today fuel taxes comprise 60% to 70% of highway funds for states, but the future of the fuel tax faces serious issues. Vehicles today are more fuel-efficient than 20 years ago, and the fuel tax has not been raised recently to keep pace with inflation and rising construction costs. Alternative fuels have further reduced the buying power of the fuel tax. Because of these trends there is a renewed interest in different ways to finance transportation in the United States. One method recently being explored is the vehicle miles traveled (VMT) fee. The VMT fee assesses a specified fee for each mile driven to road users. A literature review and interviews with professionals were conducted to explore the many methods whereby a VMT fee could be implemented. From these sources benefits of the VMT fee over the current fuel tax were identified. The barriers that would prevent the VMT fee from being implemented were determined by the author, along with techniques to overcome these barriers. Finally, steps for an implementation process of the VMT fee were created for a state government to follow. The barriers identified in the VMT fee implementation process are classified into four general categories: public perception, technological, political, and the implementation process. The current feasibility of the VMT fee depends on the method chosen and purpose of collection. The only method that could be implemented today is an odometer reading method. An odometer reading VMT fee would be sufficient to supplement, but not replace, the current fuel tax. A more comprehensive system, like the global positioning system/geographic information system (GPS/GIS) method of collection, would be needed to completely replace the fuel tax. The implementation of a VMT fee user system will take the coordinated efforts of many state government agencies. Most likely the implementation process will span 20 years or more, from the time the VMT fee is considered to when the current fuel tax collection system is completely phased out. It is important to begin exploring the possibilities of the VMT fee early because it will take 10 years to have an operational user fee system. The following steps are an implementation plan for the VMT fee that

could be employed by a state government: 1) create a task force; 2) small scale pilot tests; 3) devise/propose legislation; 4) physical/institutional infrastructure installation; 5) start-up with concurrent VMT fee and fuel tax; and 6) full implementation. Note: This research was supported by a grant from the U.S. Department of Transportation, University Transportation Centers Program.

DATABASE: Transportation Research Board

ACCESS:

<http://swutc.tamu.edu/publications/technicalreports/compendiums/Compendium2003.pdf>

Next Generation Wireless Technologies to Deliver Pervasive Road User Charging and other ITS Services.

CITATION: P. T. Blythe, A. Tully and Geoff Martin. 12th World Congress on Intelligent Transport Systems, 2005. ITS America. Pg. 20.

ABSTRACT: Wireless devices are pervasive in everyday life from mobile phones to millimetre precision locating systems (GPS). Wireless technology is advancing at speed and the opportunities for use in the intelligent transport field are immeasurable and include areas such as road user charging, congestion control and fleet management. The opportunity to harness the potential of new, intelligent infrastructure within the road transport sector will be a major research issue of the next decade. The ability to monitor, sense, manage and communicate with vehicles, the roadside control systems and the driver offers new and currently unexplored new tools to manage the road network more efficiently. One key application of a more pervasive approach to control would be the possibility of using such a system to implement an incremental road-user charging system across the whole of the UK road network in a much more intelligent way than is currently envisaged by the Secretary for State for transport and his National Road User Charging Steering Committee which suggests that within 10 years the UK could use a GPS-based solution pay as you drive solution to replace the fixed price vehicle excise duty (car tax) by a variable charge relating to the usage made of the vehicle. This paper examines and comments on the current issues of road-user charging in the UK from two perspectives; technical and political. The paper concludes that the lack of appropriate technology will not be the constraint in implementing road-user charging in the near future in the UK. However, the existing local authority schemes in London and Durham, the on-going National Trials in Leeds, the policy of introducing distance-based charging for HGV's and the recent announcement by the Secretary of State for Transport to examine the possibility of a National Road Use Charging scheme utilizing a black box approach in all UK registered vehicles suggests certain policy and technology divergences, which may be hard to sell to the public.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

Policy Options for Varying Mileage-Based Road User Charges.

CITATION: David J. Forkenbrock. Appearing in: Transportation Research Board 87th Annual Meeting, 2008. Transportation Research Board. Pg. 18.

ABSTRACT: Particularly as more fuel-efficient vehicles, hybrids, and eventually vehicles with alternative power, such as hydrogen fuel cells, become increasingly commonplace, the motor fuel tax holds limited promise. As a possible replacement, a

mileage-based road user charge has considerable potential as a means of ensuring adequate revenue with which to finance roads at the federal, state, and local levels of government. In addition to providing a stable, reliable revenue stream, a mileage-based road user charge can help enable various policy initiatives to be pursued. The key question is thus how the burden for generating the needed funds should be distributed among various classes of vehicles. The analysis concludes that if the mileage-based road user charge were structured to produce the same total amount of revenue as currently is generated by the motor fuel tax, the magnitudes of incentives or disincentives that would be produced for various vehicle classes is quite small. The analysis does point out that a real strength of a mileage-based road user charge is that it can assist policy makers in advancing a variety of choices while ensuring that the nation's road system is adequately financed.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

Proposal for a National mileage based tax.

CITATION: Adeel Z. Lari and Kenneth Buckeye. ITS America. Meeting (9th: 1999- Washington, D.C.). New thinking in transportation: conference proceedings, 1999. University of Minnesota, Minneapolis. Pg 7.

ABSTRACT: In Minnesota, as with virtually all other states, the motor fuel tax is the primary method for collecting road user charges. In addition, a significant portion of revenue is collected through motor vehicle registration fees which vary with the sale price and age of the vehicle. Although registration fees have grown in recent years, the rate of increase in motor-fuel consumption has fallen short of the increase in vehicle miles traveled due to increasingly efficient vehicles. This problem will likely be exacerbated in the future with demands for increased efficiency and as more vehicles are developed which use alternative sources of energy. One proposal to create a more optimal user fee system is a concept called the Mileage Based Tax (MBT). A primary motivation for a MBT is to close the widening gap between fuel consumption and vehicle miles of travel. Under such a concept revenue would increase in direct proportion to increased travel. The MBT, like other taxes, could be indexed to inflation thereby helping to assure that revenues keep pace with costs. Coupled with advanced electronics now becoming commonplace in motor vehicles the MBT may also be utilized to vary charges by type of vehicle, time of day, and route of travel. Primary challenges for the MBT concept are in the area of public acceptance and technical aspects of implementation.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

Resource Papers, Transportation Finance For The 21st Century.

CITATION: Giglio, J., W. Franklin, D. Forkenbrock, S. Lockwood. 1997. United States. Joint Program Office for Intelligent Transportation Systems.

ABSTRACT: Private-public partnerships.

DATABASE: National Transportation Library

ACCESS: http://ntl.bts.gov/lib/jpodocs/rept_mis/6805.pdf

Review and Synthesis of Road-Use Metering and Charging Systems.

CITATION: Paul A. Sorensen and Brian D. Taylor. 2005. Transportation Research Board. Pg. 153.

ABSTRACT: Since the 1920s the motor fuels tax has been the principal user fee through which revenues have been raised for the construction and maintenance of U.S. highways (and later public transit systems). The motor fuels tax has numerous merits, and many observers believe that it will remain the mainstay of the transportation finance for years to come. Others, however, pointing to the growing political resistance to fuels tax increases, the rise of alternative propulsion vehicles, and the need for better pricing to manage road use, argue that the days of the motor fuels tax are numbered--and that new technologies now allow new and better ways to price the use of highways. This resource paper informs this debate over the future of the motor fuels tax by examining in considerable detail many of the latest efforts worldwide to develop new ways to fairly and efficiently charge for highway system use. An extensive review of innovative electronic tolling applications around the world was performed. The review included projects already in operation as well as those that have been proposed or are in the advanced stages of planning; each was evaluated in terms of policy, technology, and political acceptance issues. Case studies were selected that focus on applications involving network wide road-use metering and tolling, as these were judged to be the most relevant to the concept of distance-based user fees. A secondary focus was given to facility congestion toll projects and cordon toll projects that might be relevant from a political or technical perspective. Note: This report was commissioned by the TRB Committee for the Study of the Long-Term Viability of Fuel Taxes for Transportation Finance.

DATABASE: Transportation Research Board

ACCESS: <http://www.trb.org/publications/news/university/SRFuelTaxRoad-MeterPaper.pdf>

The Search for Alternatives to The Fuel Tax Begins in Earnest.

CITATION: Innovation Briefs, 2006. Urban Mobility Corporation. Vol. 17, No. 2, Pg. 1-2.

ABSTRACT: This article looks at the impending highway transportation funding crisis and describes solutions recommended by several organizations. The Chamber Foundation estimates that between 2006 and 2015 annual Highway Trust Fund revenues will fall an average \$23 billion short of the amount required to maintain the present system and \$48 billion short of that needed to improve the system. It suggests indexing federal motor fuel taxes to help narrow the revenue gap in the short term; in the long run it recommends a two-tier mileage-based revenue system: a state vehicle-miles of travel (VMT) fee and a local option VMT to ease metropolitan congestion. The Transportation Research Board in another report, recommends an expansion of tolling and eventually the replacement of fuel taxes with a system of mileage-based fees. Other organizations, including AASHTO and the Reason Foundation's Mobility Project, have also issued studies on the future financing of the highway program. In addition, the author describes a U.S. Department of Transportation pilot program meant to test the effectiveness of direct user charges.

DATABASE: Transportation Research Board

ACCESS: <http://lists.umn.edu/cgi-bin/wa?A3=ind0602&L=CON-PRIC&E=quoted->

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%3D_NextPart_000_008C_01C6395C.DE612240&T=text%2Fhtml;%20charset=iso-8859-1](#)

Self-Financing Highway Pricing Scheme Using State Highway Cost Allocation Study.

CITATION: Jung Eun Oh and Kumares C. Sinha. Transportation Research Board 87th Annual Meeting, 2008. Transportation Research Board. Pg. 22.

ABSTRACT: Distance-based highway pricing scheme has recently been considered as a potential means of tackling highway revenue shortfall problem, which occurred under the current structure of fuel-tax-based funding scheme. In determining optimal fee rates of distance-based pricing scheme, the present study applies the concept of self-financing highway system. Self-financing highway system is advocated by the fact that each unit of highway usage is associated with a different level of highway cost depending on its vehicle class, road functional class, geographical location, and so forth. The present paper aims to find the optimal fee rates that reflect cost responsibility of each highway user, using Highway Cost Allocation Study (HCAS) tool. HCAS is a methodological framework that analyzes expenditures, revenues, and usages that are associated with a highway system in order to obtain cost responsibility of various user groups. State HCAS Tool, a spreadsheet-based analytic tool developed by FHWA, applies the framework for state highway systems. By updating inputs and state-specific parameters, the present study conducts HCAS for the highway system in Indiana. Cost allocation process, however, entails several assumptions on critical parameters such as load equivalency factors, non-load-related impacts on pavement, minimum requirements for construction and rehabilitation, etc. In this regard, the study uses a generally acceptable range for each input parameter and performs sensitivity analysis. The results of sensitivity analysis provide ranges of cost responsibility, and therefore, unit fee rates of a distance-based pricing scheme for each vehicle class and road functional class combination.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

States Shift Gears.

CITATION: Matt Sundeen. 2006. National Conference of State Legislatures. Note: State lawmakers are exploring new ways to finance our nation's surface transportation system.

ACCESS:

http://www.ncsl.org/programs/pubs/slomag/2006/06SLDec06_ShiftGears.htm

Technologies for Road User Charging (Matching Policy Requirements with Charging Technology Requirements).

CITATION: Andrew Pickford. Appearing in: 12th World Congress on Intelligent Transport Systems, 2005. ITS America. Pg. 12.

ABSTRACT: Up to 5 years ago the technologies commercially used for Road User Charging were limited mainly to Dedicated Short Range Communication (DSRC). Systems based on DSRC formed the backbone of national charging systems in Europe, South America and South East Asia. Standards were publicly available and DSRC was

a safe solution for tolling. Europe and US were celebrating success in interoperability between road operators from the Inter Agency Group's EZass in the tri-state area to (TIS) in France. However, we have since observed an explosion of technology choice driven by rapid policy development, the search for a replacement for fuel-tax and critical levels of congestion in developed and developing nations. National governments and highway operators are now faced with an apparently confusing choice between satellite positioning (GPS, EGNOS and the future Galileo system), Automatic Number Plate Recognition (ANPR) systems, Electronic Vehicle Identification (EVI), the humble odometer and, in Europe, the emergence of the electronic tachograph. This paper presents a critical analysis of charging technology options and matches them to existing and emerging charging policies. Case studies explored in the paper of charging schemes in Switzerland, Austria, US, Germany, Sweden, France and the UK shows that DSRC is already emerging as a common interoperable platform between electronic tolling, distance-based and area congestion charging schemes - even if each application depends upon another method. The expected 'battle of the technologies' driven by market-seeking technology vendors has now become a search for the best 'mix' of technologies rather than the best single technology solution. Feasible technology 'mixes', including DSRC/tachograph, GPS/DSRC and DSRC/ANPR, are presented based on case studies to illustrate that we need to take a more contingent view on technology choice rather than accept the collective but polarized wisdom of industry.

DATABASE: Transportation Research Board

ACCESS: Available through Interlibrary Loan to VDOT employees.

Transportation for Tomorrow: Report of the National Surface Transportation Policy and Revenue Study Commission.

CITATION: Natl. Surface Transportation Policy and Revenue Study Commission. 2007.

ACCESS: http://www.transportationfortomorrow.org/final_report/

RESEARCH IN PROGRESS

The following sources represent ongoing research. Where possible, contact information is included. For more information, contact the authors or primary investigators listed.

Costs of Alternative Revenue-Generation Systems.

ABSTRACT: The objective of this research is to develop a methodology that can be used to analyze and compare the administrative, collection, and compliance costs of systems for highway revenue generation. Although the range of revenue systems is potentially quite broad, this research shall be limited to usage-based charges such as tolls, VMT fees, and fuel taxes. Accomplishment of the project objective will require at least the following tasks. Start date: 2008/8/8

DATABASE: RIP (Research in Progress) Database.

Sponsor Organization

National Cooperative Highway Research Program

Transportation Research Board

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Mileage-Based User Fee Pilot Project: Rural/Small Urban Area Application in Northeast Texas.

ABSTRACT: Since the early 1990s, a variety of states and regions have studied the application of use-based fees. In 2003, an Oregon task force selected a mileage-based user fee as the preferred alternative, and developed an experimentation regimen involving odometer, GPS, and short-range radio frequency technologies to collect and transmit mileage data within a cordon zone around Portland. The Puget Sound region recently experimented with the use of variable-based pricing across a variety of arterials and freeways in the Seattle area to determine the feasibility of using GPS-based On Board Units (OBU) with a cellular-based transmission system. The University of Iowa is currently conducting a Road User Charge Study to evaluate the technological and pricing options for (primarily) VMT-based options. By contrast to these previous efforts, this proposed effort is focused upon determining the appropriateness of mileage-based user fees for accomplishing regional goals and objectives for mobility and long term financial sustainability. This will involve correlating fees collected with roadway maintenance, operations, and expansion expenditures; determining "actual" value of roadway miles traveled (reducing the need for formula estimates); and building the case for a citizen-validated ballot measure for transitioning to a new finance framework. While the overall goal of this project is to implement a fuel-tax alternative, a deliberate program definition must first be developed that will establish in detail what will be studied through the course of the project, who will study it, how it will be studied, and when will it be evaluated. It is this project definition phase for which UTCM funding is being requested. Start date: 2008/2/1

DATABASE: RIP Database.

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Socio-Economic Effects of Vehicle Mileage Fees.

CITATION: ABSTRACT: Oregon Department of Transportation (ODOT) is considering switching from its current fuel taxation practices to a road use tax. ODOT is currently conducting a pilot study to test the effectiveness of vehicle and fuel station reporting transmitters and collection technologies associated with implementing fees based on miles traveled. The study includes considerations for socio-economic impacts of vehicle mileage fees on Oregon consumers. Factors such as societal and regional differences, as well as gaps in income, effects on energy use and the economy were all considered. The results will provide policymakers with information needed to make informed decisions regarding alternative vehicle mileage fee structures.

DATABASE: RIP Database.

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