

# 2010 Symposium on Mileage-Based User Fees: Moving Forward

## Symposium Summary

April 20 – 21, 2010

Minneapolis, Minnesota



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**SYMPOSIUM ON MILEAGE-BASED USER FEES:  
MOVING FORWARD**

**APRIL 20-21 - MINNEAPOLIS, MINNESOTA**

**2010 Symposium on Mileage Based-User Fees**

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Hubert H. Humphrey Institute of Public Affairs  
The University of Minnesota  
Minneapolis, Minnesota

Conference Summary

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## 2010 Symposium on Mileage Based-User Fees

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### Conference Hosts

The Hubert H. Humphrey Institute of Public Affairs  
University of Minnesota Center for Transportation Studies

Texas Transportation Institute  
Texas A&M University

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# Day 1

## Welcome and Introductions

LEE MUNICH, *Humphrey Institute, University of Minnesota*

## Highlights of 2009 Symposium on Mileage-Based User Fees

GINGER GOODIN, *Texas Transportation Institute, Texas A&M University*

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### [Findings from the 2009 Symposium on Mileage-Based User Fees](#)

The Texas Transportation Institute (TTI) and the University of Minnesota's Hubert H. Humphrey Institute and Center for Transportation Studies hosted the first national Symposium on Mileage-Based User Fees in Austin, Texas, April 14-15, 2009. The vision of the conference was twofold: to advance the discussion on mileage-based fees as a potential replacement for the fuel tax, and to engage participants in a facilitated discussion to articulate a possible path forward.

Eighty transportation professionals from twelve states and over fifty organizations gathered for a day-and-a-half to hear presentations from experts on the state-of-the-practice in mileage-based fees, also called vehicle-miles traveled (VMT) fees. Participants represented all levels of government, academic institutions, trade associations, advocacy groups, and the private sector. Panelists from a variety of organizations spoke on a number of issues surrounding this topic, including institutional issues, public acceptance, technology options, and perspectives of stakeholders and local officials. The symposium program can be found at the web site <http://utcm.tamu.edu/mbuf>.

At the opening of the conference, participants were asked to consider three questions during the course of the symposium:

1. What are the greatest challenges or barriers to transitioning from the fuel tax to a per mile fee?
2. What would the transition look like and who would lead?
3. What additional research, testing and demonstration are needed?

The closing activity of the conference featured an interactive discussion session facilitated by Robert Johns of the Center for Transportation Studies and Katherine Turnbull of TTI. Using an innovative "conversation circle" format, each question above was posed by a moderator and participants were invited to join the circle and offer their responses to the individual questions.

In general, there was no clear consensus among the group in response to the three questions, but there were a number of general themes that emerged from the discussion.

## *What are the greatest challenges or barriers to transitioning from the fuel tax to a per-mile fee?*

The greatest challenges or barriers can be categorized into three groups:

### 1. Public Acceptance Challenges

- Privacy – Refers to public concerns over what data is collected at the vehicle and what is transmitted to assess a mileage fee. System design must ultimately address privacy concerns.
- Need - The benefits of a mileage-based user fee system must be stated. The new system must add value over the current system, and public policy and education needs to articulate those benefits to the public.
- Trust - Public trust in the transportation investment and the transportation planning processes is low. The current revenue allocation process does not inspire public trust, and that does not bode well for garnering support for a new, costly fee collection system. General government distrust is also a factor in technology design.

### 2. Political Leadership Challenges

- Political leadership challenges were articulated by the participants as “lack of political will” and “lack of national direction.” Most participants believe action at the national level is important because interstate commerce and travel will be impacted. The lack of clear national vision and clear system objectives was cited as a significant impediment.
- The absence of an organized coalition with an agenda and plan for implementation was expressed as a barrier.
- Education of state and local officials, especially during initial demonstration of the concept, was highlighted as more urgent than general public education.
- There was discussion about the lack of policy definition of mileage-based fees as a replacement for the fuel tax at current levels versus a means for expanding funding levels. Revenue neutrality likely has the best chance of gaining public support, but the true need is expansion of the funding base.

### 3. Fuel-Tax-to-Mileage-Fee Transition: Challenges and Barriers:

- Standards – Technology standards are necessary to guide system development and ensure interoperability as opposed to a collection of independent systems. Federal leadership will be particularly important in this regard, as the federal government is best positioned to ensure that a system can be developed with the broadest applicability to state and local agencies.
- Resources - There is concern that costs are high and moving forward will require significant federal support for pilot projects at the state level and for ultimate implementation nationally.



Not all participants agreed with the general themes highlighted in the three categories above. Two individuals expressed concerns about moving too quickly toward a “quick fix”, with poor decisions resulting. On the other hand, one felt that “experts” are the barrier because of a greater interest in studying rather than implementing.

Another participant requested a wholesale reexamination of the question: maybe there is no transition to a per-mile fee and the gas tax remains in place because it has high public acceptance. This individual suggested that other fees (such as vehicle registration) be based on actual use of the system.

Question 2: What would the transition look like and who would lead?

Five overarching themes emerged on the question regarding transition and leadership:

- The federal government should provide policies, frameworks, enabling legislation, and financial support, and the states should test the concept with more diverse, larger, and even multi-state pilot projects.
- An empowered consortium or national commission should be convened to develop a road map for implementation.
- There was a general expression of a desire for the federal government to lead, but a recognition that the states will move faster toward a transition to address their own needs.
- There were opposing viewpoints on the timeframe and pace of transition. Several suggested an interim Department of Motor Vehicle (DMV)-based system deployed in the near term, while others proposed an incremental transition over a longer period.
- Listening to the public was encouraged in early stages to define the “value proposition” and to help articulate benefits.

Question 3: What additional research, testing and demonstrations are needed?

The responses to this question represent a mix of technological and social science research needs:

- Conduct pilot projects to test multiple technology platforms with possibilities for bundled or value-added services.
- Perform research to identify objectives that can be achieved by mileage-based fees.
- Identify a framework for implementation and cost estimation.
- Study equity issues, comparing the existing system with a mileage-based system, and research fairness concerns, such as urban versus rural interests.
- Research public acceptance issues to gain an understanding of resistance to the concept and identify what is necessary to build trust.

## U.S. Deployment Approaches

Moderator: **MARK MURIELLO**, *New York/New Jersey Port Authority*

Panel: **JIM WHITTY**, *Oregon Department of Transportation*  
**DICK MUDGE**, *Delcan Corporation*  
**RAY STARR**, *Minnesota Department of Transportation*  
**ALLEN GREENBERG**, *Federal Highway Administration*

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### [Deployment of Mileage Charging Systems in the United States](#)

Jim Whitty: Instead of once again talking about the history of the Oregon program I would instead like to answer my own questions related to policy and structural issues surrounding a national mileage-based charging system.

I am a “big tent guy” when it comes to the purpose of a MBUF system. MBUF should not only serve as a revenue source but also be used to manage congestion and encourage the operation of fuel efficient vehicles. Neglecting environmental policy goals could remove political support. The system should cover all motorists and all public roads and mileage. Driver privacy should be protected based on motorist choice. The system should have a local option with states, counties, and cities being able to opt into the system. The rate structure should not be flat and should accommodate the move to fuel efficient vehicles. The system should be operated as a public-private partnership.

There are many public concerns regarding a move to MBUF. Focus groups from different states have confirmed the same basic concerns. The public is concerned with system efficiency and fairness. This can be addressed through the operation of an efficient, fair, cost-efficient public private partnership. Privacy and fear of technology is another area of public concern. This can be addressed through giving motorists choice in the level of privacy and type of on-vehicle device used to record mileage. Contrary to what some believe, I do not believe that the default should be manual reporting.

There are several structural issues that also need to be addressed. Concern over the ease of motorist use can be alleviated through choice of on-vehicle technology and invoice and payment method. Crediting the gas tax can be done through a precise credit or estimated credit. Other administrative issues can be mitigated through the operation of a public private partnership.

There are several things still left to learn. I believe that GPS and cellular can operate together, but what needs to be researched is whether it would be wise to allow both to operate in the same system. Effective enforcement is the critical research area in this area. Currently we do not know how to enforce a mileage-based system. In Europe they use a lot of monitoring devices. However this assumes that there is a mandate for all motorists to have a device in their vehicle. In the U.S. we are likely to have a partial application. Will the choice of an on-vehicle device placate motorist’s fears? I believe that it will. The private sector role, interoperability standards, costs, and the nature of early deployments are additional areas that need to be further investigated.

Here is a brief overview of the Oregon weight-distance tax: The trucking industry keeps records on truck combination, number of axles, and odometer readings. They are obligated to complete a mileage report,

calculate their payment, and then send payment. A comparison of data from ODOT and Qualcomm showed that GPS coordinates were matched very closely with the biggest deviation being 0.05%.

### **Audience Questions**

Is there going to be a flat rate for electric vehicles and what technology will be required in those vehicles?

*Whitty-All of that is unknown. A road user fee task force will work on these questions.*

### **U.S. Deployment Approaches: Truck Fees**

Dick Mudge: The financial system is badly broken which is good news for the VMT industry. I am concerned that we are trying to do too much with VMT fees and that if we get too carried away it will be something that only academics talk about and will not be implemented. There is a need to keep things simple which is why I have focused on trucks.

Many trucks already have the technology necessary and privacy is not as significant of an issue as owners have the right to know where their trucks are located. Delcan's New York VMT study is not like European systems. European systems have high collection costs. Delcan is working with a small number of companies for added depth.

The proposed fee structure was an average fee for all miles and variable fees for thruways. There is no substitute for tolls, limited access roads, primary roads, local, and an off-peak discount. Private sector folks love the idea of charging differential rates by class of road. However, the trucking industry wants simplicity and is resistant.

Phase II could potentially use real money. This would focus participant companies on how they would actually change their operations.

Truckers are wondering why a system would be revenue neutral, as the case has been made that we need more money. I can imagine a system that is not revenue neutral but a portion of excess money is spent on areas that have specific truck related issues.

### **Audience Questions**

We talk about trucks being part of this system, but I wonder if anything is being studied in terms of buses. What are the benefits of truck pricing versus bus pricing?

*Mudge-The reason to focus on trucks is that a lot of the mid to large companies already have the equipment which drives down capital costs. There is also less of a privacy issue.*

Switzerland and New Zealand charge buses. It is actually quite easy. I have a comment on the German system: I've studied it and the administrative cost is about 6% of revenue, so initially it was quite expensive but in the long term costs have been a lot lower.

*Mudge-I got my numbers (11%) from someone at a conference. I think you need to keep costs here in the US at around 1- 3%.*

### IntelliDrive (sm) for Safety, Mobility and User Fees

Ray Starr: I am going to discuss a pilot project in the works for Minnesota to demonstrate technologies that will allow for the future replacement of the gas tax with a fuel-neutral mileage charge. What is unique about the study is that we are basing it on consumer-based devices that consumers can go out and purchase. The project will have manual odometer readings because during a transition you are going to have a lot of vehicles that are not equipped.

The pilot plans to use 500 vehicles. The vendor will determine how miles are measured. I anticipate using a “congestion zone” in the metropolitan area. Only categorized miles are transmitted due to privacy concerns but detail is kept at the discretion of the driver. Billing will be done monthly with options to pay by cash, check, or credit card. The current rate should be displayed so drivers know what they are paying to drive on a road. The vendor has proposed using a TomTom unit which will provide the GPS. A cellular device would be the communication method.

Some general comments regarding transportation finance: I believe it is unthinkable to eliminate the gas tax. Not taxing gas would be like not taxing tobacco. Furthermore, the gas tax favors those with fuel efficient vehicles. Furthermore, the gas tax is easy and inexpensive to collect.

### **Audience Questions**

Are you able to say what the program participant cost will be?

*Starr- We are still working that out. It depends on what you include in the costs. We were given \$5 million and that's about what it will cost.*

Why is pay at the pump your preferred method?

*Starr-Lots of folks have trouble paying bills and I think it would be less of a burden on payees if they were to pay at the pump.*

**Pay-as-you-drive insurance (PAYD)** Alleen Greenberg: I want to make four main points:

1. Pay—as-you-drive (PAYD) insurance is important in its own right and should be promoted outside of MBUF.
2. If all of the objectives of PAYD and MBUF are considered carefully then I think a system should be designed to accommodate both.
3. We had discussions yesterday with insurance industry experts and I want to share their input.
4. And I want to discuss what this portends going forward.

Brookings has released a study on PAYD insurance and has concluded that VMT would be reduced by 8% and most drivers would see savings. Reductions in driving come from the presence of an option to pay less by driving less. Environmental groups have come out in favor of PAYD insurance. Tax credits have been endorsed as a means of moving this forward.

On the technical front, Cambridge Systematics looked at a suite of technology options for having the transportation sector help meet carbon reduction targets. The study concluded that if PAYD insurance was included with a bundle of other measures, carbon emissions would be reduced by an additional 44%. Benefits are high and costs are low and this needs to be considered outside of MBUF discussions.

A system that does not gather a lot of data would not be of any value to insurance companies. However, having detailed data enables more applications. Companies want the raw data, and the more raw it is the more useful it is.

The level of interest in partnerships varies but those who are less advanced on this topic are more interested. There was a concern about doing pilots because they would only be getting a small amount of data. More developed companies in this area were concerned about integration with their current data systems. In terms of partnerships, there was a concern that it would be difficult to design products if they were only going to get data for a period of time from temporary pilots. The insurance industry also noted that they are a low margin business. There was an interest in getting data pertaining to mileage, time of day, and type of roads travelled.

In discussing pathways forward, the view was expressed that if we had an opt in system that allowed for insurance companies to take a leadership role, some felt that because insurance offers some savings it would be more desirable than a system developed to solve a problem that most people don't know exists. Even though there was some reluctance, the presence of goals and open ended data for meeting those goals generated a lot of enthusiasm.

### **Audience Questions**

There was a concern about VMT fees replacing or supplementing the fuel tax. Can you comment on the benefits of supplementing versus replacing?

*Whitty- In Oregon it is easier to replace due to public acceptance. But there is also an environmental perspective so rates would need to be structured for the MBUF to do something similar. I think it boils down to what you can sell politically.*

*Mudge- I agree with Whitty's comments and think that tacking this on the ton tax in NY would not have generated much support.*

*Starr –There are shortfalls in the highway trust fund and the gas tax could compliment a mileage-based user fee.*

There was a quote from a Minnesota legislator who said they would never vote for a MBUF system because they did not want to see mileage data in divorce court. My question is what you researchers are doing to protect the privacy of your participants and how are you insuring that revenue goals are not overriding privacy?

*Whitty- There are a lot of privacy protection measures. The unit employed in Oregon did all calculations on-board and transmitted only charges. Motorist's choice of the device is the key to gaining acceptance. Some motorists do want more detail for auditing purposes.*

*Greenberg- If data is subpoenaed it has to be provided. It is not frequent but it does happen.*

*Mudge- The data is very valuable and I know there are ways to protect it. I don't think the data should go directly to the government. In our project we are getting very detailed data but only summary data will go into the reports.*

I have been involved in international applications of this and they all failed because there was no clear objective as to what to do with the money. I agree that revenue neutrality is not practical. Would you agree with the principle that money generated under MBUF go to the owner of the road?

*Mudge – I think revenues should go for transportation services, but I am not sure about revenue going to the “owner” of the road. In NY it may amount to subsidies. Revenues should stay in the mode with flexibility for spending within that mode.*

*Starr -Revenues would go into the existing pot and then formulas would be used to determine where it goes from there.*

In looking at large demonstration projects for the replacement of the fuel tax would states need enabling legislation?

*Whitty and Greenberg-Yes.*

*Whitty- We are seeing positive developments nationally for these discussions. Legislators are finally talking about the issue.*

Have there been discussions on the legal side about doing things in terms of policy that would put people at ease in terms of data privacy?

*Whitty- There could be some sort of standards for privacy, but no steps have been taken.*

Frank Douma (Assistant Director of the State and Local Policy Program and Attorney):-I have been looking at privacy from a legal perspective. The data is created and from there an issue arises. The policy question is different from the legal question. If data can be kept anonymous there is not a problem. If the data is not anonymous then you need to have an opt-in system and people need to be aware of the implications of opting-in. Opt-in will probably alleviate a lot of these concerns.

## Demonstration Projects

Moderator: **JIM MARCH**, *Federal Highway Administration*

Panel: **PAUL HANLEY**, *University of Iowa*

**MAX DONATH**, *ITS Institute, University of Minnesota*

**TREVOR PLATT**, *T-Systems Limited, UK*

**BERN GRUSH**, *Skymeter Corp.*

**JACK OPIOLA**, *D'Artagnan Consulting*

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### [University of Iowa National Evaluation of a Mileage-Based Road User Charge](#)

Paul Hanley: I am going to discuss the preliminary findings of the first year of the University of Iowa's National Evaluation of a Mileage-based Road User Charge Project. The basic approach was to have area-wide pricing based on miles travelled within jurisdictions. The on-board unit was the Prism III. The on-board unit would calculate total miles and would send that information to a billing and dispersal center which then sends invoices to participants. The participant cities were selected based on demographics and exposure to electronic tolling. The cities in the trial were San Diego, Boise, Austin, Eastern Iowa, Research Triangle, and Baltimore. 1,207 participants enrolled and 1,152 completed the study.

A general finding from the study was that people switched their perspectives on MBUF in both directions after participating in the study. The study gauged privacy versus audit ability by varying the information provided on the invoice. Participants generally preferred audit ability. People switching preferences in the extreme indicate that during implementation folks will need to be given the opportunity to change their preferences after initial enrollment.

The study is now in its second phase with new participant areas (Billings, Albuquerque, Wichita, Chicago, Portland, ME, and Miami)

### **Audience Questions**

Could you explain how you designed the privacy/audit ability tradeoff experiment?

*Hanley- We had a series of questions in our questionnaire addressing the topic.*

Would it be useful to talk to telephone companies who are experienced in providing numerous payment and billing options?

*Hanley – We have encountered a lot of variety in the data that people want to have access to. We need to have options available for users.*

## [Enabling Near-Term Nationwide Implementation of Distance Based Road User Fees](#)

Max Donath: I am going to talk about technology rather than policy. GPS does not mean “tracking” however this has been confused by the public and media.

Since 1996 all passenger car models have been equipped with an OBD-II data link connector. Devices can be connected to the OBD-II data link connector. We have come up with the idea of using an inexpensive cellular modem. Every cellular base station has a unique ID that can be used to determine zones. Almost every cellular modem can pick up multiple cell towers simultaneously. This device could work in “Urban Canyons”. The device has a low resolution which from a privacy standpoint means that you cannot capture exact location.

### **Audience Questions**

Does your device have to be professionally installed?

*Donath- Yes. It would be professionally installed because whoever installs it should take a reading of the odometer so as to compare with the “virtual” odometer in the onboard unit. This could be done by any number of providers that are accredited by the state or policy enforcing agency.*

## [Satellite Metering for Roads, Parking and Insurance](#)

Bern Grush: I want to make some comments about costs before speaking about a trial. I am not in favor of more trials. Pilots have been very expensive: approximately \$6,350 per participant. We need to be doing policy trials on the back of private enterprise. We need government to spend money not on volunteers but rather on providers like Cisco, Alcatel, Lucent and IBM to build the networks and systems that will allow for market corrections.

I have some remarks on the Winnipeg system: Permission was granted by the Winnipeg government to put the system in vehicles so long as the revenue was remitted appropriately. There were “enormous” benefits to both the municipality as well as system users.

## [VMT pilot studies: What should drive them?](#)

Scott Wilson: We are talking about a platform for accomplishing many things, namely having integrated infrastructure with intelligent vehicles. The key issues are:

- Objectives and goals must be clear – you have to know what you are trying to do
- End to end system design and business rules
- Open Architecture

Policies can conflict, but if you know the core objective you can move beyond these conflicts. Customer service is something that implementing agencies can get hung up on and get wrong but it is a critical aspect of the system. If you don't have a robust enforcement that is viewed as fair then the system will “fall over.”



## Audience Questions

How do you think demonstrations fit into the implementation process?

*Hanley – It is important to have an educational outreach effort. We have tested our participants on their knowledge of the fuel tax and financing and nobody knew anything about it. There also needs to be education on technology but a lot of this boils down to distrust of government and not liking taxes.*

*Grush – Let the market do the education. If we put the technology out there some people will eventually see value in it.*

What is in it for commercial carriers from adoption of such a system?

*Wilson – Elimination of diesel tax was one of the motivations behind supporting one of the systems I worked on. Another was to allow for heavier vehicles to be allowed to get onto more routes, which decreased compliance costs. It also allows for agencies to show that revenues are being directed to projects that benefit users of the system.*

You gave lots of compelling examples but what is the market incentive that will bring people into the system other than charging less which will, in turn, reduce revenue?

*Grush – You need a basket of incentives to offset the pain of paying a MBUF. PAYD could be one.*

Would there be requirements with regards to these systems for MBUF to be included or supported as part of the deployment?

*Grush – Protections for the vendor would eventually need to be removed allowing the system to operate within a free market, but getting the units in the vehicle provides a platform for the US government to build a larger pricing system.*

If I understand Bern correctly there will always be people who will not opt into the system and we should not agonize over them. That issue will take care of itself.

*Grush– Things are not going to look as they do now in a few years. Do you really think that we will be driving autos fueled by gasoline in 400 years?*

## Political Realities and Project Champions

Moderator: **KATHERINE TURNBULL**, *Texas Transportation Institute*

Panel: **REP. BERNIE LIEDER**, *Chair, Minnesota House Transportation Finance and Policy Division  
Minnesota House of Representatives*

**SUSAN BINDER**, *formerly with U.S. Senate and U.S. Department of Transportation*

**JACK BASSO**, *American Association of State Highway and Transportation Officials*

**MARK MURIELLO**, *New York/New Jersey Port Authority*

**BOB PITCHER**, *American Trucking Association*

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Susan Binder: I want to give my sense of the federal context and political environment in which we will be operating to try to improve our surface transportation system. I served as the executive director of the National Surface Transportation Policy and Revenue Study Commission. In the conclusion of their report we stated that sizable increases in investment are needed as well as a predictable stream of revenues. The contribution of the transportation system to the economy and well being of the nation is underestimated.

User fees are seen as politically fair and equitable. There is a conflict with energy policy in a system where you have to buy more fuel to contribute to the national system. We can capture externalities with a VMT based system.

We have had two commissions that concluded that program reform needs to occur along with funding reform. You cannot do one without the other. There is a lack of political will for dealing with the current position. Raising gasoline taxes at the federal level with the current state of the economy is not politically feasible. There is resistance in the short term and on the part of “budgeteers” who like the general fund infusions because it gives them more flexibility over where to put scarce resources. This is a recipe for disaster because it takes a long time to do these projects.

There is an opportunity to work towards a transition to a mileage-based fee. The concerns among staff and members of congress are privacy, administrative costs, enforcement, revenue neutrality, and replacing versus supplementing the gas tax. Running on two parallel tracks may be the way to go. Advocates of a mileage-based system should stress the basic, high level policy questions and at the same time do the due diligence necessary to answer the smaller questions.

Jack Basso: We are at a crossroads and we need to recognize that the process is first and foremost political. In order to make progress we need effective political leadership. Executive and state leadership is critical.

We have heard little from the administration on revenue systems except that there will not be new gas taxes or a VMT fee. The slowness of the political process affords us all an opportunity to affect the

outcomes of the next surface transportation reauthorization through educating and energizing political champions.

The potential political champions are at the state level. Governors and state legislatures are key. We need to work with states and state legislatures and explain it in a plain English, non-esoteric way. We need champions with credibility that can make the case in terms of benefits and investments. We should consider forming a speaker's bureau to articulate the agenda.

I want to close with three observations.

1. We are definitely at a crossroads and we cannot ignore the situation.
2. We have a golden opportunity to make a long term difference.
3. People will respond if they believe there is credibility in the product being sold.

### **Audience Questions**

Who would be included for the speaker's bureau that has not been involved thus far?

*Jack – We need regional voices for addressing regional issues. We should definitely have federal officials involved but they often lack freedom to speak openly.*

*Susan – The most compelling arguments have been made by companies who are the customers of the logistics industry who can speak to the cost of poor infrastructure.*

Rep. Bernie Lieder: I want to discuss the legislative process for trying to move different ideas. In Minnesota we have traditionally been highway oriented. It has only been in the last few years that we have been able to break through in the legislature to talk about transit, light rail, commuter rail, high speed rail, ports, and airports. Part of this transition may be due to the fact that Minnesota used to have a more rural legislature and has recently become more balanced between rural and urban.

Raising the gas tax in Minnesota has been very difficult. It took 20 years and an override of the governor to raise the gas tax. We are seeing a reduction in the states consumption of fuel even as vehicle registrations are increasing. We are about to see a lot more electric vehicles and they need to be charged. For every dollar we spend, we actually need four in revenue.

We've gotten beat up in the public and by the press over the idea of a vehicle-mile tax, but it's turning around due to federal attention on the topic. Education and healthcare are considered more important in Minnesota, so education of the public on this issue will be important.

I have met with auto makers and they don't seem to have a problem adopting the necessary technology for a mileage-based fee. I feel like it has to be done nationally because it is hard to work between the borders. Until the public is made aware and the media is on our side it is going to be tough to implement, but we can't afford to continue to lose out on money for our transportation system.

[Multi-state VMT-based Road User Fee Initiative](#)

Mark Muriello: I am speaking as the co-chair of the I-95 Corridor Coalition. The Coalition has been exploring a multi-state VMT-based road-user fee initiative. The Coalition includes transportation agencies, authorities, operators, MPOs, public safety and related organizations from Maine to Florida with affiliate members in Canada.

The Coalition has focused on administrative, institutional and legal issues with an agreement to work towards definition of a multi-state trial in the Coalition region. In discussing system functionality the Coalition made use of the NCHRP 20-24(69) RAND report. The Coalition thought that the complex option must be considered. Several administrative requirements were discussed including enrolling user participants, distributing revenues among participating parties, and enforcement issues. The cost of collecting the fuel tax is around 1%, with some states above and some below.

We are just now starting to look into legal issues. The types of things being looked into are issues surrounding whether it would be a tax or a user fee, the ability to collect the fee on all roads, and the ability to enforce out of state violators.

### **Audience Questions**

How is the coalition financed and staffed for this?

*Muriello- We have a small staff that is funded through SAFTEA-LU and personal volunteer efforts.*

Is there any chance that cashless tolling might be included in this?

*Muriello- We are still far off on that question. Toll operators are still worrying about how to get cashless tolling and this is the next step, so they are not really focused much on it right now.*

### **Trucking Industry Perspective**

Bob Pitcher: I want to address two issues. First, motor carriers are likely to oppose a VMT fee on heavy trucks, and second, a VMT on cars must be designed so as to be difficult to evade. The first issue represents ATA's position while the second issue is my own personal recommendation.

The trucking industry has always supported a user fee system and a fair vehicle registration system that is based on weight, but not a weight-distance tax. A VMT on trucks will be rightly viewed as a weight-distance tax and opposed by trucking. More than 20 states have repealed weight-distance taxes with only four states still having them in existence today. Weight-distance taxes are cumbersome, expensive, unfair, and open to evasion. The same problems undermining gasoline taxes are not present in the trucking industry as there is no satisfactory alternative to diesel fuel for heavy trucks, so there is less need to look at VMT for the trucking industry.

Moving to evasion: taxes are easier to collect if collected from a small number of payers and/or there is something to withhold for non-payment. The fuel tax is collectable, enforceable, and efficient.

There are issues with VMT fees which could cause evasion problems. First, there will be several hundred million tax payers. In addition, odometers are often off by around 4% and GPS can be unreliable if the

conditions aren't right. Furthermore, odometer tampering does occur. Who would enforce the VMT? The IRS' history with excise taxes is not as good as their history with the income tax.

It would be best to keep it all simple. We should keep the fuel tax as it is one of the best tax collection systems ever devised.

### **Audience Questions**

It seems like a lot of the issues you have raised could be addressed by automation. Why is there a uniform opposition to a VMT system?

*Pitcher-There is a general feeling that roads are in bad shape and fees need to go up. And it is not a coincidence that the weight-distance fees are the highest. Technology may be able to take care of some evasion, but thus far it has not*

What about the German system, which is based on the capacity of the truck and not the actual weight? Would something like that be more attractive than a weight-distance tax?

*Pitcher-Now you are getting into the limits on size and weight that are enforced in this country. Trucks that are not fully loaded are that way because they need to get somewhere fast.*

We need to be talking about the actual costs and benefits in this. There are lots of other taxes like tire taxes and brake taxes but these do not reflect cost.

*Pitcher-The industry is not for a highway system that is financed solely by fuel taxes. Coupling with weight based registration fees gets us close to the point on collecting for actual costs.*

I think that we're capable of making this work and keeping evasion down to manageable levels.

*Pitcher-I think the private market can use data and has used it effectively, but I doubt that government can accomplish this.*

Susan, could you describe in a little more detail the two parallel tracks moving forward?

*Binder – There is a lot of turnover in the house so education can be difficult and while it is less pronounced in the senate there is still a need. I think there are things that we can do in order to get action in between sessions. What we need, though, is some general policy direction. Perhaps also take some funding and allow private industry to explore these issues. We need to “move the ball” and not be doing the same things over and over. Again that is why I see things going on a two track course. We can't wait on the “perfect study” in order to get going.*

We are looking at moving from a fuel tax to a user fee based system. Perhaps at the state level we should consider giving drivers the option of not a state annual vehicle tax but rather a mileage fee. What does the panel feel about that?

*Basso – A simpler solution may be to raise the gas tax, but we will be right back here in a few years. The problem is that this has not been touched since 1993 and we need to do something about the immediate problem. We should look at the solution mentioned along with many more.*

Lahood noted a while back he was in favor of mileage-based user fees, which was rebutted by the administration. If that continues to be the administration's stance and the new bill has no VMT in it how serious of a setback would that be for this movement? Also, is there an active effort to make sure there is something in that bill?

*Basso-AASHTO is putting on a heavy push and generating research to make sure there is something in that bill. If we are going to dig into this we might as well go all the way. If we can't get the fuel tax raised then we need to recognize that the other option is simply that investment will go down. That is a policy option, but I think it is a fool's option.*

*Susan – My observation is that the administration simply doesn't want to deal with this right now, and that is what occurred with SAFETEA-LU. It needs to be articulated that raiding the general fund does not fit the desired model for transportation investment that has been previously outlined. I believe that studies should continue to at least evaluate the options that are there and to provide information moving forward.*

## Public Outreach, Awareness and Acceptance

Moderator: **ADEEL LARI**, *Humphrey Institute, University of Minnesota*

Panel: **KENNETH BUCKEYE**, *Minnesota Department of Transportation*

**MATHEW KITCHEN**, *Puget Sound Regional Council*

**JOHN SABALA**, *Texas Department of Transportation*

**R. SCOTT RAWLINS**, *Nevada Department of Transportation*

**JOE LOVELAND**, *Loveland Communications*

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### Minnesota Mileage-Based User Fees: Public Opinion Study, Phase III

Ken Buckeye: I will discuss a Mileage-Based User Fees Public Opinion Study. Winning public acceptance is one of the keys to moving forward. Phone-mail-phone interviews were conducted with 821 Minnesota drivers. Surveys found that few Minnesota drivers were concerned about current levels of funding for transportation. 72% said funding will be a problem in the future. Only 41% of respondents had heard of the concept of a mileage-based user fee. Driver's believed that future funding solutions will contain a mix of options including MBUF.

In terms of technology, GPS is a potential deal breaker. Higher technology approaches drew stronger negative reactions than low technology approaches.

Goals have to be articulated in a clear manner and you have to show how the system will address these goals. There must be a compelling case for how mileage-based user fees will affect quality of life.

Some work was done on a risk assessment, and the top five risks identified were:

1. Increasing fees when necessary
2. Perception of privacy invasion
3. Legacy systems interface
4. Cost to implement
5. Debate on revenue distribution

### Findings from a Road Pricing Experiment

Mathew Kitchen: I will discuss a project in which behavioral experiments were carried out to see how drivers changed their driving behaviors in response to tolls meant to reflect the actual costs, specifically the congestion externality, placed on the roadway system. Drivers will be the best agents for determining behavior so long as we give them data about the costs they will face. By pricing for congestion you are able to determine which roadway assets are most valuable. The project used GPS-based tolling.

The question of who benefits is perhaps more important than the question of who pays. The real question we face is can we make some better off without making some worse off. Something we can all work on is communicating the benefits in a tangible way. In terms of privacy concerns from the study,

people were driven from the middle in terms of their feelings on privacy under the system. The key is to now to figure out what drove them from the middle.

### **Vehicle Mileage Fees: Exploratory Study, Update on Quantitative Work**

John Sabala: I will discuss an exploratory study which investigated the public's interest, perceptions, and preferences with regards to transportation finance in Texas as well as responses on potential vehicle mileage fee system deployment options. One of the reasons for doing the project was the criticism we received in trying to implement toll roads in areas that had never had toll roads.

Focus groups were conducted in Dallas, Laredo, and Yoakum, Texas. Each area had a different demographic makeup and response to VMT fees. The Yoakum focus group's demographic makeup was generally older and Caucasian. The Yoakum participants were flatly opposed to VMT fees. The strongest concerns were privacy and cost/bureaucracy issues. The Laredo focus group's demographic makeup was younger and Hispanic. In that group, participants saw a potential value in VMT fees. The strongest concern was enforcement and privacy. The Dallas focus group's demographic makeup was the most racially diverse of the three cities. That focus group's respondent's saw potential value in vehicle mileage fees, but had doubts as to whether it could work. The strongest concerns were enforcement and system costs. Respondents from Dallas thought that VMT fees should be aimed at electric vehicles.

Texas Department of Transportation is also in the process of conducting stakeholder interviews, receiving feedback from a technology panel, and conducting state peer group discussions.

### **Vehicle Miles Traveled Fee Study in Nevada: "Public Outreach & Acceptance"**

Scott Rawlins: The object of our study was to look at VMT fees as a replacement to the gas tax. We are selling the notion that the fuel tax model is broken, and are therefore presenting this as a fuel tax replacement. We started right out from the beginning to get the message out to legislators and the public as to why this is being studied. We have legislative support at this point from the assembly chair and chair of the other house. Workshops were conducted on smaller groups with a facilitator to get feedback on critical issues.

There are going to be differences in the states, so it is important to do state and regional pilots. For example, there are concerns in Reno about private firms collecting data, while in Las Vegas there is a desire for societal benefits to prevail over privacy concerns that is not necessarily reflected in other areas. It is important to remember that the media will grab onto privacy issues and sensationalize them. One interesting result from the public meetings was that people started talking about raising the fuel tax.

One important note on public outreach is the concept of negativity bias. You can get more of a reaction from framing things in a negative light.

### **VMT Tax: Towards Overcoming Public Concerns**

Joe Loveland: The issues discussed as drawbacks to VMT fees have potential solutions. Trials are important because acceptance usually comes through seeing things work as opposed to just being told that they will.



To mitigate the backdoor tax increase concern you have to do a revenue neutral implementation. It is also crucial to find a tax foe champion to stand up say they are fine with VMT fees.

To mitigate the environmental concerns you need a variable rate. You also need to find an environmental champion to help promote VMT fees.

The lack of choice concern can be mitigated by conducting pilots on an opt-in basis. Early adopters should be rewarded so others envy them.

The “devil you don’t know” concern can be mitigated by continually spotlighting the urgent crisis associated with the gas tax. You also have to answer questions no matter how silly it may seem and there needs to be a technical component involved in the discussions. In fact, you shouldn’t be out there talking about VMT fees until you have a sound technical base and robust technical team.

The concern that the technology might crash can be mitigated through pilots as well as immediately fixing any technical problems. Once again, you must show not just tell.

The “Big Brother” concern can be mitigated by piloting on an opt-in basis. Privacy champions should be involved in design and measurement. Having a third party audit can also reduce “Big Brother” fears.

Complexity concerns can be mitigated through keeping the system design simple and linear. Communications should be kept simple. The more people can understand it in 15 seconds the better. The harder it is for people to understand the less they are going to like it.

Champions need to have thick skins and credibility.

### **Audience Questions**

Loveland stated that revenue neutrality is essential but we also need to highlight the funding crisis. It seems like we can’t do both at the same time. We are into some sort of Catch 22. Can you sort that out for us?

*Loveland-I think that you can credibly call something revenue neutral that is revenue neutral at the time of implementation and that still addresses the declining revenues overtime.*

*Buckeye – We did a series of a dozen focus groups and my sense is that the public knows why we are talking about this and it is not to insure revenue neutrality. I think therefore presenting this as neutral damages credibility.*

*Rawlins- If you frame it under equity, in terms of trucks and hybrids and paying for what you use, some of these issues fall out.*

*Kitchen – Our legislature passed fuel tax increases in 2003 and 2005 and in both cases there was the expectation that bonds would be issued against those revenues. We built projects and*

*revenue neutrality does not compute and you have to say up front that the expectation is that we need more revenue. Perhaps commit to revenue neutrality for a certain specified time.*

*Loveland – If you need to do a tax increase be up front and transparent with it.*

Why is more not made of the fact that VMT enables speed to rise (through congestion reduction)?

*Kitchen-We are thinking about this problem as a public finance problem, but it doesn't mean that people don't have the capacity to understand something more complex.*

*Buckeye – In the two models we presented, the low tech option does not have a variable price option. It is present in the high tech option. I suspect that aspect was lost in the "static" with regards to our analysis.*

*Sabala – The speed argument fell flat with regards to tolls in Texas.*

There has been talk of moving the ACLU onto the side of the VMT pricing... maybe Mark Muriello can talk about this.

*Muriello – It is about engaging people who will have an opinion on this. But we are talking about electric tolling.*

*Loveland– Sometimes outreach is about converting foes to friends and at other times it is about showing people "you don't have horns."*

How does the type of entity doing outreach affect acceptance?

*Loveland – In my experience the university is able to say things the DOT would not. The University helped build public trust.*

*Rawlins, Buckeye, Sabala – All agree.*

Rawlins mentioned media relations and the biggest lesson I learned was to think in terms of sound bites to feed to the media.

*Kitchen – There are people out there who know how to write a good story and others are kind of lazy and the lazy will pick up the good stories.*

*Rawlins – We have not talked about blogging and tweeting. These outlets were more destructive than the actual media articles that came out about our efforts.*

Everyone knows that this is about getting more money for transportation. We need to reestablish the basic trust in the system before we can ask for more money.

*Sabala– Where does that begin? We've been trying to educate the public for years and it is not happening.*

*Kitchen – The problem is that the chain between cost and benefit has been broken.*

*Loveland – There will always be people that are not going to believe what you are talking about.*

Do you have any thoughts on pilots and how we might structure a federal pilot?

*Loveland – Maybe 15 opt in pilots so that everyone is near one and can participate if they are interested. Until you do that it will be hard to get people to think that these things can work in their area.*

## Day 2

### The Netherlands: Progress Toward a National Road Pricing System

MARIAN JONGMAN, *Strategy Director Road Pricing Project, The Netherlands*

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#### Road Pricing in the Netherland: Lessons Learned

Marian Jongman: The Netherlands is facing increasing congestion. Pricing has been attempted 6 times since 1988 and is currently being developed as a kilometer charge. However, the cabinet is not currently able to make decisions due to the withdrawal of one party. Revenue generation has never been a primary purpose of previous Dutch road pricing attempts. The primary goal is always congestion reduction. All parties have sought to implement, not just one. Opposition is currently for political reasons.

Several alternatives were investigated, including:

- Congestion charge at busy times and places – This would be the best overall system for congestion reduction.
- Payment per kilometer for heavy goods
- Fuel tax increase – The main problem with a fuel tax is the border with Germany. It is too easy for motorists to avoid the fee increase by purchasing fuels in Germany.
- Payment per kilometer with a rush-hour surcharge

Previous attempts at implementing pricing have failed due to a lack of support amongst stakeholders. The ministers implementing the current configuration decided to approach opponents, starting with a motorcycle organization, to generate support.

The guiding principles for the system are as follows:

- Taxing vehicle use as opposed to vehicle ownership
- Pricing throughout the Netherlands, even if driving does not occur on roads
- Fee is assessed at a basic rate per kilometer that is differentiated according to environmental characteristics (such as CO2 emissions).
- A rush-hour surcharge for periods of high congestion
- Utilization of satellite technology
- Motor vehicle tax, provincial surcharges and purchase tax to be abolished
- Revenue from road pricing will go to the Infrastructure Fund (maintenance, new construction, public transport, etc.) – There is no opposition in the Netherlands to funding transit and railroad systems with fee revenues derived from motor vehicles.

There are several aspects to the pricing system, the first of which is the on-board unit (OBU). The OBUs are based on “open sources” and it is hoped that they can be combined with other road based services. Travel reporting, invoicing and collections account for the next phases. The last phase is enforcement, which will always be handled by the government as private enterprise is barred from such activities. There are essentially two tracks: The low tech “guarantee” track and the more technologically advanced “main” or “market-based” track. The first step in system development was to open the market by setting specifications that would fulfill system goals.

### **System Overview**

Messages are sent to system provider on an intermittent basis. It does not matter which track this occurs on. The system provider gives the user a bill.

### **Cost**

Implementation	3.8 billion
<u>Exploitation</u>	<u>1.8 billion</u> (during scaling-up period)
<b>Total</b>	<b>5.6 billion</b>

It is not known yet what the cost of the private back office will be, but the system does not cost much compared to other European systems. It is hoped that administrative costs can be kept at around 5 percent. The government will be paying for the first round of OBUs, which will be a substantial cost. The Netherlands is currently in crisis along with other European nations, and it is believed the new government will reconsider whether it will pay for these units. It is believed that the presence of added services will encourage people to purchase an OBU on their own. The system will need to cover about 9 million vehicles, 1 million of which will be trucks, lorries, busses and other special vehicles.

### **Current State of Affairs**

On March 11th, the house declared that the Different Payment for Mobility project was “controversial” and, as a consequence, the Minister of Transport, Public Affairs and Water Management has given instructions to:

- Not undertake any new financial obligations in relation to the project;
- Reduce the project organization;
- Suspend the process of tendering and certification; and
- Discontinue preparations for the intended roll-out of the system.

The Netherlands will continue to work on other mobility projects and international projects such as the EETS.

The Ministerie van Verkeer en Waterstaat has learned to work in steps of three years due to the typical length of time cabinets stay together, which presents a problem for system development. Most of the parties involved want to continue road pricing. Not listening to stakeholders has resulted in failure of

previous attempts at road pricing. However, the Netherlands is attempting to incorporate all stakeholder concerns in the current system, which has resulted in the system being very complex.

### Lessons learned -

- Societal support is key driver
- Political Ambition versus Realistic Planning – The cabinet wanted to implement this system by 2012 but politics precluded a realistic time table. Without that pressure it is not believed that the guaranteed track would have been pursued and the Netherlands would have gone with the market approach.
- Parallel versus serial planning
- KISS: Keep It Simple (difficult enough) and Stupid – This way all users can understand the system.
- Think backwards: exploitation, expand, test, build, develop and incorporate (virtual, if necessary) corresponding stakeholders during all steps in project development.
- Keep to basic principles: paying for use, revenue neutrality and allocating revenues to infrastructure. A poll was conducted showing that 63 percent of respondents favored taxing use of vehicles not ownership of vehicles. Furthermore, many believed that they are currently paying twice: once through vehicle registration and again through use taxes.
- Communication strategy - Focus on a clear message as to why the system is necessary. Ministers have been asked to speak out on numerous occasions because the only information getting out to the public about the system is from media outlets that are generally opposed to the pricing system.

### Audience Questions

Has the Netherlands considered not applying registration fees to people who have already paid and then charge only the mileage fee moving forward?

*Jongman-The system was developed too technically with the only consideration being the number of vehicles. It was assumed that vehicles would turnover .In this system, money goes to the minister of finance and they want their money every year. There are some insurance companies that want pricing but will not invest in the system. Furthermore, everyone is doing their own thing in project development and there is not a lot of communication.*

As a new governmental coalition takes place, how will you advise them on simplifying the system?

*Jongman-The problem is not with the km fee... it is with congestion pricing and privacy. If we could have an OBU based only on kilometers and not rely on location for congestion pricing then it would be more acceptable. However, we are not sure how the government will want to move.*

What happens to the money and the concept of revenue neutrality? If money goes into the infrastructure fund, then it seems that road users are paying for expensive public transportation. This

does not seem like revenue neutrality. Would it not be simpler to put money into a road fund as opposed to an infrastructure fund (IF) and then people would feel that they are paying for and getting something?

*Jongman-At this moment there is no acceptance issue with regards to putting money into the IF and transit. Maybe that will change but it is not an issue right now. And when we talk about revenue neutrality we are talking about neutrality in terms of the km charge. Before money was going into schools and other non-infrastructure items but now it is going into transportation infrastructure. The current laws say that we charge about 6.3 cents but we only need about 5, so we are getting more than we need.*

What benefits are being advertised to the public and what is their acceptance?

*Jongman-It depends on who you are. We think that drivers will drive less because of the charge, so for a business they will see benefits from reduced congestion from fewer drivers. Most individual drivers already drive less and will now pay less as a result of their reduced driving.*

I understand that operating costs are not to exceed 5 percent of revenues, but what we have seen is that significant funds have to be spent on the front end to get it up and working. Is there a schedule for meeting that 5 %?

*Jongman-Yes. We think we need about three years to change the pricing system and about 5 years to change the taxing system. By 2020 I expect we will reach the 5% operating cost.*

## Transition Issues

Moderator: **ZHIRONG ZHAO**, *Humphrey Institute, University of Minnesota*

Panel: **JACK WELLS**, *U.S. Department of Transportation*

**ADRIAN MOORE**, *Reason Foundation, National Surface Transportation Infrastructure Financing Commission*

**PAUL SORENSON**, *RAND Corporation*

**FERROL ROBINSON**, *Humphrey Institute, University of Minnesota*

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### [Administrative Costs of Road User Charges](#)

Jack Wells: The study being discussed was sponsored by US DOT and conducted by HDR Decision Economics to investigate that administrative costs of moving to VM fees. Road user charges are perceived to have significant advantages over fuel taxes as a financing mechanism but high collection costs are perceived as a major weakness. This study is not definitive, but HDR is now part of a larger firm (HLB) which is experienced at developing toll systems and knows a lot about administrative costs. Getting administrative costs down to a reasonable level will be very important for VM fee system development and implementation.

There are several available technologies:

- Video tolling (LPR)
- Automatic Vehicle Identification (AVI) (I.e., transponder-based systems like E-Zpass)
- Global Positioning System (GPS)

There are also several road user charge scenarios:

- Corridor tolls
- Cordon tolls
- Nation (or area-wide) user charges

Some technologies are better suited for corridor or cordon tolling. Costs are dependent on what revenue is being generated. The figures presented in the study are weighted against what would be generated under the fuel tax and estimates should be regarded as an upper bound. This is because it is likely that many revenues would be much higher than what is presented due to the fact that pricing systems like cordon and corridor pricing would not be implemented if there was not a significant opportunity to generate revenue.

### **Corridor Tolls**



For a 10 mile corridor, GPS applications are the cheapest running at about 4 to 5 percent of revenues. AVI is next at about 16-25% of revenues and video tolling is the most expensive at about 33-50 percent of revenues. Longer corridors will generally have access points that are fewer and farther between, thus requiring less infrastructure development in terms of gantries, etc. Costs are likely to vary depending on how often tolling points are established. For a 1,000 mile corridor GPS and AVI are tied running at about 2 to 3 percent of revenue. Video tolling is still the most expensive but now only runs at about 3 to 5 percent of revenue. With transponders there are numerous different technologies that can be used which causes more variability in cost. With GPS based units, you have the option to choose between thick and thin client computational systems; thin being the cheaper of the two.

### **Cordon Pricing**

In this study the administrative costs of a cordon pricing system are not expressed as a percentage of revenue. AVI and GPS are tied in terms of cost, running at about \$2.1 million per year per 10 entry and/or exit points. Video tolling is more expensive running at about \$4 million per year. It is not known; however, how realistic these figures are due to the number of entry and exit points. Of course, it may not that matters as cordon tolling is not that popular here domestically.

### **Road User Charges**

Fuel tax costs vary by state but are generally about 1 percent of revenues. In a national user-based charge system video and AVI would be generally be impractical. However, in a limited deployment administrative costs would run at about 26-51% of revenues if readers are used every 2 miles, 3-5% if used every 20 miles, and 1-2% of revenues if readers are used every 50 miles. The cost of GPS based systems will vary based on whether a thin or thick client configuration is used. Thick OBUs run about \$650 and are more complex to update on a regular basis but have fewer privacy concerns. Thin OBUs cost less, about \$195 per unit, but have more privacy concerns and higher data transmission costs. However, they are easier to update in terms of mapping software. Transaction costs are very low with GPS, running at about 0.07% of revenues. Capital costs would be about 1-4% of revenues. Total cost of the system, if including costs of OBUs, total costs would be 7.9% of revenues for a thin OBU configuration and 33.2% of revenues for a thick OBU.

### **Conclusions**

GPS is only feasible technology for national user-charge system and administrative costs are feasible if a thin OBU configuration is used. However, these costs are still significantly higher than the fuel tax. Collection costs could only be justified if significant benefits other than just collecting revenue (such as congestion pricing, targeted emission fees, differential rates for roads of different load-bearing capacity, or better traffic data) are realized.

### **Issues**

GPS has imperfect locational accuracy, especially in cities. There are also accuracy issues with closely parallel roads (such as interstates and service roads). However, GPS accuracy will improve as new GPS

signals become available. The OBU is key cost item and could be greatly reduced if built into the vehicle at the factory. Furthermore, thin OBUs are much cheaper but could raise more privacy concerns. The US DOT is representing civilian agencies in talks with the Air Force regarding the future of the GPS system. DOT is looking to address issues with urban canyons and other urban related GPS issues that impede the ability of GPS to function optimally in an urban environment.

Adrian Moore: I want to just briefly discuss a set of issues:

1. How much money is this system supposed to raise? – The point was raised as to why anyone would do this if you were not going to generate more revenue. This comes back to the issue of trust and what people are getting for their money. We have a general problem with getting people to invest in the system that overrides development of the system itself. How do we explain that transportation is currently underinvested in? We have to make the case that money is being spent effectively and get the focus off of the “Bridge to Nowhere.” We should perhaps focus on what could be happening with better investment. We are doing lots of pilots and every one of them seems to include a hefty public acceptance component.
2. Use of the money – Is it going to be a user fee or will it be a mileage-based tax that goes into a general bundle of spending? Doing this (allocating to general fund) would be stupid, myopic and absurd. The fuel tax is a second best user fee. Mileage-based user fees are a first best and it would be stupid to shift it to a tax. Spending the money ties into the public trust issue because people want to know what the money is going to be spent on.
3. How to set prices – This has not been discussed thus far. True price is based on supply and demand and the prices we would be discussing are at best an approximation of a true price. Any good price sends signals to the market in terms of demand. But what about the supply side? We don’t have pricing information feeding into our planning systems. Unless we “marry” these two, supply and demand, there will be a disconnect. Without a feedback into the supply side, price will just increase and roads will not develop in response to demand.
4. Incorporating Choice – Do we have “green” outcomes and do we provide other services? Another thing to think about is that choices within the system will allow for privacy issues to be addressed. If we design a system for everyone it will be expensive, but allowing for choice will allow people to adopt high privacy/high cost systems on their own. Not everyone desires the high privacy, and offering a choice will save us from having to implement the same expensive system for everyone.
5. Top/Down or Bottom/Up development – This issue needs to be addressed. What will be the role of the federal government in system development, and to what extent can (and should) that states be allowed to develop these systems on their own?

### Transition Issues and Research Needs

Paul Sorenson: This research effort is twofold and is based on previous AASHTO and NCHRP studies into VMT fee systems and how they can be studied and implemented. What is emerging in this research effort is that there is a variety of perspectives that lead to a different view on how trials should proceed. There are also different views about who should lead, what transition strategies should be pursued, and the time frame for these activities.

In its initial study, RAND looked at nine implementation options, ranging from technically simple to technically sophisticated:

- Self-reported odometer readings
- Periodic odometer inspections
- Assumed annual mileage with optional odometer inspections
- AVI with fees based on fuel consumption, fuel economy
- OBU with OBD II port connection
- OBU with OBD II / cellular
- OBU with GPS (configured for coarse resolution)
- OBU with GPS (configured for high resolution)
- RFID tolling on partial road network

RAND also looked at ways of reducing system cost and speeding transition through the use of interoperable ( or “open” systems) and the use of voluntary opt-in. With an “open systems” architecture, government publishes required specifications and firms would compete for market share based on price and value-added functionality. This will work to drive down cost and provide for continued innovation. With a voluntary opt-in period drivers choose to participate in the system so as to save money, gain greater convenience, and/or gain additional valued services. This strategy demonstrates that common concerns related to privacy, enforcement, and cost can be overcome

The coming authorization will provide a significant opportunity to fund a set of activities in preparation of a potential implementation beginning in 2015. As such, the study recommended targeted investment in:

- Planning
- Analytic studies
- Technical research and development
- Trials
- Public education and outreach

In this second study, researchers have focused on the types of trials that should be funded. Specifically, the study will look at

- What information decision makers will need in order to determine if it is appropriate and politically feasible to implement VMT fees;
- What information decision makers will need in order to determine the mechanisms and institutional arrangements for implementing VMT fees;
- What subset of relevant questions is best addressed through trials; and
- How trials can be designed to gain these necessary insights?

To date, the study has received answers to these questions that are “all over the map.” The different perspectives of our study participants have led to very different visions as to what future user fee trials should accomplish, such as:

- Help states help themselves – This does not preclude states working together or coordinating research efforts
- Learn enough to design a flexible federal system that states can opt into
- Jump start the market to develop and deploy in-vehicle travel services, including the capacity to support federal and state VMT fees along with many other applications

Moving forward, it may be a good idea to have larger pilots with participants numbering in the 10 to 100’s of thousands. If we are looking at possible implementation then those participants are going to become the future users of the system.

### [Moving to a VMT-Fee System: Transition Considerations](#)

Ferrol Robinson: There are numerous attributes of a road charge system. A road user charge system must:

1. Accommodate all vehicles regardless of propulsion system;
2. Accommodate fuel tax collection until fuel taxes can be replaced by VMT fees;
3. Apply to all roads and jurisdictions;
4. Be capable of assessing higher charges to users who impose higher costs;
5. Have technology that accurately calculates distance driven (regardless of time, road and place of travel) and allows charges based on fuel efficiency, vehicle weight and emission level;
6. Ensure the privacy of road users, and be secure and reliable
7. Be flexible and accommodate future changes in technology and a variety of public policies
8. Generate a stable revenue stream that is able to grow as transportation needs grow
9. Ensure a ‘low’ rate of evasion
10. Ensure that collection costs are not burdensome to agencies or users

In transitioning to road user charges as a primary means of funding transportation programs, the following elements need to be considered:

- What vehicles and vehicle classes will be charged? (Electric vehicles may represent the “lowest hanging fruit” due to the fact that they are currently not paying anything.)

- What roads and jurisdictions will be priced?
- What will be the geographic coverage (urbanized areas, statewide, nationwide, etc...)?
- Will participation be voluntary or mandatory? Will incentives be offered if voluntary?
- What taxes and fees will be replaced/supplemented by the road user charge?
- How will the mileage charge rate be structured (flat, variable)?
- What is the basis for the rate structure (revenue neutrality, recover costs, etc..)
- What technology will be used? Will available in-vehicle technology be used or will after market devices be utilized?

The major implementation issues that will need to be address in the future include:

1. Policy decisions should drive technical approaches and solutions
2. A national policy framework needs to be in place to guide local-area implementation decisions
3. There is a need for large-scale implementations, not just demonstrations
4. Clear objectives (e.g., travel and congestion management versus revenue generation) will need to be articulated.
5. There is a need for extensive outreach and education with users, policymakers, and legislators
6. Decisions on revenue allocation will need to be made. Will it be divided among jurisdictions; will it go to roads where the fees are collected; will it be allocated to roads where demand is highest; what about transit improvements?
7. Role of exceptions and exemptions will need to be examined. They help achieve consensus but introduce equity problems.
8. We need a better understanding of the effect of pricing implementation decisions on different user-market groups.
9. What is the trade-off in terms of privacy and audit ability? It is essentially a customer choice?
10. The potential erosion of pricing revenues and benefits over time (VMT reduction, inflation, changes in road use) needs to be assessed.
11. What applications beyond VMT and congestion pricing can be incorporated? (Safety features, traveler information, PAYD insurance, parking)
12. How (and to what extent) will user fees systems interoperate with legacy systems?
13. There is a need to avoiding unnecessary complexity, as this erodes support for the system and drives up cost.

### **Audience Questions**

With regards to the issue of revenue neutrality: in our focus group research we struggled as to whether this concept should be framed as a replacement to the fuel tax or a supplement or something else. I think that it needs to be framed in terms of local context. We had to go in and talk about it as a replacement so as to not get bogged down in discussions about TxDOT. In order to get good feedback on this concept we had to frame this in terms of not increasing revenue.

*Jack Wells - This gets back to the issue of building trust in the transportation funding and financing system.*

*Adrian Moore – You have to find a way to present this.*

*Ferrol Robinson – One way to address this is to go through the focus group process and educate about the need for new revenue in the face of declining future revenues.*

*Jack Wells – It might also help to show that the GPS system allows for better collection and allocation of revenues based on where and when use is occurring.*

How confident are you about the system costs identified in the FHWA study?

*Jack Wells – The study is more of a snapshot in time. These costs will likely change moving forward*

The \$650 identified as the cost for a thick client OBU is based on the 2006 German system. That cost is much lower now. The thin OBU has higher telecommunications costs. I also had a thought about the previous question related to framing in user fees as a replacement or supplement: When you explain things to people they get it, but this cannot be done on a large scale. What about doing some sort of federally sponsored spots that address the current funding situation?

*Jack Wells – Virtually all fed agencies are prevented from lobbying, and it sounds like this is what that type of effort would be.*

*Adrian Moore – And part of the problem is getting things like that on television. There is a substantial cost associated with running spots like that and is not very cost effective.*