A New Way to Pay for Transportation: Exploring a Shift from Fuel Taxes to Mileage-Based User Fees (MBUF)

“Pain at the Pump”
NCSL Legislative Summit

Liisa Ecola
August 10, 2011
Today’s Presentation

• Context for revenue shortfall and why MBUF can help
• Technologies and trade-offs
• High-level observations from stakeholder interviews
• Suggestions for designing MBUF trials
• Possible frameworks for transition
• States pursuing MBUF trials and programs
State highways were bankrupting states in 1915-25 period; fastest growth of autos and roads ever . . . led to innovation of “user fees”

- Tolls – direct user fees – were most desirable in principle
- Motor fuel taxes and various “car taxes” adopted as “second best” but practical
Motor Fuel Taxes Waning in Popularity

• Still largest source of revenue for transportation capital expenses and operations

• Viability waning because
  – Revenues not keeping pace with needs
  – Opposition related to high price of fuel
  – Need for revenue conflicts with environmental goals
    • Dramatic growth sought in fuel efficiency
    • Ultimate replacement of petroleum based fuels for GHG policy reasons
Projections of Highway Account Balance of the HTF Through 2020

Source: Congressional Budget Office.
Mileage-based User Fees are a Promising Long-term Replacement for Fuel Taxes

• More stable revenue stream

• Option of structuring fees to reduce congestion, emissions
  – Pricing based on location and time of day

• Option of offering value-added services
  – Pay-as-you-drive insurance
  – Payment of tolls and parking fees
  – Safety alerts

• Option of collecting travel data to improve planning, operations
  – Provision of real-time congestion levels and alternative routes
Projected Gap Between Vehicle Miles Traveled and Fuel Consumption Underscores Value of MBUF

VMT (FHWA)

Fuel Consumption
Why Do We Need Further Study of MBUF?

• MBUF is promising, and technically feasible now, but implementing MBUF poses challenges and uncertainties:
  – Policy requirements
  – Cost
  – Institutional roles
  – Public acceptance

• Trials, while expensive, can help resolve these issues and bring us closer to a decision
### Potential Mechanisms for Metering MBUF Vary in Their Technical Capabilities

<table>
<thead>
<tr>
<th>Metering Option</th>
<th>Entire Road Network</th>
<th>Vehicle Emission Class or Weight</th>
<th>Mileage by Area, Jurisdiction</th>
<th>Route, Specific Location of Travel</th>
<th>Time of Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odometer, self-report</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Odometer, required check</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Odometer, optional check</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Fuel consumption estimates</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>RFID tolling on partial network</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>On-board unit, OBDII</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>OBU, OBD/cellular</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>OBU, GPS</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

RAND  ● = full capability;  ● = some capability
...as Well as in the Obstacles They Present

<table>
<thead>
<tr>
<th>Potential Obstacles:</th>
<th>Hard to Enforce</th>
<th>Extensive State Support Needed</th>
<th>Privacy Concerns</th>
<th>Vehicle Equipment Cost</th>
<th>Other Capital, Operating Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metering Option</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odometer, self-report</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odometer, required check</td>
<td></td>
<td></td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odometer, optional check</td>
<td></td>
<td></td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel consumption estimates</td>
<td></td>
<td></td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RFID tolling on partial network</td>
<td></td>
<td></td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-board unit, OBDII</td>
<td>●</td>
<td></td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBU, OBD/cellular</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBU, GPS</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RAND ● = major obstacle; ○ = minor obstacle; Shaded area: more research needed
High-Level Themes That Emerged from Stakeholder Interviews

• Federal leadership is critical; the lack of clear federal policy direction is holding back implementation efforts

• The trials merit considerable federal investment

• Trials (along with other research) should answer all uncertainties about implementation

• Principle obstacles include cost and user acceptance; general mistrust in the government is another challenge

• Trials should draw on “lessons learned” from past programs

• Authorizing legislation should not be overly prescriptive
What is the Appropriate Structure for Trials?

- **Number of trials**: 4 to 6, in multiple regions, competitively selected

- **Duration**: 4 to 6 years, with 1-2 years to plan, 2-3 years data collection, 1 year analysis

- **Number of vehicles**: 10,000 to 20,000 per trial, 50,000 to 100,000 overall

- **Funding required**: $100 to $400 million

- **Oversight and management**: Three entities
  - National panel to make high-level policy decisions
  - Working group to set technical standards
  - Agency/organization to implement trials
How Might the Transition Work? Three Possible Frameworks

• **Federal-led**: Start with federal charge, and states can “piggyback”

• **State-led**: Encourage states to experiment as interoperability is established

• **Market-based**: Allow device manufacturers to compete to provide value-added services in a voluntary system
Which Framework Would Be Best?

• Little agreement on this question, given interest in:
  – Enabling development of a national system
  – Allowing interested states to proceed rapidly
  – Exploring competition among firms, value-added services, and voluntary adoption strategies

• May be possible to design trials to blend elements from the different frameworks

• Seem to be leaning towards state or market
Funding for the Trials Would Be Awarded on a Competitive Basis

Required Criteria to Qualify for Funding
- Simulate collection of applicable fees
- Examine option for cash payment
- Examine options to prevent evasion
- Examine interoperability with tolling systems

Optional Criteria on Which to Rank Bids
- Examine variable fee structures
- Evaluate parking fees
- Explore using travel data from system to support improved planning/operations
- Collect actual fees
- Evaluate methods for rebating fuel taxes
- Explore methods for charging foreign or out-of-state vehicles

Collective Criteria for All Trials
- Examine MBUF for passenger vehicles and trucks
- Span different regions of the country, include both metropolitan and rural areas
- Include at least one multi-state trial
State Actions in Pursuit of MBUF

- **Minnesota**: MBUF trials beginning this summer
  - Read odometers and pay flat fee of 5 cents/mile
  - or-
  - GPS-enabled cell phone application and pay lower rates for off-peak, rural, and out-of-state miles
  - May install devices for legislators on task force
  - Funding: $5 million in state funds (no federal)

- **Oregon**: Pending legislation to mandate MBUF for all EVs beginning in 2015
  - State has allocated funding to system architecture and standards
State Actions in Pursuit of MBUF Trials

• **Colorado**: Actively planning for trials
  – Intent to apply for federal funds, but unclear if would fund trials without federal contribution

• **Texas and Nevada**: Preparing for odometer-based trials

• **I-95 Corridor Coalition**: Considering a three-state trial (Maryland, Delaware, Pennsylvania)
Final Thoughts

- While trials may be expensive, the revenue lost by not switching to MBUF is growing every year
  - If we switched in 2015 on a revenue-neutral basis, by 2030 we would collect an additional $8.5 billion (total)

- Switching from fuel taxes to MBUF is a major effort; important to get it right and learn as much as possible before implementation
Full report, *System Trials to Demonstrate Mileage-Based Road Use Charges*

Research brief, *Moving Toward Vehicle Miles of Travel Fees to Replace Fuel Taxes: Assessing the Path Forward*

available at: www.rand.org