Symposium on Mileage-Based User Fees: Moving Forward
University of Minnesota
Center for Transportation Studies

Administrative Costs of Road User Charges
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Administrative Costs are Key Issue

- Road user charges are perceived to have significant advantages over fuel taxes as financing mechanism.
- But high collection costs of user charges are perceived as major weakness.
- U.S. DOT asked HDR Decision Economics to investigate road user charge administrative costs.
Several Technologies Available

• Video tolling (LPR)
• Automatic Vehicle Identification (AVI)
  – i.e., transponder-based systems like E-Zpass
• GPS
Several Road User Charge Scenarios

- Corridor tolls
- Cordon tolls
- Nationwide (or area-wide) user charges
Corridor Tolls

• For 10-mile corridor
  – GPS is cheapest
    • Costs about 4-5% of revenues
  – AVI is next
    • Costs about 16-25% of revenues
  – Video tolling is most expensive
    • Costs about 33-50% of revenues
Corridor Tolls

• For 1,000-mile corridor
  – GPS and AVI are tied
    • Costs about 2-3% of revenues
  – Video tolling is most expensive
    • Costs about 3-5% of revenues
  – Shows strong economies of scale
  – Costs vary depending on
    • Number of exists (hence toll reader points)
    • Hard tag vs. sticker tag
    • “Thick” OBU vs. “thin” OBU
Cordon Pricing

- Not expressed as percent of revenues
- AVI and GPS are tied
  - About $2.1 million/year for 10 entry/exit points
- Video tolling more expensive
  - About $4 million/year
- Contrary to Stockholm’s experience
National User-Charge System

- Fuel tax costs are about 1% of revenues
- Video and AVI are impractical on national scale
  - Limited national deployment would cost
    - 26-51% of revenues if readers every 2 miles
    - 3-5% of revenues if readers every 20 miles
    - 1-2% of revenues if readers every 50 miles
  - Less frequent readers save costs
    - But pose risks of greater evasion
National User-Charge System

• GPS tolling
• Depends critically on costs of OBU
  – “Thick” vs. “thin” OBU
  – Thick OBU costs more ($650)
    • Less privacy concerns
    • More complex to update mapping software
  – Thin OBU costs less ($195)
    • More privacy concerns
    • Mapping software off-loaded to host computer
    • Higher data transmission costs
National User-Charge System

- Transaction costs are very low
  - 0.07% of revenues
- Capital costs would be 1-4% of revenues
- Including costs of OBUs, total costs would be
  - 7.9% of revenues (thin OBU)
  - 33.2% of revenues (thick OBU)
Conclusions

• GPS is only feasible technology for national user-charge system
• Administrative costs are feasible if thin OBU is used
• But still significantly higher than fuel tax
• Collection costs could only be justified if significant benefits other than just collecting revenue
  – E.g., congestion pricing
  – Targeted emission fees
  – Different rates for roads of different load-bearing capacity
  – Better traffic data
Issues

• GPS has imperfect locational accuracy
  – Especially in cities
  – For closely parallel roads (e.g., interstates and service roads)
  – GPS accuracy will improve as new GPS signals become available

• OBU is key cost item
  – OBU costs could be greatly reduced if built into car at factory
  – Thin OBUs are much cheaper
    • But could raise more privacy concerns