



INFRASTRUCTURE, SAFETY,  
AND ENVIRONMENT

***Transportation Tax Policies for Electric  
Vehicles:  
Revenue Impacts and Options***

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## ***Financial Crisis here now***

**Unable to fund standard maintenance much less system expansion or environmental improvements**

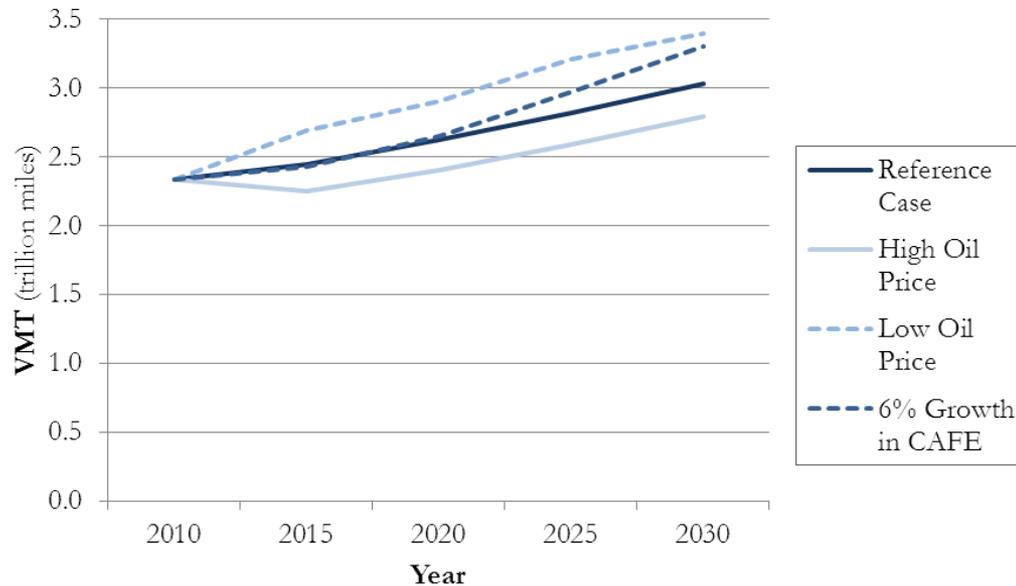
**For first time ever less than half of state transportation expenditures from user fees**

**Increasingly states are borrowing to pay for maintenance and operations**

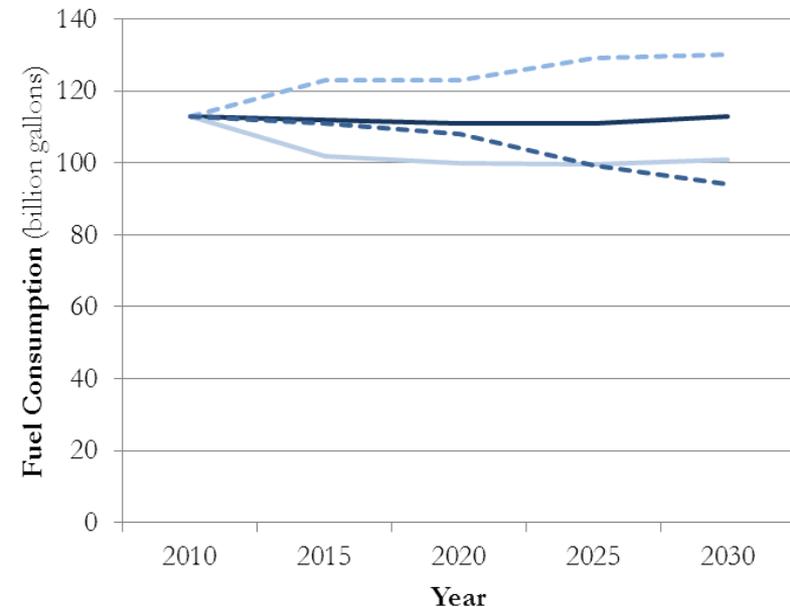
**Federal Highway Trust Fund and many state transportation funds are in deficit while legislators oppose increase in user fees**

# Projections of VMT & Fuel Consumption 2010 - 2030

## VMT



## Fuel Consumption



- VMT rises in all scenarios
- Fuel consumption likely to fall over time unless world oil prices remain at lower than current levels

# ***New CAFE Standards and Introduction of EVs***

- **CAFE Standards to 34.1 MPG by 2016**
- **Federal Highway Trust Fund Revenue Reductions**
  - **Down by \$800 million in 2012**
  - **Down by \$2.8 billion in 2026**
  - **Total reduction of revenue of more than \$20 billion by 2020**
- **Need to address revenue implications as a core policy issue; EVs must contribute “fair share”**

# ***How Can We Promote Adoption of EVs And Produce Revenue?***

- **Abandon User Fee Basis for Finance**
  - **Local Option Sales Taxes is an Example**
  - **Shift to General Fund Financing of Transportation**
- **Use Indirect User Fees for EVs**
  - **State Registration Fees**
- **Tax Petroleum Use MORE Heavily to Promote EVs**
- **Adopt User Fee that Can Include Evs**
  - **MBUF**
  - **Indexed Energy User Fee**

# ***In Each Case We Must Weigh***

- **Revenue Potential in Comparison with Need**
- **Political Acceptance versus Hostility**
- **Perceived and Actual Efficiency and Equity**
- **Cost of Implementation and Operation**
- **Transition Process and Period – Hundreds of Millions of Vehicles**
- **MBUF is most developed and studied of the alternatives – provided for in US Senate Bill**

# ***MBUF Is Viewed as a Promising Long-Term Replacement for Fuel Taxes***

- **Would provide a more stable and equitable transportation revenue stream**
- **Was the original “ideal” system when motor fuel taxes were adopted as “second best” in 1920s**
- **Additional policy options:**
  - **Allocate revenue by jurisdiction more accurately**
  - **Structure fees to reduce congestion, emissions, and excessive road wear**
  - **Offer value-added services**
  - **Collect detailed (anonymous) travel data for improved planning and operations**

# ***MBUF Would Provide a More Stable and Equitable Revenue Source***

- **Stability:**
  - **MBUF revenue would increase with total travel, which in turn drives the need for maintenance and expansion**
  - **Would still need to index or periodically raise mileage fees to address inflation**
- **Equity:**
  - **All drivers pay based on the amount they drive (i.e., in proportion to the benefits they derive from the system)**
  - **EVs will initially be higher priced and purchased by more affluent drivers; with MBUF these drivers will still pay their fair share for road use**

# ***Fees Could Be Structured to Reduce Congestion, Emissions, and Road Wear***

- **To reduce congestion:**
  - **Per-mile fees could be increased for travel in congested travel corridors during peak hours**
- **To reduce emissions:**
  - **Per-mile fees could be increased for vehicles that emit more local air pollutants or greenhouse gases**
- **To reduce road wear (mainly for trucks):**
  - **Per-mile fees could be increased for heavier axle loads and for travel on local roads with lower engineering standards**

# ***In-Vehicle Metering Equipment Could Provide Many Value-Added Services***

- **Idea: provide driver with financial savings, greater convenience, better information about travel options, improved safety...**
  
- **Examples:**
  - **Pay-as-you-drive insurance**
  - **Automated parking payment**
  - **Navigation assistance based on current traffic**
  - **Downstream traffic incident alerts**

# *The Design of a VMT-Fee System Must Address (at Least) Four Functional Components*

- Metering road use
- Collecting payment
- Preventing evasion
- Protecting privacy



# ***The Choice Among Implementation Options Involves Important Tradeoffs***

- Ability to pursue additional policy goals beyond revenue collection
- Burden on users (relative to fuel taxes)
- Difficulty of enforcement
- Privacy concerns
- Cost of implementing and operating system

# ***The Potential Advantages of MBUF Have Attracted Significant Attention***

- **U.S. experience**
  - **Trials conducted by Oregon, Puget Sound, University of Iowa, Minnesota**
- **International experience:**
  - **Weight-distance truck tolls in Switzerland, Austria, Germany, Slovakia, Czech Republic**
  - **Distance-based fees in New Zealand for trucks and diesel-burning passenger cars**
  - **Effort to develop program in the Netherlands**
- **Prior trials and programs have yielded valuable lessons...**

# ***But Numerous Issues and Uncertainties Still Need to Be Addressed***

- **System requirements**
- **Technical implementation mechanisms**
- **Public / private institutional roles**
- **Implementation and transition strategies**
- **System cost**
- **User acceptance**

*For details, see **System Trials to Demonstrate Mileage-Based Road Use Charges**, NCHRP 20-24(69A), 2010.*

# ***Many of the Implementation and Transition Issues Are Quite Complex***

- **Phasing in the system over time**
- **Rebating fuel taxes for early MBUF adopters**
- **Charging out-of-state or foreign drivers**
- **Ensuring interoperability among systems from different states (assuming that a national system is not developed first)**

# *The Prospects for Transitioning to MBUF Appear to Hinge on Two Critical Issues*

- User acceptance
- High administrative cost (vs. fuel tax collection)

# ***Public Knowledge of and Support for MBUF Is Low***

- **Privacy appears to be the main concern (despite multiple methods for protecting privacy)**
- **Other concerns**
  - **Low trust in government**
  - **Concern for increased tax burden**
  - **Fear of unknown**
- **A sliver lining:**
  - **University of Iowa trials have shown that support increases considerably as drivers become familiar with MBUF**

# ***MBUF Will Be Expensive to Collect Relative to Fuel Taxes***

- **Fuel tax collection: ~ 1% of revenue**
- **MBUF collection: ~ 5% - 20% of revenue**
- **Cost ultimately depends on such factors as:**
  - **Technology choice and future innovation**
  - **Number of users (economies of scale)**
  - **Total revenue collection**
- **Increased collection cost will be more than offset by growth in MBUF revenue vs. fuel taxes within the next decade or so**

# ***Initial Focus on a Limited User Group May Help to Reduce Opposition***

- **Oregon plans to levy MBUF for electric vehicles**
  - **Few current EV owners, limited opposition**
  - **Compelling argument that EV owners should pay their fair share for using the roads**
  - **Legislation narrowly defeated in last session, but legislature did provide funding for ODOT to develop system by 2015**
- **Another concept being explored: implement MBUF for Mexican trucks under NAFTA agreement**

# ***Providing User Choice May Help to Reduce Opposition***

- **Allow users to choose among:**
  - **Metering approaches, payment options, methods for protecting privacy, value-added services, etc.**
- **Minnesota trials provide an example**
  - **Pay flat rate based on odometer reading, or**
  - **Qualify for reduced rates based on GPS**
    - **No fee for out-of-state miles**
    - **Reduced fee for rural and off-peak miles**
- **Oregon exploring similar idea of allowing EV owners to choose among metering options**

# ***Value-Added Services and Voluntary Adoption May Reduce Costs and Opposition***

- **Concept**
  - Multiple vendors compete to provide mileage metering, billing, and value-added services
  - Competition and revenue from value-added services reduce cost of collecting MBUF
  - Users voluntarily adopt system for access to value-added services
  - Experience of initial adopters demonstrates that system works and protects privacy, paving the way for subsequent mandatory MBUF
- **Examples**
  - NYCDOT “DriveSmart” RFEI
  - Minnesota trials (value-added services)

# ***Is the Value-Added Services / Voluntary Adoption Concept Realistic? Perhaps...***

- **Attracting users:**
  - A low-mileage driver that currently pays \$1000 per year could pay well less than \$500 for pay-as-you-drive insurance
  - Automated parking payment could be structured to eliminate parking time violations
- **Reducing collection cost:**
  - Assume an in-vehicle metering device is used to collect \$250 in road-use fees and \$500 in pay-as-you drive insurance
  - If metering and collection costs are equally apportioned to mileage fees and insurers, the cost of collecting mileage fees would be reduced by two thirds

# ***Who Should Take the Lead on Developing MBUF Systems***

- **There is (some) interest in both Congress and the Administration in funding research to explore and refine the concept for a national MBUF system**
- **But some states, and even some metro areas, are interested in pursuing MBUF more rapidly**
  - **Oregon, Minnesota, Texas, Nevada...**
  - **New York City, Southern California...**
- **There are pros and cons for both federal leadership and state leadership**

*For details, see **System Trials to Demonstrate Mileage-Based Road Use Charges**, NCHRP 20-24(69A), 2010.*

# ***Assessment of Federal Leadership on the Development of MBUF***

- **Advantages:**
  - **Addresses federal revenue shortfall**
  - **Allows interested states to join, focusing on policy development rather than technical issues**
  - **Avoids interoperability problems**
  - **Reduces collection costs by collecting more revenue and through economies of scale**
- **Disadvantages:**
  - **Near-term political prospects appear weak**
  - **More challenging to implement and enforce within states that do not choose to adopt**

# ***Assessment of State Leadership on the Development of MBUF***

- **Advantages:**
  - **Let 1000 flowers bloom...**
  - **States with political will for MBUF do not need to wait on the federal government**
  - **States have more opportunity to create user choice and foster value-added services**
  - **States control registration databases and law enforcement assets**
- **Disadvantages:**
  - **Higher risk of non-interoperable systems**
  - **Challenge to collect for drivers from other states**
  - **Reduced economies of scale**

# ***Charge on the Basis of Energy Consumed to Create a Greener User Fee***

- Tax on gasoline, alcohol, electricity, hydrogen in each case based on “meggajoules” and indexed to transportation cost increases
- Provides an incentive for energy conservation
  - Equitable to users of alternative energy
  - Collection costs have to be studied

