



INFRASTRUCTURE, SAFETY,  
AND ENVIRONMENT

***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**

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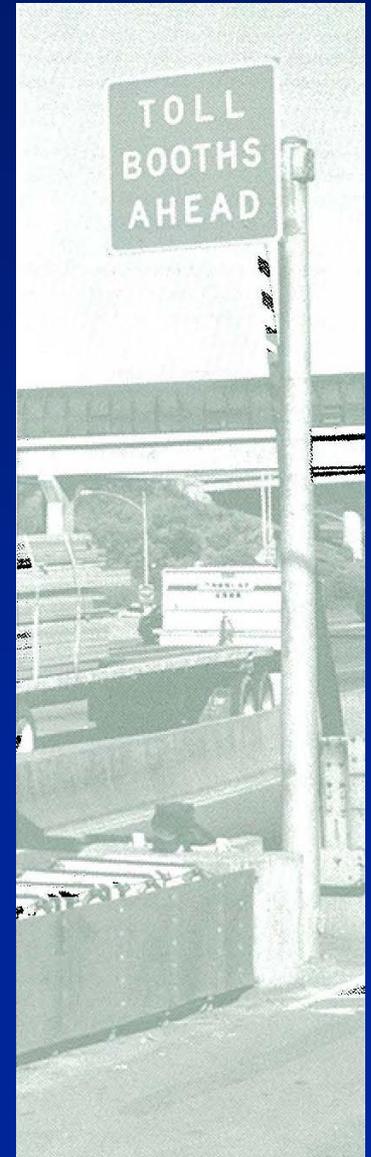
**August 10, 2011**

# *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**

# ***Gasoline Taxes were Invented Before 1920 But Have Always been “Second Best”***

- **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**

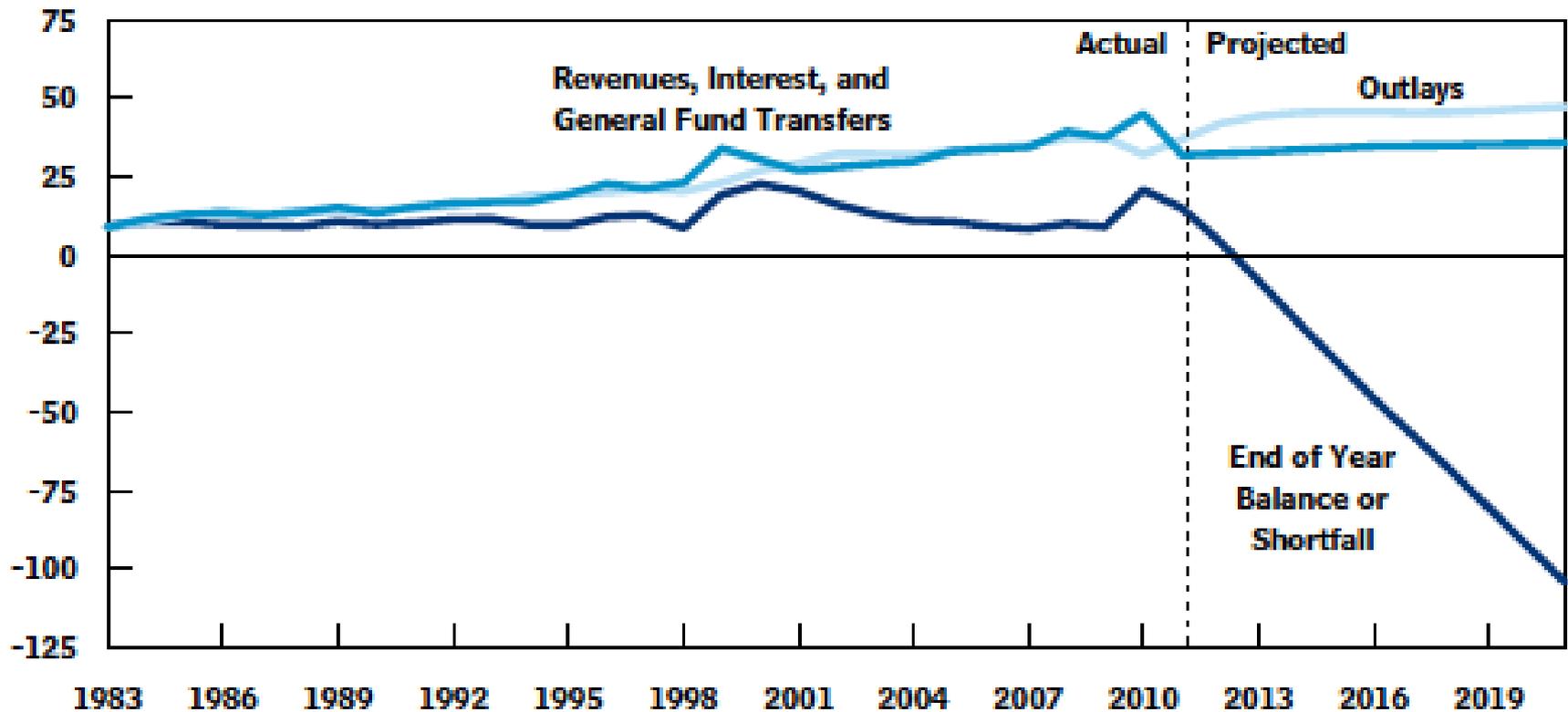


# ***Motor Fuel Taxes Waning in Popularity***

- **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

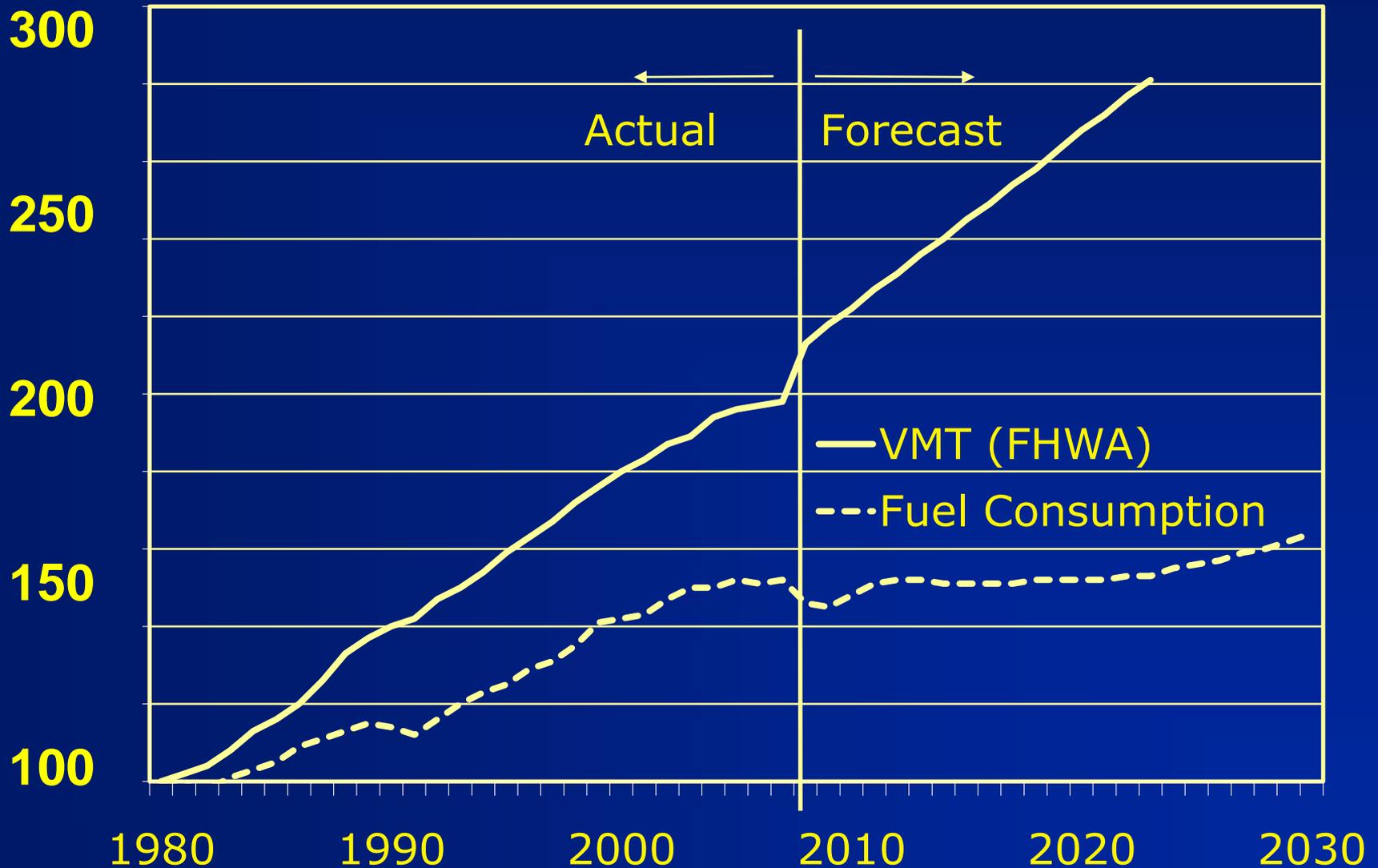


Source: Congressional Budget Office.

# ***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



# ***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...

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

RAND ● = full capability; ● = some capability

# ...as Well as in the Obstacles They Present

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

RAND ● = major obstacle; ● = minor obstacle; Shaded area: more research needed 10

# ***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](http://www.rand.org)**



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