

Notes on The Impact of New Technology Motor Vehicles on Virginia Highway User Fee  
Revenues

George E. Hoffer

Professor of Economics

Virginia Commonwealth University

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## I. What's Coming in the next Five Years: Fuel Efficiency Has Momentum

### A. More diesels in light vehicles

1. Ford F-150, first 1/2-ton pick up w/ diesel; Expedition to get diesel
2. DaimlerChrysler "Bluetec" diesel technology, 2008; this project was not disbanded w/ sale of Chrysler
3. VW-Audi, 50 states diesel, 2008, 2<sup>nd</sup> half;
4. "50 states diesels" coming to: BMW, Jag-Landrover, Hyundai Veracruz '10, Honda Accord '09; Mitsubishi '10

### B. Plug-in electric-hybrid

1. Chevy Volt; as early as 2010; Ford Escape, 2012
2. GM to use lithium-ion batteries; smaller, lighter, generate heat
3. need lithium battery to stand the severe cycle of full charge to near complete discharge
4. The GM Volt plug-in gets the equivalent of 150 mpg on a 60 mile commute; 40 miles on pure electric; has 1.0 liter engine; only purpose of gasoline motor is to recharge batteries

### C. More full hybrids

1. Ford Fusion/Mercury Milan
2. Toyota/Ford/Honda/Nissan use nickel-metal hybrid batteries
3. By 2011: BMW; Porsche; Volvo; Nissan, Subaru/Toyota, Suzuki, Toyota, and most Lexi will have full hybrid availability
4. GM will have 3 hybrid systems by '09
5. GM big SUV (Suburban) hybrid, 20-25% better MPG for '08 model

### D. Mild hybrid

Better MPG from combination of engine deactivation & acceleration boost from electric super charger; 15-20 % mileage improvement; Saturn Vue & Aura, Malibu all in '08

### E. New technology gasoline engines

1. Daimler, 39 MPG, large car direct injection; 1.8 L, 238 HP
2. engine deactivation at idle
3. Ford "Twin-force" (4.6, 8 cyl); same fuel efficiency as diesel; 25-30 % better w/ direct injection & turbo charging; MKS '09

### F. Entry of class "A" and "B" vehicles into the U.S. Market

Examples include:

1. Daimler 'Smart' Car (A)
2. BMW 1 series
3. The Chinese 'Dodge'
4. European 'Fords'

## Summarizing I:

### 1. Fuel Efficiency Has Momentum

- a. Europeans are heavy into diesel, but lesser impact on USA, unless Ford light truck diesel takes off
- b. full hybrids: this is where the action is; relative price should fall, making them more attractive; unless Congress changes tax law, the hybrid credits apply to too few units to make a difference
- c. plug-in/electric hybrid; real future if the lithium-ion battery is viable; within 3 years, effective 150 mpg between Richmond and Fredericksburg; Fredericksburg and Arlington  
GM banking on leaping ahead of Toyota
- d. mild-hybrids: more hype than anything; tweaks
- e. more efficient gasoline-tweaks, turbo charging, direct injection
- f. fuel inefficient truck-based SUVs will be retiring with time
- g. fuel cells are still far into the future; over a decade away

## II. A “Model” Highway User Tax System

### A. 3 components to highway user tax system

1. fixed fee/mo for the right to drive in VA – Equivalent to current registration fee/license plates
2. variable fee/based on miles driven/mo – Equivalent to current motor fuels tax
  - a. fee could vary by region of state
  - b. fee could vary by type of road taken
  - c. fee would always be  $> 0$  per mile
  - d. fee per mile could vary with weight
  - e. fee per mile charge would be designed to cover the variable maintenance cost/mile and highway growth
3. variable congestion – user tax (could be incorporated into 2 above with less invasiveness)
  - a. fee would be  $0$  or  $\geq 0$  on the same road depending on time & day of travel
  - b. fee would vary by time of day and day of use
  - c. in most sections of the Commonwealth, this component would always be  $\emptyset$
  - d. this tax/user fee is designed to better utilize existing roads & to cover cost of capital for new roads where excess demand exists
  - e. this fee could be used to fund public transit by region; so a Bland County resident traveling to Fairfax, would contribute to DASH and/or Metro only when traveling there

### B. Collection Specifics

1. system would be GPS satellite based
2. monthly bill-itemized – very similar to current cell phone statements

- a. itemized by fixed charge – say \$50 year/12
  - b. itemized by miles driven – Today for gasoline it would approximate 20¢ /gal/15 mpg = 1.25¢ /mile
  - c. itemized by place & time of day, like cell phone, if a congestion component were to be incorporated
  - d. suggested driving alternative routes & times to lower this component
3. no pay? no problem. immobilize vehicle from satellite; very similar to what “buy here-pay here” dealers currently use

### III. Implications

#### A. On motor fuels tax collections

1. ceterus paribus, hybrids are heavier, use much less gas
2. charge hybrid/plug-ins with higher registration fees? inefficient & perverse; raises FC, lowers VC, want the opposite: want a system that collects per mile driven, when & where
3. Increase diesel fuel user taxes above gasoline
  - a. diesels are heavier
  - b. get much better mileage
  - c. more durable; lower title tax/mile
  - d. issue of heavy trucks; non-residents pay disproportionate share; motor fuel surcharge on heavy vehicles has been 2¢ /gallon since 1956 in VA

#### B. Registration fees on New Technology Vehicles?

1. increases FC
2. need very high registration fee to make a difference per mile; penalizes the low user; the high user underpays
3. incentive in D.C. metro area for firms to register elsewhere
4. lessens incentives to adopt new technology

#### C. Higher Gasoline Taxes?

1. ignores the basic problem of what is coming
2. higher gasoline taxes is what TRB recommends

#### D. An odometer mileage fee collected as part of state safety inspection?

1. problem with nonresident collection
2. problem with odometer fraud
3. collectibility issues