Toll-Financed Interstate Reconstruction and Modernization

by
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Overview

- Context: why the conventional wisdom won’t solve the problem
- Economic feasibility of toll-financed Interstate replacement
- How to address concerns and make this politically feasible
Context: why consider toll-financed modernization?

- Increasing fuel taxes is very difficult politically, especially at federal level.
- Achievable increases will be spread over all existing programs.
- Fuel taxes are also a declining revenue source.
## Where does federal money go now?

**Highway Trust Fund, FY 2013**

<table>
<thead>
<tr>
<th>Agency</th>
<th>Amount</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>FHWA</td>
<td>$40.968B</td>
<td>81%</td>
</tr>
<tr>
<td>FTA</td>
<td>8.478</td>
<td>17%</td>
</tr>
<tr>
<td>NHTSA</td>
<td>.670</td>
<td>1%</td>
</tr>
<tr>
<td>FMCSA</td>
<td>.561</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$50.677B</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Source: GAO-15-33, October 2014
## How much actually goes for roads and bridges? (1)

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads</td>
<td>$18.340B</td>
<td>47%</td>
</tr>
<tr>
<td>Bridges</td>
<td>6.700</td>
<td>17%</td>
</tr>
<tr>
<td>Safety improvements</td>
<td>2.580</td>
<td>7%</td>
</tr>
<tr>
<td>Enhancements</td>
<td>.850</td>
<td>2%</td>
</tr>
<tr>
<td>Project delivery</td>
<td>7.760</td>
<td>20%</td>
</tr>
<tr>
<td>Other</td>
<td>2.660</td>
<td>7%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$38.890B</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Source: GAO-15-33, October 2014
How much actually goes for roads and bridges (2)

- Previous slide, actual roads+bridges spending = $25.04B
- That is just 49% of the $50.677B total
- That $25 billion is spread over the entire federal-aid highway system.

But, how much gets spent on major projects (Interstates + NHS)?
## Major projects spending

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reconstruction</td>
<td>$1.590B</td>
</tr>
<tr>
<td>Resurface/rehab.</td>
<td>1.189</td>
</tr>
<tr>
<td>New construction</td>
<td>.261</td>
</tr>
<tr>
<td>Project develop.</td>
<td>.883</td>
</tr>
<tr>
<td>Safety improve.</td>
<td>.328</td>
</tr>
<tr>
<td>Enhancements</td>
<td>.070</td>
</tr>
<tr>
<td>Other</td>
<td>.278</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$4.599B</strong></td>
</tr>
</tbody>
</table>

Source: GAO-15-33, October 2014
Just 6% goes for major projects

- Out of entire $50.7B FHWA budget, only $3.04B goes for major highway and bridge projects, per previous slide.
- Yet if we expand the current federal program by 10-15%, every current program will be increased, since each has a vocal constituency.
- This is no way to fund a trillion-dollar Interstate replacement program.
What are America’s two greatest highway investment needs?

- Rebuilding and widening the Interstate highway system nationwide, as it wears out. Cost: about $1 trillion.
- Reducing chronic freeway congestion. Direct cost to highway users: about $160 billion per year.

There is no serious federal program for either of these.
Tolling is a powerful tool for both:

- Can mobilize large sums of money up-front to finance major highway projects.
- Can reduce traffic congestion sustainably (if used as a variable price).
Two major funding priorities:

- Replace the obsolescing Interstate system with a 2\textsuperscript{nd}-generation system, including dedicated truck lanes.
- Add networks of Express Toll Lanes in the 15 largest metro areas, for serious congestion relief.

Both could be toll-financed and procured as long-term P3 concessions.
**Purpose of Interstate 2.0* study:**

- Estimate cost of reconstructing entire Interstate system;
- Estimate cost of needed lane additions, including truck-only lanes;
- Assess the feasibility of financing this project via all-electronic tolling (AET);
- Address political feasibility.

*Poole, “Modernizing the Interstate Highway System via Toll Finance,” TRB Paper No. 14-0716
Methodology

- Use state-specific FHWA HERS unit cost data;
- Estimate costs state by state, for reconstruction and widening;
- Use FAF data for truck-lanes analysis;
- Use same toll rates everywhere as baseline, CPI-adjusted;
- Use moderate congestion pricing for urban Interstates;
- Basic feasibility: NPV revenue/NPV cost.
**Toll revenues**

- For each state, rural and urban separately
- VMT growth rate estimates for each state, for cars and for trucks (Volpe Center)
- 30-year VMT and revenue, for each state.
- Rural: 3.5¢/mi cars, 14¢/mi trucks; CPI-adjusted
- Urban: moderate peak/off-peak tolls, for each of four urban size categories
- Net revenue=85% of gross (10% for O&M, 5% for AET collection costs)
Urban congestion pricing

Toll rates for cars:
- Small urban: 5¢ peak, 3.5¢ off-peak
- Med. urban: 6¢ peak, 4.5¢ off-peak
- Large urban: 7.5¢ peak, 5.5¢ off-peak
- V. large urban: 10.0¢ peak, 7.0¢ off-peak

Truck toll rates: 4X car rates
Results of reconstruction analysis

- NPV of net revenue exceeds NPV of reconstruction cost in most states.
- But—some of that revenue was based on VMT beyond what specific corridors can handle at current size.
- Hence, next step assessed widening needs.
**Widening methodology**

- Analyzed each Interstate in each state.
- FHWA provided data on rt-mi and ln-mi for each route, by state.
- Used VMT projections to estimate DVMT/ln-mi for each: 2010, 2020, 2030, 2040.
- Used LOS C as standard for rural: **96 routes** need lane additions.
- Used LOS D for urban: **97 need** lane additions.
Truck-only lanes

- Separate data set from FAF on truck volumes, by Interstate route, by state.
- Truck VMT for 2007 and 2040, based on FAF modeling.
- Computed 2040 truck DVMT/ln-mi for all long-distance corridors, compared with our previous (non-FAF) 2040 projection.
- Result: **29 corridors** with 40% or more truck traffic in 2040—some exceeding 100%.
- Overall widening cost about $500B.
**Overall results**

- NPV of cost = $983 billion.
- NPV of revenue = 99% of NPV cost.
- 30 states positive with basic toll rates, of which 9 could do it with lower rates.
- 9 states need slightly higher rates
- 6 urban states need even higher rates.
- Only 6 rural states are not really toll-feasible.
Four major implications

- Compared with 50 years ago, a very positive result.
- Large majority of states could do this on their own.
- Big constraint is federal ban on tolling “existing” lanes—but these lanes won’t be there unless reconstructed.
- Could be the first major shift from fuel taxes to mileage-based user fees.
**Political feasibility issues:**

- Tolls are seen as “taxes.”
- Tolls are diverted to other uses (e.g., Pennsylvania Turnpike).
- Truckers oppose “double taxation.”
- Interstate toll reconstruction pilot program has not been used.
- Cost of toll collection eats up revenues.
- MBUFs seen as privacy threat.
Value-Added Tolling principles*

- Provide better service (LOS) than today.
- Begin tolling a corridor only after it is modernized.
- Use toll revenues only for Interstate modernization (true user fee).
- Tolls would replace fuel taxes on tolled corridors (via fuel tax rebates)

AAA national board has endorsed these principles (Dec. 2015)

All-electronic tolling (AET) basics

- Cost of AET collection can be as low as 5% of revenues (2012 Fleming paper)*.
- AET technology (transponders and license-plate verification) is widely accepted.
- AET facilitates variable pricing where it is most needed (urban freeways).

What does trucking industry want?

- Safety benefits from dedicated truck lanes
- Longer, heavier rigs for increased productivity, energy savings (LCVs)
- Safe overnight parking
- Corridor suitable for automated trucks and/or truck platooning.
Trucking’s tolling concerns*:

- Single transponder nationwide
- Single monthly toll invoice
- Confidential routing/billing info.

All three features already being provided by Bestpass and PrePass Plus, both ATA-approved vendors.

*Poole, “Renewing Trucking’s Infrastructure for the 21st Century,” TRB Paper No. 16-1353
Reasonable truck toll rates

- Interstate 2.0’s 14¢/mi. is far less than eastern toll roads (which divert revenue).
- Rebate of state diesel tax would further reduce cost.
- State would still come out ahead, since per-mile toll charge exceeds per-mile yield of fuel tax.
Benefits of all states having permission for toll-financed Interstate replacement

- Pilot program forces states to single out one Interstate for toll-based reconstruction
- Broader program would let each state develop 20-year plan to rebuild all its Interstates.
- Letting only 3 states do this prevents more innovative states from trying.
- A 50-state program increases odds of a pathfinder state achieving political consensus.
- Demonstration effect can be powerful (e.g., SR 91 Express Lanes)
Conclusions

- Interstate replacement is mostly toll-feasible.
- Value-added tolling could be key to political feasibility.
- AET would jump-start the transition to mileage-based user fees.
- First step: federal permission for all states (mainstream the pilot program).
Questions?

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Lower-cost, lower-toll states

- AL, AR, IL, LA, MS, OK, SC, TN, UT
- Could do it with less than baseline rates of 3.5¢/mi car and 14¢/mi truck.
- Estimated range:
  - Cars 2.1 - 2.7¢/mi
  - Trucks 8.3 - 11.2¢/mi
Higher cost, higher-toll states

- CA, DC, MA, NJ, NY, WA
- Range for cars: 5.2 - 7.7¢/mi
- Range for trucks: 21 - 31¢/mi
- Compare current rates in Illinois:
  - Cars: 2.2 - 6.2¢/mi
  - Trucks: 22 - 49¢/mi
**Difficult rural states**

- Low traffic and costly, mountainous terrain
- AK, MT, ND, SD, VT, WY
- Except for Alaska:
  - Cars: 5.5 - 9.8¢/mi
  - Trucks: 22 - 39¢/mi
- Alaska not toll feasible (only 24% of costs covered)