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# TOLLING RURAL INTERSTATE CORRIDORS

by Baruch Feigenbaum

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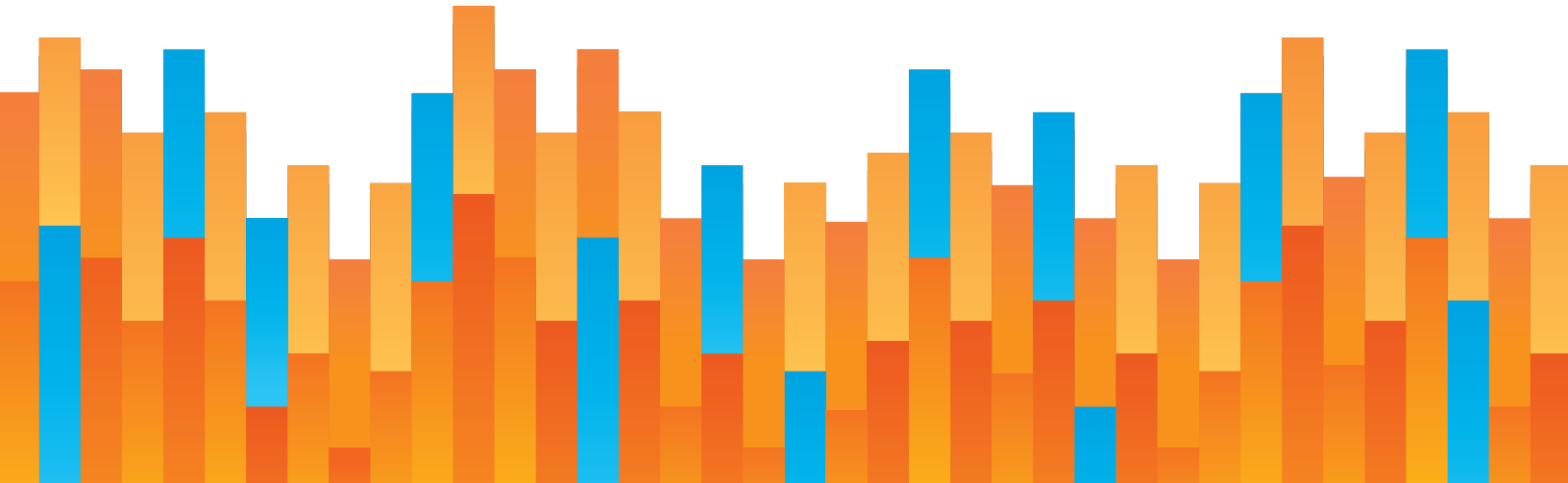


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PART 1

# INTRODUCTION

Each year, an increasing percentage of U.S. Interstate highways reach the end of their design life and need to be rebuilt. Many of these highways also need to be widened to eliminate crippling traffic congestion growing in a post-COVID-19 world. And while rural Interstates have lower traffic counts, they may be more important than urban Interstates to the movement of freight. The Interstate system serves to move people and goods across the world's third largest nation by geographic area, and much of the system lies in rural areas. And while congestion might not be a major problem in Montana or Vermont, it is in Michigan and Virginia. Despite federal programs allowing the use of tolling to rebuild Interstates, many state departments of transportation (DOTs) have been hesitant to participate in these pilot programs.

*"Each year, an increasing percentage of U.S. Interstate highways reach the end of their design life and need to be rebuilt. Many of these highways also need to be widened...."*

This brief examines the twin problems of dilapidated roadways and traffic congestion on rural Interstates. It examines the increase in truck traffic and automobile traffic, and how vehicles wear out highways. It also addresses growing traffic congestion in rural areas and

quantifies the magnitude of the problem on key corridors. This brief then explains why the dominant conventional funding mechanism, the fuel tax, is ineffective and why increasing it is politically toxic. Accordingly, it explores the feasibility of tolling in these corridors. and discusses how to implement tolling, providing details on some of the corridors that most need to be reconstructed. Finally, the brief provides some next steps for rebuilding these corridors through tolling.

PART 2

# CONGESTION IS GROWING ON RURAL INTERSTATE CORRIDORS CONNECTING METRO AREAS

The COVID-19 pandemic showed all Americans the importance of the freight delivery network. Empty grocery store shelves and a lack of new consumer goods from automobiles to sofas tested the patience of consumers.[1] Early in the pandemic, freight traffic grew even as commuting, vacation, and business travel all but disappeared. As on-demand commerce plays a greater role in the U.S. economy, the need for freight delivery vehicles will only grow.[2] And while sidewalk robots and drones may play niche roles, trucks will continue to be a major player. The increase in freight during the COVID-19 pandemic is one reason that rural Interstate vehicle-miles traveled (VMT) didn't decline at the same rate as VMT in

1 Melissa Repko, "Empty Grocery Shelves Return as Sick Employees, Supply Chain Delays Collide," *cnbc.com*, CNBC, 11 Jan. 2022. https://www.cnbc.com/2022/01/11/empty-grocery-shelves-return-as-sick-employees-supply-chain-delays-collide.html (12 Sep. 2022).

2 "Supply Chain Assessment of the Transportation Industrial Base: Freight and Logistics," *transportation.gov*, U.S. Department of Transportation, Feb. 2022. https://www.transportation.gov/sites/dot.gov/files/2022-03/EO%2014017%20-%20DOT%20Sectoral%20Supply%20Chain%20Assessment%20-%20Freight%20and%20Logistics_FINAL_508.pdf (12 Sep. 2022).

cities.[3] And the trend is for truck traffic to grow much faster than automobile traffic. During the next 30 years, VMT from light-duty vehicles (personal cars) is forecast to grow by only 0.6% annually.[4] However, the VMT of combination trucks, which tend to serve long-haul freight, is forecast to grow by 1.6% annually. Since trucks make up a greater share of vehicles on rural Interstates, their projected growth is forecast to impact rural Interstates more than urban Interstates.[5]

> *… the trend is for truck traffic to grow much faster than automobile traffic.*

During the COVID-19 economic recovery, we've also seen a larger bounce back in vacation trips than business trips.[6] This trend affects rural Interstates disproportionately because vacation travelers are more likely to drive and less likely to fly compared with business travelers.[7] As freight traffic continues to grow, Interstate segments that are intermittently congested today will be congested some or most of the time in 10 years.

3 "Daily Vehicle Travel During the COVID-19 Public Health Emergency," Bureau of Transportation Statistics, *bts.gov*, 15 Mar. 2022. https://www.bts.gov/covid-19/daily-vehicle-travel (12 May 2022).

4 FHWA Forecasts of Vehicles Miles Traveled (VMT), Office of Highway Policy Information, Federal Highway Administration, *fhwa.dot.gov*, May 2021. https://www.fhwa.dot.gov/policyinformation/tables/vmt/2021_vmt_forecast_sum.pdf (12 May 2022).

5 "Competing in the Global Truck Industry," *assets.kpmg*, KPMG International, Sep. 2011. https://assets.kpmg/content/dam/kpmg/ru/pdf/2016/8/ru-ru-global-truck-industry.pdf (12 May 2022).

6 Suzanne Rowan Kelleher, "How COVID Changed Business Travel Forever," *forbes.com*, Forbes, 12 May 2022. https://www.forbes.com/sites/suzannerowankelleher/2022/03/12/covid-changed-business-travel/?sh=3275d00f53a0 (12 May 2022).

7 "US Travel Answer Sheet," *ustravel.org*, U.S. Travel Association, 31 Mar. 2022. https://www.ustravel.org/research/us-travel-answer-sheet (12 May 2022).

## TRUCKS WEAR OUT HIGHWAYS FASTER THAN AUTOMOBILES

One challenge of increased truck traffic is its effect on highway pavement. The higher the vehicle weight per axle, the more stress the vehicle places on the highway.[8] Tractor trailers carry far more weight per axle than automobiles. Under federal law, trucks may generally carry up to 20,000 pounds on a single axle or 34,000 pounds on a tandem axle when traveling on an Interstate highway.[9] On the other hand, a mid-sized automobile typically carries 3,300-4,000 pounds per axle.[10] Given that the relationship between weight and pavement degradation increases exponentially with increasing axle-weight, trucks inflict 100 times or more wear on the highways than automobiles.[11]

Heavy trucks carry critical consumer goods and are vital to the 21st century economy. It's important to strike a balance that considers both how much trucks wear out pavement and their important role in commerce.

8 "Implications of the Fourth Power Law," *ipwea.com*, Institute of Public Works Engineering Australasia, Sept. 2017. https://higherlogicdownload.s3.amazonaws.com/IPWEA/c7e19de0-08d5-47b7-ac3f-c198b11cd969/UploadedImages/pdfs/Info%20sheets/IS-06_4th_Power_Law.pdf (12 Aug. 2022).

9 "23 US Code 127 Vehicle Weight Limitations—Interstate System," Cornell Law School, *law.cornell.edu*, Legal Information Institute, 2023. https://www.law.cornell.edu/uscode/text/23/127 (19 July 2023).

10 Kate Miller-Wilson, "List of Car Weights," *cars.lovetoknow.com*, Love to Know, 2022. https://cars.lovetoknow.com/List_of_Car_Weights (12 Aug. 2022).

11 K.P. George, A.S. Rajagopal, and L.K. Kim, "Models for Predicting Pavement Deterioration," Transportation Research Record 1215, *onlinepubs.trb.org*, 1989, https://onlinepubs.trb.org/Onlinepubs/trr/1989/1215/1215-001.pdf (7 Oct. 2022).

PART 3

# QUANTIFYING THE SCALE OF THE PROBLEM

Virtually all Interstate highway pavement that has not been comprehensively rebuilt over the past 30 years has reached the end of its useful life. The Transportation Research Board estimated that 35,000 miles of the 46,876-mile Interstate Highway System need to be rebuilt. This total includes Interstate miles in both urban and rural areas.[12]

*“The Transportation Research Board estimated that 35,000 miles of the 46,876-mile Interstate Highway System need to be rebuilt.”*

Typically, drivers associate rural highways with low congestion and level of service “A” conditions based on guidelines provided in the American Association of State Highway and Transportation Officials policy guide, “A Policy on Geometric Design of Highways and Streets,” commonly known as the “Green Book.” Roadways are rated on a scale of A-F, with

12 “Interstate Frequently Asked Questions,” Federal Highway Administration, *fhwa.dot.gov*, 27 Apr. 2021. https://www.fhwa.dot.gov/interstate/faq.cfm (12 Aug. 2022); “Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future,” National Academy of Sciences, *nap.nationalacademies.org*, 2019. http://nap.naptionalacademies.org/25334 (12 Aug. 2022).

"A" being unencumbered traffic flow and "F" being totally congested conditions. Highway planners take cost, benefit, and geographic considerations into effect when determining level of service. For example, level of service (LOS) B is a common goal for rural highways while LOS C suffices for urban highways.

But what might be surprising is how many rural Interstate segments suffer from chronic congestion, rating "C" or lower. Several states, such as Tennessee, have studied rural Interstate congestion and attempted to quantify the magnitude.[13] They have found that congestion is not just annoying. It stifles economic development because businesses are hesitant to relocate or expand in areas with worse traffic congestion than peer areas. Congestion can also be dangerous because it leads to more traffic crashes. When those traffic crashes occur at differing speeds, they are more likely to be severe.

*...what might be surprising is how many rural Interstate segments suffer from chronic congestion, rating "C" or lower.*

In order to determine which rural Interstate segments are the most congested, this brief used as its data source comprehensive traffic count data that state DOTs provide to the Federal Highway Administration as a condition for receiving federal funding. This analysis chose 11 corridors in seven states that have significant congestion and a roadbed that needs to be rebuilt. It determined the level of congestion by taking the highway traffic count data and dividing by the number of lanes on the highway as indicated by Google Maps to determine the average vehicles per lane. Then it analyzed how many lanes needed to be added to each highway to create level of service "B". The principle is that rebuilt highways need to offer a better level of service than the older highways.

Table 1 lists the most congested segments and their average traffic counts.

[13] "Rural Interstate Highway Congestion," The Tennessee Advisory Commission on Intergovernmental Relations, *tn.gov*, 5 Feb. 2013. https://www.tn.gov/content/dam/tn/tacir/commission-meetings/2013-february/Tab6_Interstate.pdf (12 May 2022).

## TABLE 1: TRAFFIC VOLUME COUNTS PER LANE-MILE

| State | Highway | From | To | Total Count | Old No. of Lanes | Adj. Vehicles per Lane | Centerline -Miles | New No. of Lanes | New Lane-Miles* |
|---|---|---|---|---|---|---|---|---|---|
| California | I-5 | SR 99N Kern County | I-580-W | 40,942 | 4 | 10,235 | 238 | 6 | 1,428 |
| California | I-5 | SR 99N Sacramento County | SR 299 | 40,851 | 4 | 10,156 | 155 | 6 | 930 |
| Maryland | I-70 | I-68 | I-270 | 58,321 | 4 | 14,580 | 52 | 6-8 | 374 |
| Michigan | I-94 | IN State Line | I-275 | 48,163 | 4-6 | 10,620 | 179 | 6 | 1,074 |
| Mississippi | I-10 | AL State Line | LA State Line | 58,036 | 4-6 | 11,986 | 77 | 6 | 462 |
| Texas | I-35 | SR 1604 | SR 45N | 146,175 | 6-8 | 23,646 | 51 | 12 | 612 |
| Texas | I-35 | SR 130S | I-35E/I-35W Split | 90,070 | 4-6 | 15,917 | 106 | 8 | 848 |
| Virginia | I-81 | I-77S | WV State Line | 51,163 | 4 | 12,791 | 242 | 6-8 | 1,452 |
| Virginia | I-95 | NC State Line | I-295N, Petersburg | 39,800 | 4 | 9,950 | 47 | 6 | 282 |
| Virginia | I-95 | I-295S, Richmond | I-495 | 158,591 | 6-8** | 20,645 | 86 | 8-10** | 726 |
| Washington | I-5 | I-205 | US 101 | 69,219 | 4-6 | 11,832 | 97 | 6 | 582 |

***After construction is complete**

****Variably-priced express toll lanes not included**

**Source: State Department of Transportation Websites**

Researchers agree that it will be close to impossible to solve the congestion problems on current funding methods alone. Therefore, DOTs need to find an alternative revenue source for modernizing and expanding Interstate highways.

PART 4

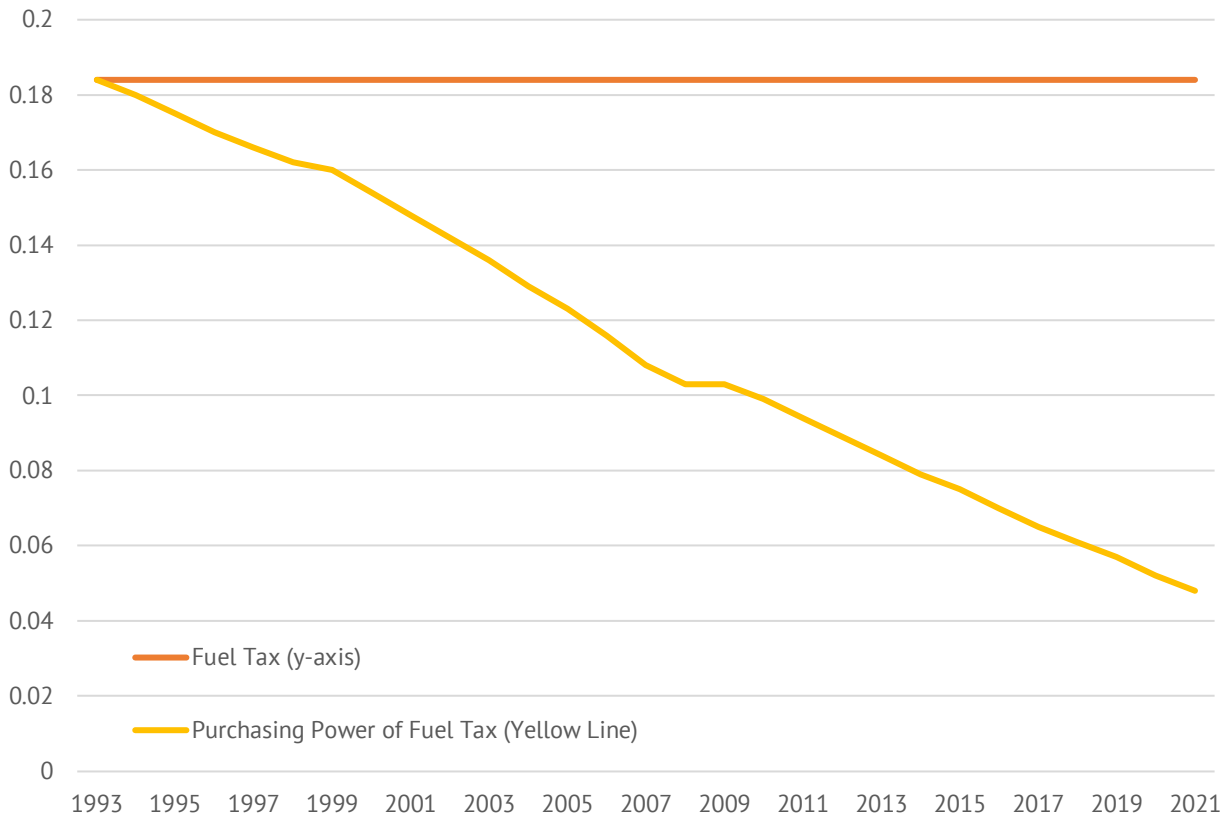
# THE FUEL TAX IS A ROCKSTAR ON ITS FAREWELL TOUR: USING TOLLING AS A REPLACEMENT REVENUE SOURCE

The current funding method for widening and maintaining highways is to use the motor fuel tax. The federal motor fuel tax has not been increased since 1994. As a result, its purchasing power has declined by approximately 50% in the last 18 years.[14] In addition, most vehicles powered by internal combustion engines have become more fuel-efficient. Further, some vehicles with hybrid powertrains use drastically less fuel, while others with completely electric powertrains use no gasoline at all. Combining the average decrease in fuel used with inflation, the fuel tax's purchasing power has declined by approximately 75%.[15] Figure 1 illustrates the decline in real purchasing power of the fuel tax.

14 "It's Been 28 Years Since we Last Raised the Gas Tax, and Its Purchasing Power Has Eroded," https://www.pgpf.org/blog/2021/03/its-been-28-years-since-we-last-raised-the-gas-tax-and-its-purchasing-power-has-eroded, *pgpf.org*, Peter G. Peterson Foundation, 16 Mar. 2021. https://www.pgpf.org/blog/2021/03/its-been-28-years-since-we-last-raised-the-gas-tax-and-its-purchasing-power-has-eroded (4 Oct. 2022).

15 Carl Davis, "Federal Inaction on the Gas Tax is Costing Us Dearly," *itep.org*, Institute on Taxation and Economic Policy, 26 Feb. 2020. https://itep.org/federal-inaction-on-the-gas-tax-is-costing-us-dearly/ (4 Oct. 2022).

## FIGURE 1: FUEL TAX PURCHASING POWER




**Source: U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers 2021.**

Therefore, most researchers believe the fuel tax is not a sustainable funding mechanism. The American Association of State Highway and Transportation Officials (AASHTO) has examined more than 20 alternative revenue sources from a national sales tax to a tire tax.[16] For limited-access highways, the most promising replacement revenue method is tolling.

Tolling can be controversial, largely because of the way some entities have implemented it. Any tolling mechanism needs to be friendly to toll-road users (roadway customers). Customer-friendly tolling addresses each of the four concerns drivers have about replacing the fuel tax with tolls:[17]

16 "Matrix of Illustrative Surface Transportation Revenue Options," *policy.transportation.org*, The American Association of State Transportation and Highway Officials," January 2019. https://policy.transportation.org/wp-content/uploads/sites/59/2019/02/HTF-Matrix-2019.pdf (7 Oct. 2022).

17 Bob Poole and Baruch Feigenbaum, "Customer-Friendly Tolling A Guide for States," Reason Foundation, 2022. https://reason.org/wp-content/uploads/customer-friendly-tolling.pdf (19 July 2023).

## CONCERN #1: TOLL ROADS AS CASH COWS

A portion of toll revenue on many conventional toll roads, such as the Pennsylvania Turnpike, is diverted to non-roadway purposes such as transit or the general budget.[18] As a result, many motorists are skeptical of tolling. To ensure that toll roads do not become cash cows, it is crucial to provide legal protection of new toll revenues to be used solely for the capital and operating costs of the newly tolled corridors.

## CONCERN #2: HIGH COST OF TOLL COLLECTION COMPARED WITH FUEL TAXES

With 20th century tolling (tollbooths and toll collectors) it could cost 25% of total revenue to collect tolls.[19] With the cost to collect the fuel tax of less than 5% of total revenue, the fuel tax had much lower administrative costs. However, with 21st century all-electronic tolling using gantries on highways and in-vehicle transponders, the collection cost is less than 10%.[20] Once economies of scale are reached, experts expect collection costs of approximately 5%, equivalent to the fuel tax.[21] To reduce the costs of collection, it is important to use all-electronic toll collection and provide strong incentives for motorists to use prepaid transponder accounts.

## CONCERN #3: NO VALUE ADDED FOR HIGHWAY USERS

Currently, many motorists encounter uneven, degraded pavement and severe traffic congestion. They are eager for major highway improvements. But some states are looking to implement tolling without making major improvements.[22] Even worse, some states want to begin tolling while the highway is under construction and has fewer travel lanes, detours, and a greater risk of traffic crashes. To provide a better overall highway experience

18 "Pennsylvania Turnpike Makes Final $450 Million Transit Payment to PennDOT Today," *Pennsylvania Turnpike*, *paturnpike.com*, 28 July 2021. https://www.paturnpike.com/news/details/2021/09/14/20210728144102 (4 Oct. 2022).

19 Daryl Fleming et al., "Dispelling the Myths: Federal Tax Collection Costs in the 21st Century," Reason Foundation, 12 Nov. 2012. https://reason.org/wp-content/uploads/files/dispelling_toll_and_gas_tax_collection_myths.pdf (4 Oct. 2022).

20 Ibid.

21 Ibid.

22 "Tolling U.S. Highways and Bridges," *everycrsreport.com*, EveryCRSReport.com, 4 Aug. 2017. https://www.everycrsreport.com/reports/R44910.html (4 Oct. 2022).

than existed before tolling, begin charging tolls only after replacement capacity is opened for use.

## CONCERN #4: DOUBLE TAXATION (I.E., PAYING BOTH TOLLS AND FUEL TAXES ON THE SAME HIGHWAY)

Many motorists are worried that tolling is simply a money grab. Today's toll roads charge a toll and a fuel tax. Fewer vehicles use tolled highways when non-tolled highways are available since motorists would prefer to pay just once (a fuel tax) as opposed to twice (a fuel tax and a toll). To eliminate double taxation, provide rebates of fuel taxes for the miles driven on newly tolled corridors.

If state DOTs will adapt all four of these principles into their plans to rebuild rural Interstates, motorists can benefit from better quality highways without inefficient management and double taxation.

PART 5

# RECOMMENDATIONS AND NEXT STEPS

This brief outlined 11 Interstate segments stretching in length from 52 miles to 242 miles that need to be rebuilt and that face significant traffic congestion. Each is located in a state that has revenue challenges, and nine of the 11 are located in states with a large number of existing toll roads.

While tolling Interstates is generally prohibited by federal law, there are two ways that states are allowed to rebuild Interstate highways using tolls. The first is by using the Interstate System Reconstruction and Rehabilitation Pilot Program (ISRRPP), which allows a state to use toll financing to rebuild one of its Interstate highways. Currently, there are three slots open in the program. The second is to toll bridges and/or tunnels along an Interstate highway corridor. There is no limit to the number of states that may toll a highway using bridges and tunnels and no limit to the number of Interstates that a state could rebuild using this method. Clearly, a state has to have a sufficient number of bridges or tunnels on an Interstate segment for this to be a realistic solution.

PART 6

# CONCLUSION

An increasing number of Interstates are reaching the end of their design lives and need to be rebuilt. Further, many rural Interstates are facing significant congestion. Using tolling to refinance the reconstruction of these highways is the most realistic option. Unlike the fuel tax, tolling is immune from electric vehicles, hybrid vehicles, and more fuel-efficient vehicles powered by efficient internal combustion engines. Further, each of the four concerns relating to tolling (toll roads as cash cows, high cost of collection, no value added, and double taxation) can be addressed. State policymakers need to address rebuilding the Interstate highway network, which is essential to economic vitality. Tolling provides the most realistic option.

# ABOUT THE AUTHOR

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Feigenbaum has a diverse background researching and implementing transportation issues including revenue and finance, public-private partnerships, highways, transit, high-speed rail, ports, intelligent transportation systems, land use, and local policymaking. Prior to joining Reason, Feigenbaum handled transportation issues on Capitol Hill for Rep. Lynn Westmoreland.

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Feigenbaum earned his master's degree in transportation planning with a focus in engineering from the Georgia Institute of Technology.