

## White Paper #2 — Transportation Funding Series

# Roadmap for optimal distance-based user fee systems in the United States

Compiled by: [A-to-Be®](#) | [Mobility-Beyond](#)

## Executive Summary

For close to a century, **America's road network has been paid for through primarily state and federal fuel taxes.** These taxes have not kept pace with inflation and, when measured in real dollars per mile of travel, **are worth 40 percent less than they were 25 years ago** (1). Meanwhile, fuel economy standards are at a record high as more fuel-efficient cars and electric vehicles permeate the nation's roads.

To compensate diminishing transportation funds, **a growing number of states have looked to alternative revenue systems based on vehicle miles traveled.** Also known as a mileage-based user fee or road usage charge, the Federal Highway Administration (FHWA) projects that vehicle miles traveled will grow at an average rate of 1 percent annually over 20 years as a result of rising incomes and a growing population. (2)

**Oregon, California and Washington were among the first to administer mileage-based user fee pilot programs in the United States.** They have created a considerable amount of national momentum, encouraging additional states to look beyond traditional sources of transportation funding. Oregon currently operates a fully functional RUC system for voluntary participants and California and Washington concluded testing in 2017 and 2019, respectively. In this White Paper, **A-to-Be identifies consistencies across each pilot program** that support the foundation of intelligent transportation systems in the United States.

## Introduction

Roadways are the foundation for a functioning economy and the wellbeing of America’s transportation network is tied directly to each gallon of fuel burned. It is an **outdated assumption that fuel consumption mirrors road use**, as evolving efficiency standards and heightened environmental concerns have **pushed manufacturers to invest in stronger fuel economies and reduce emissions**. A *Consumer Reports* survey suggests that 73 percent of people that currently drive a “Large SUV” or “Pickup Truck” would consider a vehicle that is more efficient than their current one (3). For various reasons – ranging from economic development to energy independence and environmental degradation – **the United States faces an increasing number of challenges related to the country’s road network**.

Alternative funding mechanisms have been most thoroughly explored along the West coast, where **states like California, Oregon and Washington** lead the country in emissions standards but levy some of the heaviest tax rates per gallon of gasoline. After Pennsylvania, California and Washington lead the country in gas tax rates at 55.22 cents per gallon and 49.40 cents per gallon, respectively. These programs offer a glimpse into the design and implementation of **optimal distance-based user fee systems in the United States**.

“Evolving efficiency standards and heightened environmental concerns have pushed manufacturers to invest in stronger fuel economies and reduce emissions.”

## Roadmap: Step-by-Step

### Step 1: Establish Program Governance

The introduction of intelligent transportation systems to American arteries constitutes the most significant shock to U.S. transportation policies in nearly a century. Understanding the limited viability of a rapidly declining gas tax, a growing number of states have established governing bodies to inform the viability, design and eventual implementation of these systems. Oregon was first in the U.S. to experiment with a mileage-based fee system and created the Road User Fee Task Force (RUFTF) in 2001. The Washington State Transportation Commission convened a Steering Committee and 2012 and California created the Road Charge Technical Advisory Committee in 2014.

### Step 2: Prioritize User Choice

The average household spends one-fifth of its total disbursements on transportation. (4) Transportation is the second-highest expenditure after housing and Oregon determined early on that drivers demand choices in how they report their mileage and manage their accounts. Current OReGO participants may choose from three account managers, including an ODOT-sponsored option. They may also choose a reporting device with or without GPS and a service plan that best suits their individual needs. (5)

Participants in Washington and California indicated a similar preference to inform how their data is (or is not) collected, how they are charged and how they pay to use the road. Fifty-six percent of participants in Washington chose to use an automated mileage meter; 37 percent used a device with GPS and 19 percent opted for the non-GPS option. Fourteen percent of participants preferred the ease of telecommunications technologies offered through an app on their smartphone and 28 percent of Washington drivers used the odometer in their car, owing to needs for in-person assistance. (6) Numbers were similar in California, where 80 percent of drivers favored automated reporting options, 62 percent of which chose a device with GPS capabilities. (7)

### Step 3: Establish Privacy Standards

Americans know more about how much they pay in taxes at the grocery store than they do at the pump. They often know less about where potential RUC revenues will go, let alone safeguards designed to protect user privacy. Concerns for consumer privacy drive the development of intelligent

“The average household spends one-fifth of its total disbursements on transportation (...), the second-highest expenditure after housing.”

Source: Office of Energy and Renewable Energy (4)

“ Americans know more about how much they pay in taxes at the grocery store than they do at the pump.

”

transportation systems. Private sector vendors employ a combination of advanced security measures such as verification and authorization for data access, notification of data modification, data masking, encryption and storage, data transmittal, IOS requirements for network security, and data destruction to facilitate financial transactions. Non-GPS reporting options are always available and, other than mileage and fuel consumption data, service providers must be granted permission by the user to collect additional information.

Whereas many government tax collection programs require social security numbers, RUC systems do not collect personally identifiable information such as vehicle registration or drivers' license numbers. Over the course of a near 10-year feasibility study in Oregon, for example, most participants felt the system protected privacy as well or better than common credit card or mobile phone systems. (8) In California, 78 percent of participants reported overall satisfaction with pilot privacy and data security. (7) And while many participants in Washington would like privacy and legal protections written into future legislation, 83 percent felt they were not required to provide an intrusive amount of information. (6)

#### Step 4: Implement Equitable Practices

It is a common misconception that a VMT system penalizes low-income households. The inequities of a mileage-based system are associated with vehicle type and fuel economy, not total distance traveled. In fact, a 2010 study out of Oregon found that a RUC is less regressive overall than a consumption-based gas tax; that rural households would benefit relative to their urban counterparts by experiencing a relative reduction in tax burden. (9) Artificial increases on the price of gas fall most heavily on low-income and rural families who spend a higher percentage of their budget on gas and have fewer alternatives (i.e., public transportation, fuel-efficient and electric vehicles) available to them. Households that must spend more at the pump have less disposable income to save or spend, and businesses often pass higher transportation costs on to the consumer or allocate investments away from capital and labor to make up for higher fuel prices. (10)

“ Artificial increases on the price of gas fall most heavily on low-income and rural families who spend a higher percentage of their budget on gas and have fewer alternatives (...)

”

Source: Starr McMullen, Lei Zhang, Kyle Nakahara (9)

The pilot programs in California and Washington drew similar conclusions, finding that drivers of cars that get more than the average 20 mpg saw a small increase in the amount of taxes paid and drivers of cars that get less than the average 20 mpg saw a small reduction in the amount of taxes paid. Specifically, consumers in Washington currently pay 2.4 cents per mile of gas. Drivers of vehicles that get less than the state average pay more than 2.4 cents per mile – as high as 5 to 6 cents per mile – and drivers that get more than the average 20 mpg pay as little as a penny per mile. (6) The California pilot drew similar conclusions, finding that the average fuel efficiency of vehicles in urban areas was 10.5 percent higher than those in rural areas – 23.5 mpg for rural drivers and 26.0 mpg for urban drivers. Under a per-mile system in California, approximately 10 percent of the cost burden would shift from rural to urban consumers, significantly reducing the road funding burden borne by rural drivers. (7)

#### Step 5: Guarantee Ease of Use

Drivers want transportation systems that are simple and easy to use. In fact, simplicity ranked second only to privacy amongst concerns from participants in Washington. (6) Drivers should be able to understand the rules and comply with them efficiently and effectively. That is why each pilot program to-date has been thoughtfully designed so as not to deter public support. In California, 85 percent of participants stated overall satisfaction with the pilot and 87 percent found the program easy to participate in. (7) Most respondents in Oregon found all aspects of the system either easy or very easy to use. The only aspect of the system that more than one participant found difficult was locating the OBD-II port in their car. (8)

## Step 6: Anticipate Advances in Technology

Current and most-often proposed tolling systems in the United States fall short in their ability to communicate with neighboring jurisdictions and interact with outside pricing structures. Interoperable systems, like Via Verde in Portugal, allow for the continuous integration of advanced communications technologies into transportation infrastructure. In each pilot program thus far, we have seen open systems, governed by set standards, without proprietary requirements. Open systems allow multiple organizations to participate in a way that fosters a competitive market. Vendors may enter at any time so long as they are certified and, over time, increased competition could facilitate lower operational costs and better customer service.

“ As programs grow to incorporate larger fleets, develop new technologies and realize economies of scale, administrative costs are expected to decrease significantly.



Source: Washington State Transportation Commission (6)

Open systems hold more immediate significance for states in the Northeast and Midwest, where cross-state travel represents a considerable fraction of the total miles traveled. During the Washington pilot, the state collaborated with Oregon, Idaho and British Columbia to test interoperability between states and abroad. The back-office system processed multi-jurisdictional driving data from each state and the successful exchange of funds between, particularly, Oregon and Washington demonstrated interoperability between distinct service providers and state agencies is achievable. (6)

## Step 7: Reduce Costs & Generate Greater Revenue

The cost to administer RUC programs will initially be more expensive than collecting a fuel tax. This is because administering a gas tax requires relatively minimal overhead, whereas collection costs for a RUC are estimated between 5-10 percent. (6) As programs grow to incorporate larger fleets, develop new technologies and realize economies of scale, administrative costs are expected to decrease significantly. The pilot in Washington, for example, examined a range of scenarios that combined a RUC with the existing gas tax. Under all scenarios, when holding RUC and gas tax rates constant, the road charge generates more revenue but is more costly to administer. (6) The exact cost of a road charge will depend on varying policy priorities unique to each state but, in general, the unit cost of collecting a RUC will decline as programs and systems expand.

There are not yet examples in United States from which to derive reliable cost estimates, but experiences from programs in Oregon, California and Washington suggest common cost drivers include the number of vehicles or user accounts, vehicle miles reported and allocated amount of non-compliance, and the number of participating entities. Final project reports from each pilot program indicate the importance of industry partners in driving down costs and administering an effective RUC system. The reason is not due solely to private sector innovation and agility, according to the Caltrans report. Rather, the ability of commercial partners to attract and retain customers and to sell value-added services to motorists will drive greater revenues that can offset systems costs. (7)

## Step 8: Be Open and Transparent

There is currently little to no transparency afforded by the gas tax system. To calculate total taxes paid, drivers must know their total distance traveled, vehicle's fuel economy and the gas tax rate. Sixty-five percent of people were unable to accurately estimate the amount they pay in gas taxes annually at the onset of the Washington program. (6) Participants were not accustomed to receiving invoices for driving charges but, by the conclusion of the pilot, 86 percent of respondents said their understanding of a RUC was the same or better than a gas tax. Similarly, 78 percent of participants in California were satisfied with both the clarity of invoices and transparency of charges. (7) Under a VMT system, customers receive continuous invoices that disclose all data elements used to calculate the RUC. Invoices include comprehensive information regarding total reported miles, the charge per mile and the total RUC for the invoice period.

“ (...) 86 percent of respondents said their understanding of a RUC was the same or better than a gas tax.



Source: Washington State Transportation Commission (6)

## Summary

The introduction of intelligent transportation systems to American arteries constitutes the most significant shock to U.S. roads in nearly a century, but **chronic underfunding and deferred maintenance puts the United States in a position today that requires swift action.** About **40 percent of transportation revenues come from fuel excise taxes.** According to data from the Congressional Budget Office, receipts from U.S. motor gasoline consumption are projected to decrease by an average 0.3 percent per year from 2019 to 2030 as the use of alternative energies advances. (11)

An increase in gas tax rates offers immediate relief to state and federal transportation funds but is considered throughout the industry to be **unsustainable over time.** According to the Transportation Research Board, a 50 percent increase in average mile per gallon would lead to a 28 percent decrease in gas tax revenues, the same increased fuel economy would benefit VMT revenues by 4.4 percent. (12)

There is still much to learn about mileage-based transportation systems, but the success of pilot programs in Oregon, California and Washington and the prospect of more to come set the United States on a constructive path forward. We look forward to the success of future VMT programs ■

“ (...) the success of pilot programs in Oregon, California and Washington, and the prospect of more to come, set the United States on a constructive path forward.

”

## 8-Step Roadmap

- 1 Establish Program Governance
- 2 Prioritize User Choice
- 3 Establish Privacy Standards
- 4 Implement Equitable Practices
- 5 Guarantee Ease of Use
- 6 Anticipate Advances in Technology
- 7 Reduce Costs & Generate Greater Revenue
- 8 Be Open and Transparent



### Contact information

**Jason Wall**

Jason.wall@a-to-be.com  
A-to-Be, Powered by Brisa  
a-to-be.com

Stay tuned for the **Third Edition of A-to-Be's Transportation Funding Series**, where we explore consumer experiences with RUC programs.



This —  
and more interesting  
industry content —  
can be found here.  
<http://bit.ly/AtoBe-knows>

## Works Cited

1. **Institute on Taxation and Economic Policy.** The Federal Gas Tax: Long Overdue for Reform. [Online] May 2014. <https://itep.org/wp-content/uploads/pb43fedgastax.pdf>.
2. **Federal Highway Administration.** FHWA Forecasts of Vehicle Miles Traveled (VMT): Spring 2018. [Online] May 2018. [https://www.fhwa.dot.gov/policyinformation/tables/vmt/vmt\\_forecast\\_sum.pdf](https://www.fhwa.dot.gov/policyinformation/tables/vmt/vmt_forecast_sum.pdf).
3. **Consumer Reports.** 2019 Automotive Fuel Economy Survey Report. [Online] August 2019. <https://advocacy.consumerreports.org/wp-content/uploads/2019/08/Consumer-Reports-Fuel-Economy-Survey-Report-2019.pdf>.
4. **Office of Energy and Renewable Energy.** Saving on Fuel and Vehicle Costs. U.S. Department of Energy. [Online] 2019. <https://www.energy.gov/eere/electricvehicles/saving-fuel-and-vehicle-costs>.
5. **Oregon Department of Transportation.** OReGO, A New Way to Fund Roads for All Oregonians. [Online] <http://www.myorego.org>.
6. **Washington State Transportation Commission.** Steering Committee Report for the WA RUC Pilot Project. [Online] October 2019. [https://waroadusagecharge.org/wp-content/uploads/2019/10/WA-RUC\\_Final-Report.pdf](https://waroadusagecharge.org/wp-content/uploads/2019/10/WA-RUC_Final-Report.pdf).
7. **California Department of Transportation (Caltrans).** California Road Charge Pilot Program: Final Report. [Online] December 2017. <https://dot.ca.gov/-/media/dot-media/programs/road-charge/documents/rcpp-final-report-a11y.pdf>.
8. **Kathryn Jones, Maureen Bock.** The OReGO Program: Final Report. [Online] April 2017. [https://www.oregon.gov/ODOT/Programs/RUF/IP-Road%20Usage%20Evaluation%20Book%20WEB\\_4-26.pdf](https://www.oregon.gov/ODOT/Programs/RUF/IP-Road%20Usage%20Evaluation%20Book%20WEB_4-26.pdf).
9. **Starr McMullen, Lei Zhang, Kyle Nakahara.** Distributional Impacts of Changing from a Gasoline Tax to a Vehicle Mile Tax for Light Vehicles: A Case Study of Oregon. [Online] November 2010.
10. **Ditch, David, et al.** Paying for Surface Transportation Infrastructure: Four Wrong Routes, Four Good Paths. [Online] July 2019. <https://www.heritage.org/budget-and-spending/report/paying-surface-transportation-infrastructure-four-wrong-routes-four-good>.
11. **Congressional Budget Office.** The Budget and Economic Outlook: 2019 to 2029. [Online] January 2019. <https://www.cbo.gov/publication/54918>.
12. **Transportation Research Board.** The Fuel Tax and Alternatives for Transportation Funding. [Online] 2006. <http://onlinepubs.trb.org/onlinepubs/sr/sr285.pdf>.