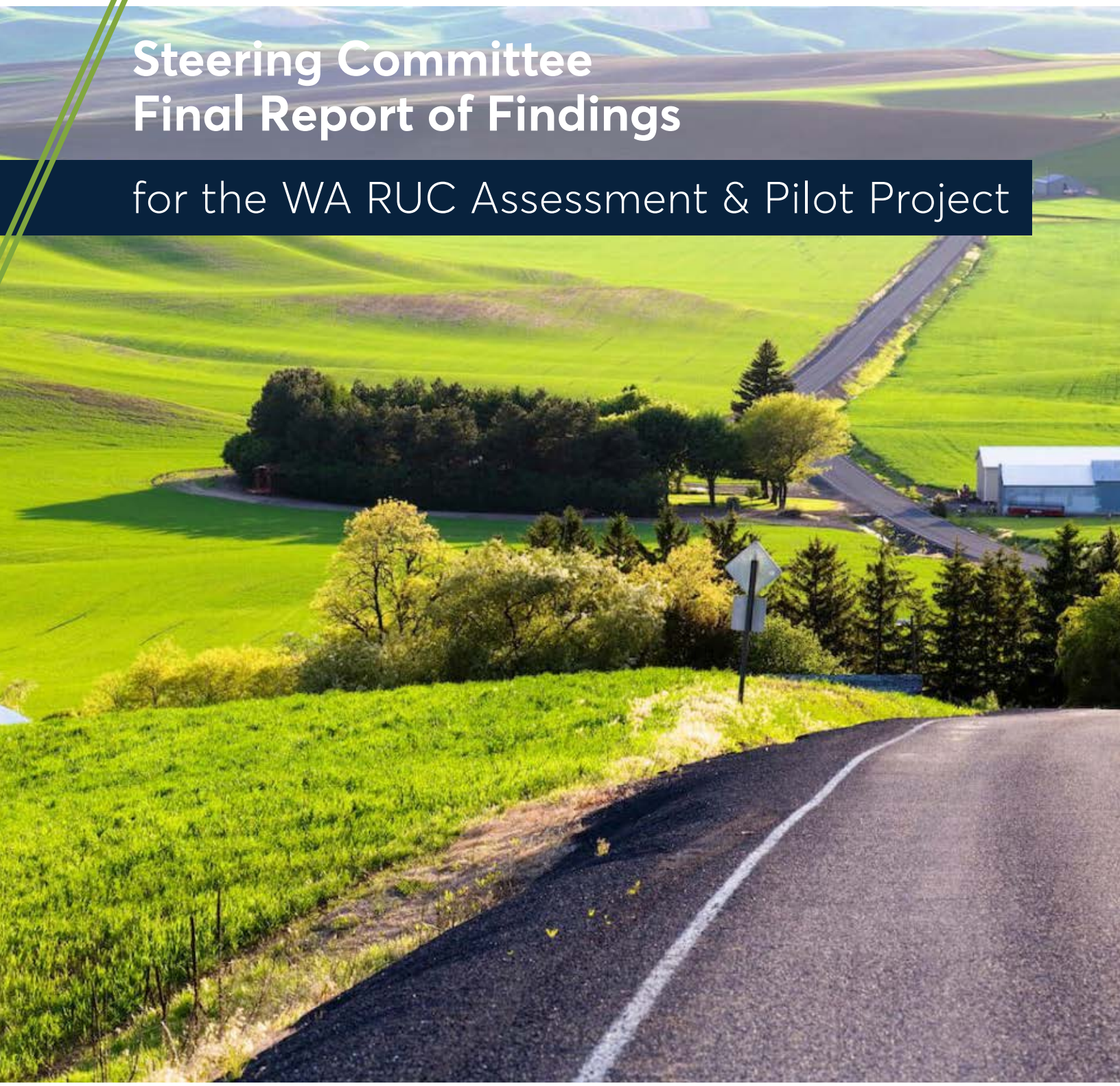
Steering Committee Final Report of Findings

for the WA RUC Assessment & Pilot Project



WA RUC
Test Drive the Road Ahead

vol. 2
December 2019

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SPECIAL THANKS

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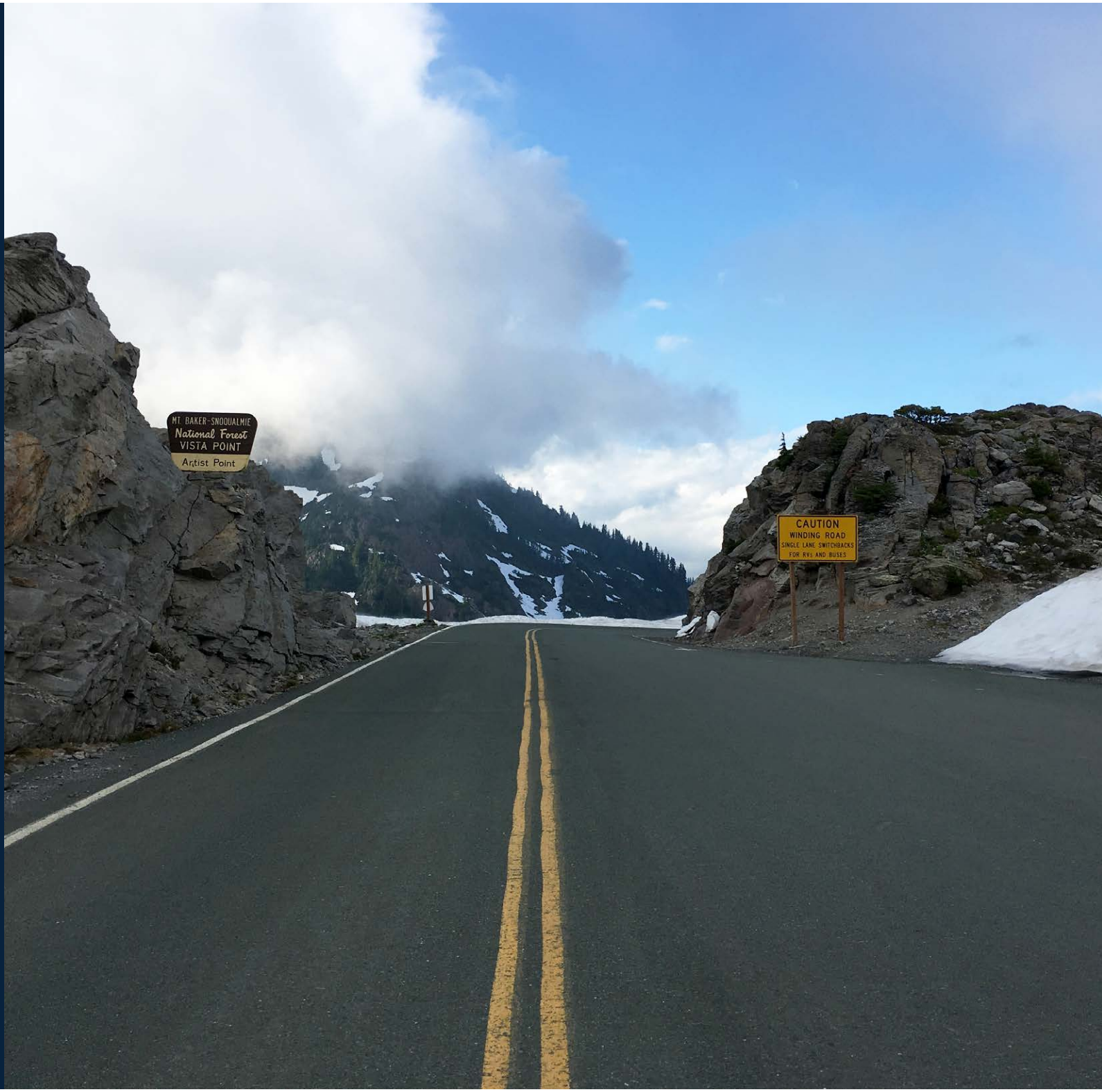
appendices

All appendices—published as Volume 3 of the WSTC's Final Report—are available to view or download at waroadusagecharge.org.

exhibits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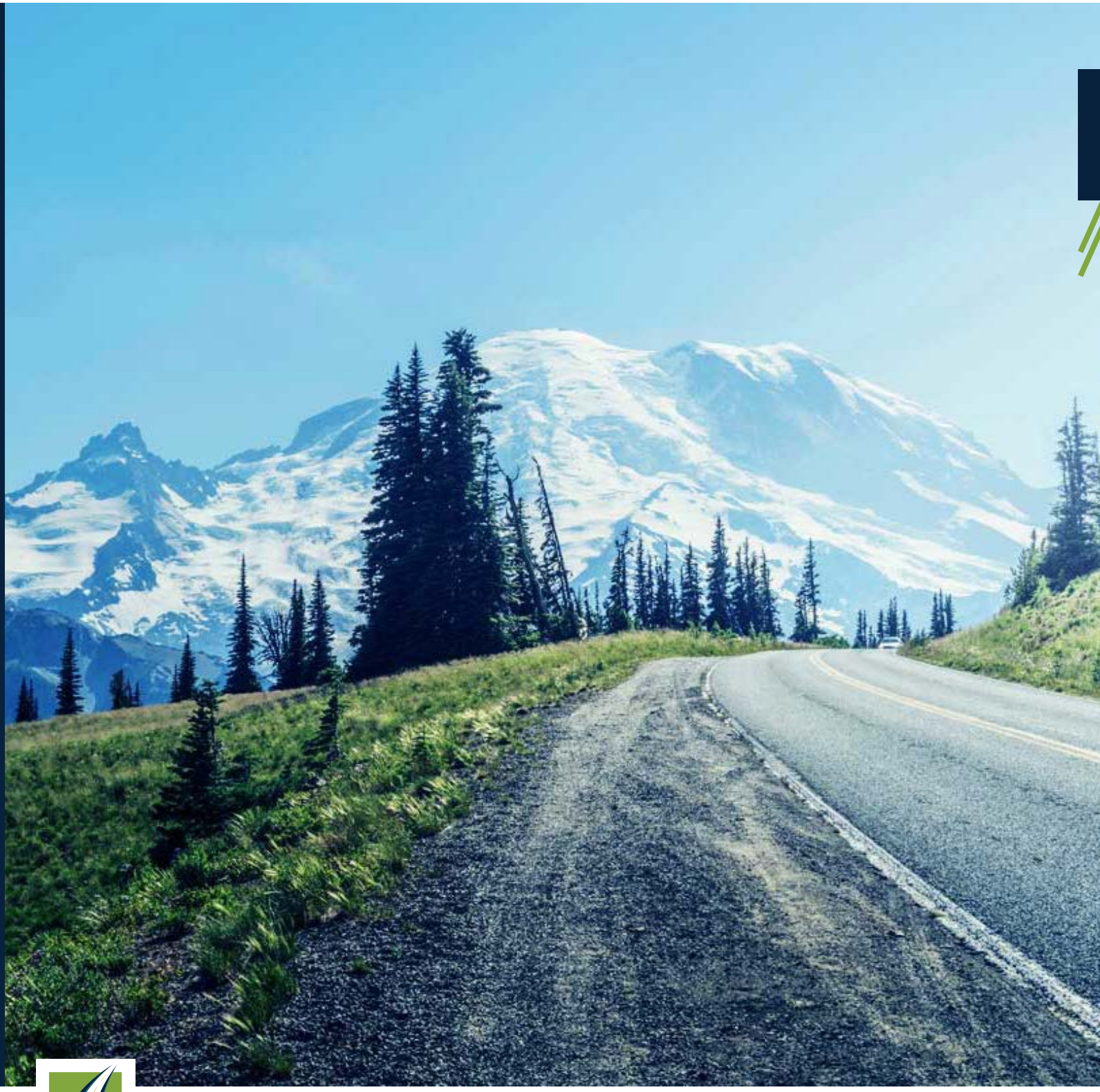


chapter 1

WASHINGTON'S EXPLORATION OF A ROAD USAGE CHARGE

After several years of in-depth research and analysis, a 29-member expert stakeholder committee found a pay-per-mile system to be technically feasible as a potential replacement for the state's gas tax. The more difficult question was whether a road usage charge (RUC) can become an ***acceptable*** way to fund roads—not only from the perspective of policymakers', but from drivers' as well.

To explore this issue, drivers in Washington were given an opportunity to "test drive" a RUC system prototype that was specifically designed for Washington state. To be successful, RUC must account for the geographic, demographic, economic, and social factors unique to the state. This report documents Washington's exploration of a RUC, including drivers' reactions and preferences in a RUC system, and what issues must be resolved for RUC to become a widespread method of funding roadways in Washington.

2

key takeaways

1. The State relies on motor vehicle fuel taxes to fund maintenance, operations, preservation, and improvements to roadways. Fuel tax revenue is flattening and projected to decrease on a per-mile basis due to improvements in vehicle fuel economy.

2. The concept of a federally administered RUC system would likely face steep challenges if it were applied in practice, primarily due to the lack of a national vehicle registration requirement or direct tax accounting between the federal government and vehicle owners. States have primarily maintained the legal relationship between vehicles and their owners.

3. Early on, the WA RUC project team identified and implemented several "participatory design" principles, ranging from public design workshops to create new reporting mileage options for drivers to use their own smartphones, to the inclusion of over 2,000 Washington resident drivers providing feedback and insights into what works, what doesn't, and what would have to change in any future RUC system.

4. To date, the Legislature has carefully balanced its policies to incentivize clean transportation ("innovation policy"), with their policy for all road users to contribute to the cost of the system ("stewardship policy"). This careful balance is reflected in the State's incentives for the purchase of plug-in electric vehicles and alternative fueling stations, and the requirement that plug-in vehicles pay a $150 annual fee that is deposited into the State's motor vehicle fund, with proceeds used for highway purposes.

5. Washington and bordering jurisdictions of Oregon, British Columbia, and Idaho comprise an economic region that ranks 9th largest in North America. Cross-border travel is essential for the mobility of goods, services, and the region's people. The greater Portland metropolitan area includes Vancouver, Washington and nearby urbanized areas. This interconnection between the states presents a special challenge in determining how vehicles crossing these borders might be charged for roadway use in other jurisdictions.

1.1 ASSESSING THE FEASIBILITY OF A ROAD USAGE CHARGE

Thorough research and analysis of the legal, fiscal, operational, and policy impacts of a road usage charge have been conducted since 2012 to fully assess how RUC may be implemented in Washington.

1.1.1 WA RUC ASSESSMENT BACKGROUND

In July 2011, Washington Governor Chris Gregoire convened the Connecting Washington Task Force to examine current and future transportation system funding needs in the state. In its final report, the Task Force recommended that the State of Washington begin planning the transition to more sustainable funding sources for transportation. The Task Force specifically recommended a direct user fee system based on miles traveled with rates based upon system use, similar to other public utilities.[1] This recommendation echoed the position taken two years earlier by the Washington State Transportation Commission (WSTC) and its counterpart transportation commissions in Oregon and California, that jointly authored a letter in 2009 urging Congress to support state exploration of mileage-based user fees as an alternative to a fuel tax[2] and a west-coast pilot of RUC.

In 2012, the Washington State Legislature provided funding to WSTC "solely to determine the feasibility of transitioning from the gas tax to a road user assessment system of paying for transportation."[3] The Legislature also provided funding to the Washington State Department of Transportation (WSDOT) "solely to carry out work related to assessing the operational feasibility of a road user assessment, including technology, agency administration, multistate and Federal standards, and other necessary elements." Both efforts were administratively consolidated and conducted under the guidance of a legislatively created Steering Committee.

1.1.2 STEERING COMMITTEE'S INVESTIGATION OF RUC

For the past seven years, WSTC and its specially appointed 29-member[4] stakeholder Steering Committee have investigated, designed, and tested a per-mile charge system, or road usage charge (RUC), as a potential replacement for the state gas tax.

In January 2013, the WSTC and the Steering Committee found the concept feasible as a potential state transportation funding policy.[5] However, while RUC was deemed technically feasible, questions remained around whether RUC would be *acceptable* as an alternative funding mechanism for transportation from both a public policy and consumer acceptance standpoint.

The Steering Committee met throughout 2013 and into 2014 and considered various operational and policy issues related to a RUC system in Washington. As a result of this process, the Steering Committee identified several core design principles that must be reflected in any proposed WA RUC system. These design principles were refined and adopted as the WA RUC Guiding Principles. These Guiding Principles were then used to develop a more formal Concept of Operations (ConOps) for a RUC system. The ConOps acts as a basic blueprint for how mileage would be recorded, reported, and paid by drivers. Once the Steering Committee developed these details, the project team conducted a formal Business Case Evaluation, which included detailed financial modeling and analysis to help policymakers assess the potential costs and revenues that can be expected from the prototype system over a period of years. The results showed that a WA RUC system

1 Executive Summary, page 2, Connecting Washington: Strategic Transportation Investments to Strengthen Washington's Economy and Create Jobs, January 6, 2012. Accessed at: https://www.digitalarchives.wa.gov/GovernorGregoire/priorities/transportation/connectwa.asp

2 Letter to Senator Patty Murray from Washington, Oregon and California Transportation Commissions, January 16, 2009.

3 Engrossed Substitute House Bill No. 2190, 62nd Legislature, 2012 Regular Session.

4 The exact number of Steering Committee members has increased since 2012. As of October 2019, there are 29 currently appointed members of the Steering Committee.

5 Washington State Road Usage Charge Assessment, page 6, Section 1, January 23, 2013. https://waroadusagecharge.org/wp-content/uploads/2018/11/4.201302WARoadUsageChargeAssessment.pdf

Pilot timeline

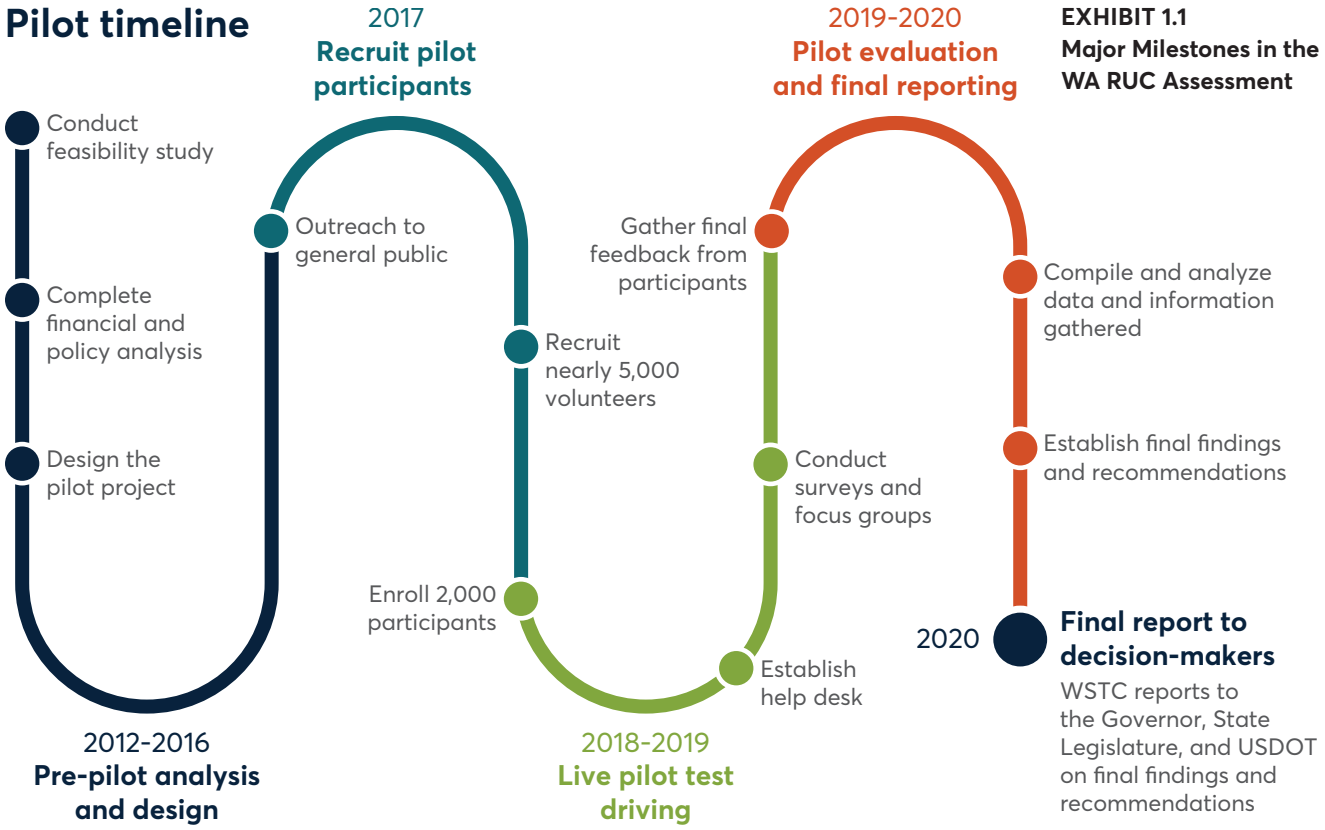


EXHIBIT 1.1
Major Milestones in the WA RUC Assessment

designed in accordance with the Guiding Principles and the ConOps would financially outperform the current gas tax system on a per-mile basis.[6]

Throughout the entire WA RUC Assessment process, the Steering Committee developed a comprehensive list of legal, fiscal, operational, and policy issues that must be addressed before a RUC could replace the gas tax. While some questions were answered through further research, many of the unresolved issues could only be addressed by conducting a live test of a RUC system prototype and recording the results.

In 2015 and 2016, WSTC and the Steering Committee prepared for a statewide public demonstration (known as the WA RUC Pilot Project). In mid-2016, the US Department of Transportation announced an award of $3.85 million in federal funds for Stage 1 of the WA RUC Pilot Project, which funded all necessary design and testing of the WA RUC prototype system.

In Spring 2017, WSTC submitted a proposal to the federal government for $4.6 million for Stages 2 and 3, which would fully fund the 2,000-vehicle statewide, 12-month live pilot operations and the ensuing pilot evaluation, assessment of results, recommendations, and reporting. In late 2017, FHWA awarded full funding, enabling the pilot project to launch in January 2018.

The WA RUC live pilot test was conducted from January 2018 through January 2019. This report includes the results of the 12-month statewide pilot test. The WSTC and the Steering Committee provided guidance for the entire test: from the original design parameters, to performance measures and evaluation methods, and in considering the legal, fiscal, operational and policy implications of a RUC system in Washington. This report contains the results of this work, as well as the WSTC's and Steering Committee's findings, conclusions and, to the extent of their legislative charge, any recommendations for how a RUC system might be most effectively implemented.

6 Business Case Evaluation Final Report, January 7, 2014. https://waroadusagecharge.org/wp-content/uploads/2018/11/WARUCBusinessCaseEvaluation010714.pdf

1.2 DRIVERS, VEHICLES, & TAXES: ELEMENTS OF RUC IN WASHINGTON

Designing an acceptable RUC system requires an understanding of Washington's vehicle fleet, drivers, and the current gas tax funding approach coupled with an appreciation for the unique transportation policy context in Washington.

1.2.1 MOTOR VEHICLE FUEL TAXES IN WASHINGTON

Washington enacted an excise tax on motor fuels in 1921 to fund highway improvements. In 1944, voters adopted Amendment 18 to the Washington Constitution, which dedicates the fuel excise tax to "highway purposes." Originally one cent per gallon, the tax doubled three years later. The tax rate increased on average once every five years between 1921 and 2019, most recently to 49.4 cents per gallon of gasoline and diesel as of July 1, 2016.

HOW THE TAX IS COLLECTED

Like most states, Washington does not impose its fuel tax directly on motorists at the pump, but rather on licensed fuel distributors and suppliers. This method of collection limits the number of taxpayers to fewer than three hundred companies. Distributors and suppliers of fuel remit the tax to the Department of Licensing based on the number of taxable gallons removed from their terminals each month.[7]

Because of its method of collection and use of revenue, Washington's fuel tax functions as an indirect user fee. The taxation of a commodity from distributors (in this case, fuel) that approximates a user activity (driving on public roads) makes it indirect. However, economic research indicates that motorists bear the cost of fuel taxes "on average fully and immediately" after any change in the tax rate.[8] In other words, companies pass along the fuel tax to motorists even though it is technically levied on the distributors, not directly on the drivers. Since motorists who use the public road system pay the fuel tax, and since the State dedicates revenue to improving that public road system, the fuel tax is a user fee.

EXEMPTIONS & REFUNDS

Washington law provides for several uses of fuel tax revenue other than for highway purposes, including to cover the cost of collecting fuel taxes and for exemptions and refunds.

The law provides for exemptions and refunds from fuel taxes, consistent with the user fee approach. Generally speaking, exemptions, available before incurring a tax, require more effort for the State to process, while refunds, available only after incurring a tax, require more effort for the individual. By statute, Washington generally exempts the imposition of fuel tax, or allows the refund of fuel tax, for use of public roads by vehicles not required to register (such as construction equipment), sold to the US government, or used in transit vehicles.[9]

Since many non-automobile vessels consume tax-paid fuel, and since many cars consume tax-paid fuel on private roads, the State created several accounts for fuel tax revenue deposits in recognition of these deviations.

- **Aeronautics.** The State devotes a small portion of fuel tax revenue to aeronautics infrastructure, since light aircraft consume a small amount of tax-paid gasoline.
- **Marine.** As with aviation, the nexus for marine expenditures is the use of tax-paid (and non-refunded) gasoline in vessels.
- **Outdoor recreational vehicles.** Since vehicles consume some tax-paid fuel for off-road recreational purposes, the Legislature provides a small amount of gas tax revenue to support expenditures related to off-road vehicle use.
- **Snowmobiles.** The Legislature provides a small amount of gas tax revenue to support expenditures related to snowmobiles, since they pay tax on fuel consumed without using public roads.

7 The federal government collects its fuel tax (18.4 cents per gallon of gasoline, 24.4 cents per gallon of diesel) through a separate, but similar, process. The US Internal Revenue Service collects tax on the removal of fuel from bulk storage terminals.

8 "Fuel Tax Incidence and Supply Conditions" by Justin Marion and Erich Muehlegger, National Bureau of Economic Research Working Paper 16863 (https://www.nber.org/papers/w16863.pdf).

9 RCW 82.38.080 and RCW 82.38.180.

INTERSTATE TAXATION OF MOTOR VEHICLE FUEL

Because Washington taxes fuel at the wholesale distributor level, the State lacks the ability to distinguish between fuel consumed in state versus in other jurisdictions, or by Washington vehicles versus vehicles from out-of-state, light- and medium-duty vehicles. For heavy vehicles that travel across state lines, Washington participates with 47 other lower states in the US and 10 Canadian provinces in a revenue reconciliation program known as the International Fuel Tax Agreement (IFTA).

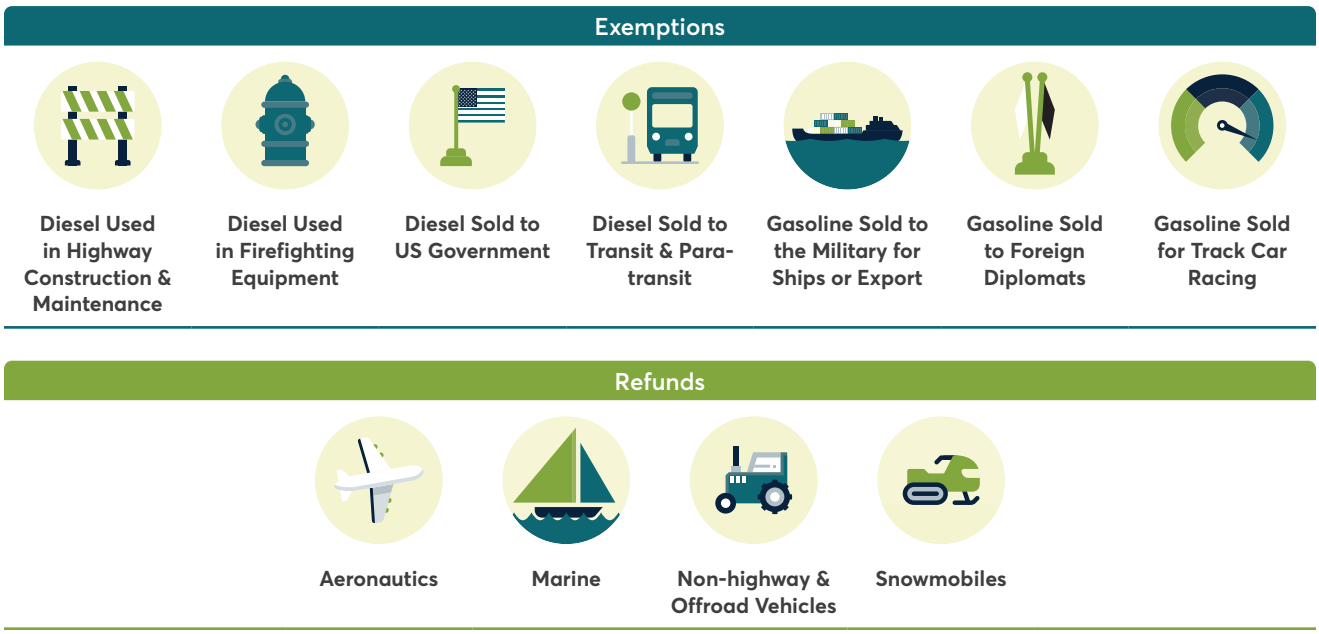
Under IFTA, heavy truck fleets calculate and pay taxes owed to each jurisdiction based on their overall fleet fuel economy, number of miles driven by jurisdiction, and tax-paid fuel purchases by jurisdiction. As an IFTA participant, Washington-based fleets report and pay their taxes to all jurisdictions directly to Washington, and Washington in turn only reconciles its fuel tax collections on behalf of Washington-based fleets with the other 57 jurisdictions through the IFTA clearinghouse.

DISADVANTAGES OF THE MOTOR FUEL TAX

For all its advantages as a revenue mechanism, the fuel tax suffers from several disadvantages. Most importantly for purposes of this report, the fuel tax bears no direct relationship to the usage of the public road system it funds. Historically, the indirect relationship between fuel consumption and road usage had negligible impact on the effectiveness of the fuel tax as a revenue source. However, as Washington's vehicle fleet evolves and fuel efficiency increases, the fuel tax burden shifts in ways not previously seen or anticipated. An increasing share of the public road system cost falls on a smaller tax base of vehicles, those with average or below-average fuel economy. Increasing the rate of fuel tax will disproportionately impact drivers of average and below-average fuel economy vehicles.

Washington has already begun to consider how it might need to shift away from its historical reliance on the fuel tax. Without increases in the fuel tax rate, fuel tax revenue will decline, giving even greater import to other sources of transportation revenue such as existing vehicle fees or alternatives such as RUC. To better understand the prospective impacts of transportation revenue alternatives on Washington motorists, whether fuel tax, RUC, vehicle fees, or something else, it is helpful to understand the nature of the vehicle fleet and those who drive.

EXHIBIT 1.2
Statutory Fuel Tax Exemptions & Refunds



1.2.2 THE LIGHT VEHICLE FLEET IN WASHINGTON

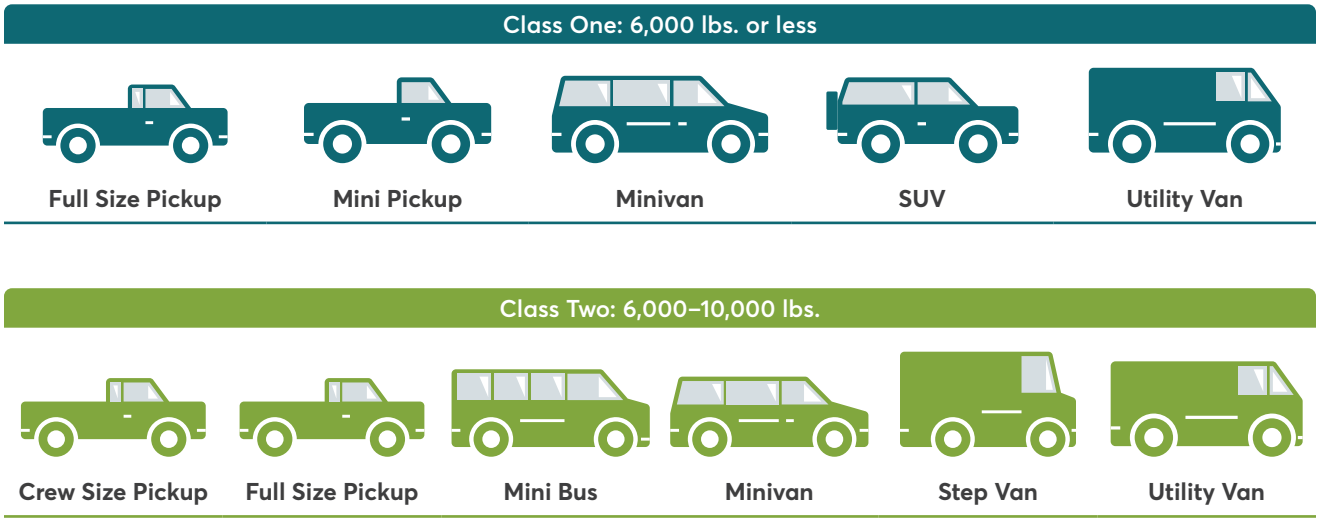
As of June 30, 2019, there were over 8 million registered vehicles in Washington.[10] This number includes all types, makes, and models of vehicles, from passenger sedans, light duty pickup trucks, and sport utility vehicles (SUV) to taxi cabs, rental cars, motorcycles, and vehicles owned by state, local, and tribal governments.

Since a primary purpose for considering funding mechanisms like RUC is to mitigate the diminishing return on fuel tax revenues resulting from increased vehicle fuel efficiency and the growing use of alternative fuels, it's important to understand which types of vehicles are currently subject to the federal fuel economy regulations under the Corporate Average Fuel Economy (CAFE) standards. In 1982, Congress directed the US Department of Transportation (USDOT) to establish separate fuel economy standards for passenger automobiles ("passenger cars") and non-passenger automobiles ("light trucks") even though a majority of these light trucks are, in fact, used as passenger vehicles. In 2012, FHWA added "medium duty trucks" (those weighing less than 10,000 lbs.) to the class of vehicles subject to CAFE standards.[11] A simplified description of vehicles subject to fuel economy regulation includes all vehicles with a gross vehicle weight rating of 10,000 lbs. or less. FHWA refers to these vehicles as "light duty". These vehicles include passenger sedans, regular and full-size pickups, SUVs, minivans, and utility vans.[12]

Of the 8 million registered vehicles in Washington, approximately 50% fit the federal definition of light duty vehicle and are subject to fuel economy regulations. The vast majority of these vehicles use gasoline or diesel for fuel (estimated at 98%) and thus currently pay Washington's motor fuel tax of 49.4 cents per gallon.

As measured by volume (total units sold), new vehicle sales in the US fell in 2017 for the first time in US history. After

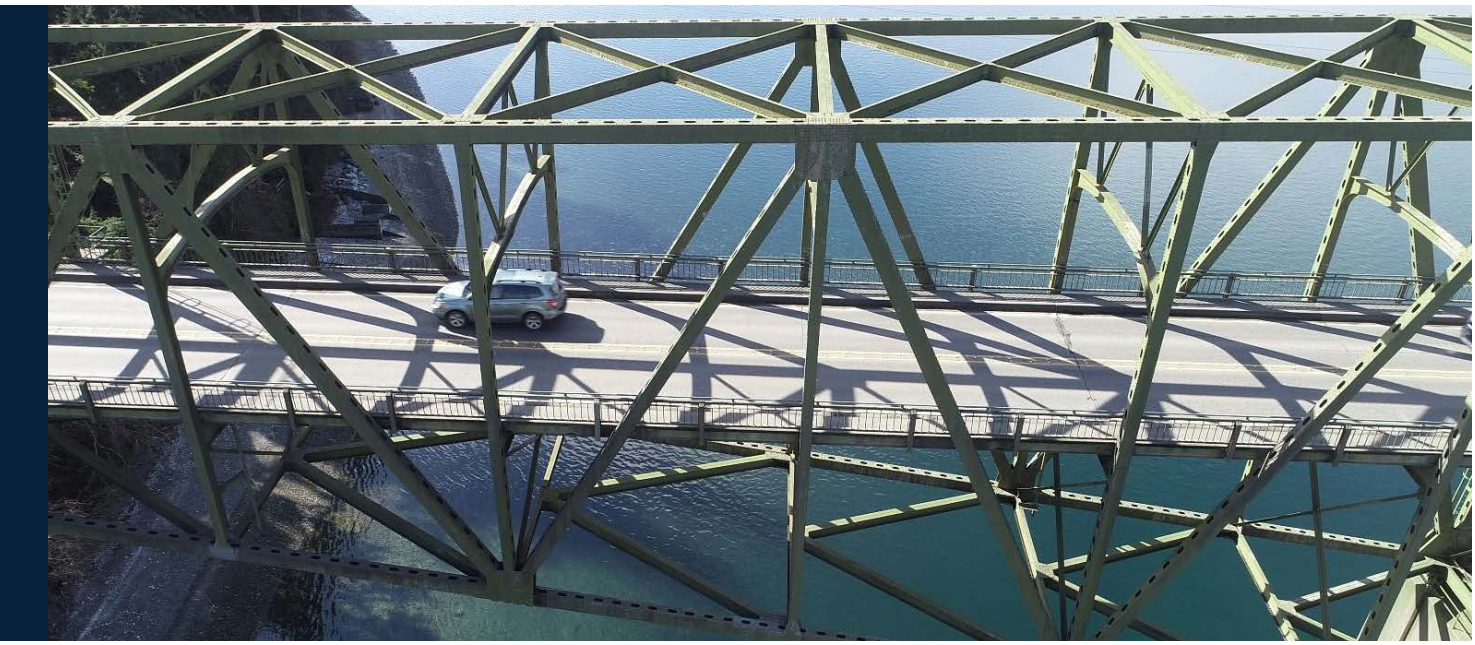
EXHIBIT 1.3
Light Duty Vehicles Types, by Weight Classification



10 Registered vehicles in Washington, Statistics-at-a-Glance, Fiscal Year 2019, Washington State Department of Licensing. https://www.dol.wa.gov/about/docs/2019-FY-stats-at-a-glance.pdf

11 In 2014, heavy vehicles were also subjected to federal CAFE standards. However, since those vehicles were specifically excluded from consideration of a RUC by the Washington State Legislature, these vehicles are not addressed in this report.

12 Types of Vehicles by Weight Class (https://afdc.energy.gov/data/10381).



flattening in 2018, new vehicle sales are projected to be lower again in 2019, with a forecasted 16.9 million vehicles sold, compared to 17.3 million in 2018 (and 17.5 million in 2016).[13]

1.2.3 VEHICLE DRIVERS IN WASHINGTON

There are over 5.4 million persons with a valid driver's license in the state,[14] for an average of .84 drivers for every vehicle, which is right at the national average. However, growth in issuance of new licenses has flattened in recent years.[15] Washington is not alone in this trend; nationally, the percentage of licensed drivers in the US has been decreasing since 1983. For example, 46% of 16-year-olds had a drivers' license in 1983. In 2008, that number dropped to 31%. By 2017, only 26% held a driver's license. Although not as dramatic across all age groups, on a national level the overall percentage of licensed drivers has fallen.[16] The age groups that show increased percentage of drivers' licenses in 2017 compared to 1983 are those older than 55.

Restrictions placed on young drivers, the availability of ridesharing and ride-hailing apps, as well as the ability for people to stay connected through the social network technology are all contributing factors for the decreased percentage of people under age 40 who hold a driver's license. While graduated licensing laws (regulating driving by those under age 18) may only result in a delay in obtaining a driver's license, the emergence of new technologies such as autonomous vehicles and mobility-as-a-service (most notably, Lyft and Uber) will make forecasting the number of future drivers in Washington more uncertain.

13 US Auto Sales Slipped in First Half of 2019 as Prices Climbed, Wall Street Journal, July 2, 2019. https://www.wsj.com/articles/u-s-auto-sales-slip-in-first-half-of-2019-as-prices-surge-11562084050

14 Registered vehicles in Washington, Statistics-at-a-Glance, Calendar Year 2018, Washington State Department of Licensing. https://www.dol.wa.gov/about/docs/2018-CY-stats-at-a-glance.pdf

15 https://www.statista.com/statistics/191653/number-of-licensed-drivers-in-the-us-since-1988/

16 "Americans Get Drivers Licenses Later in Life," Statista, July 12, 2019. Accessed at https://www.statista.com/chart/18682/percentage-of-the-us-population-holding-a-drivers-license-by-age-group/

1.3 ADDITIONAL FACTORS INFLUENCING ROADWAY TAXES IN WASHINGTON

Understanding the context for roadway taxes in Washington requires more than vehicle data—it requires an awareness of the geographic, economic, and societal aspects of transportation, including the extent of cross-border travel throughout the Pacific Northwest.

1.3.1 THE ADVENT OF ELECTRIC DRIVE VEHICLES

For various policy reasons ranging from national security concerns and economic independence, to environmental impacts, the State of Washington has embraced a transition from petroleum-based fuel sources to cleaner, renewable, domestically produced fuel sources to power the transportation system. This is prominently evidenced by policy support for adoption of electric vehicles.

State policy related to plug-in electric vehicles (PEVs) is still evolving. When mass-market PEVs first launched with the Nissan Leaf, Chevy Volt and Mitsubishi iMiev in 2011, the Legislature enacted tax incentives to encourage adoption as well as a flat annual fee on PEVs to ensure owners were contributing to the maintenance and upkeep of the state's public roadways. Washington was the first state in the nation to enact a vehicle fee for PEVs: $100 per year, with the revenue required to be spent in the same manner as gas taxes are today. However, the Legislature recognized that a flat annual fee based solely on a vehicle's engine technology did not align with the "user fee" principle, where the amount of the fee varies based on consumption—i.e., the amount of roadway used (either directly as measured in miles or, as with the gas tax, an indirect measure of use—fuel consumption). As a result, the Legislature expressed its intent that the PEV annual fee should be a temporary measure until the State adopts a revenue system based on direct use of the roadway, as measured in miles.[17]

Since its original enactment in 2012, the Legislature has taken additional steps to incentivize consumer adoption of PEVs, while still requiring some form of financial contribution for use of the public roadway system. In 2015, the Legislature amended the PEV fee to make sure that plug-in hybrid electric vehicles like the Chevy Volt were also paying the annual fee. In that same year, the Legislature provided $1 million in seed funding for a public-private partnership aimed at expanding the state's network of public fast-charging stations for PEVs. Fees collected from PEVs have been earmarked for this purpose—in effect, functioning as an "amenity" fee, where vehicles paying the fee receive a direct public amenity (PEV charging stations) funded by the fee itself. This is similar to how the annual fees collected on recreational vehicles are used to provide wastewater dumping stations for RVs at state rest areas. In addition, the Legislature renewed and refined its PEV tax incentives to ensure the tax exemptions weren't over-subsidizing the purchase of expensive PEVs (which can range from $45,000 to over $100,000).

EXHIBIT 1.4
Distribution of Plug-in Electric Vehicle Fees

	Through June 30, 2025			Beginning July 2025	
	For Highway Purposes	For Clean Transportation Incentive Program	Annual Total	For Highway Purposes	Annual Total
PLUG-IN VEHICLES	$150	$75	**$225**	$225	**$225**
HYBRID VEHICLES	—	$75	**$75**	$75	**$75**

17 RCW 46.17.323 (5) provides: "This section applies to annual vehicle registration renewals *until the effective date of enacted legislation that imposes a vehicle miles traveled fee or tax.*" (Emphasis added).

In 2019, the Legislature enacted a broad initiative aimed at further refining its tax incentives and tax policy related to PEVs, hybrid vehicles, and alternative fuel vehicles.[18] In essence, these new policies further honed public tax incentives to ensure consumers who cannot afford a new PEV are supported if they wish to purchase a used PEV. At the same time, the Legislature expanded the range of alternative fuel vehicles and public infrastructure eligible for state funding assistance. Revenue to support these new programs will come from an additional annual fee of $75 to be collected from PEVs and hybrid vehicles. To ensure these tax incentives and programs are provided beyond the current year, the Legislature dedicated revenue to these programs until July 1, 2025, when the additional fee revenue will be redirected to public roadway spending (similar to the gas tax and the $100 PEV fee). Either coincidentally or by design, this 2025 timeframe is the same period that many experts forecast that the cost to buy a new PEV will reach price parity with conventional gas-powered vehicles.

EXHIBIT 1.5
Cascadia Megaregion

1.3.2 *CASCADIA*: AN INTERCONNECTED ECONOMIC REGION WITH CROSS-BORDER TRAVEL

Two other prominent features of Washington state deserve mention at the outset. First, Washington (and more specifically, the Puget Sound area) is one of the jurisdictions that comprise the Cascadia megaregion.[19] A megaregion is a network of metropolitan regions that share similar environmental systems and topography, have interconnected infrastructure systems (like hydropower, rail, etc.), are economically interconnected, and sometimes share similar culture and history. There are 11 megaregions in the United States. The Cascadia megaregion includes Washington, Oregon, Idaho, and British Columbia, where the primary metropolitan areas of Seattle-Everett-Tacoma, Portland-Salem-Eugene, Spokane-Tri-Cities, and Vancouver-Victoria are located. The Boise metropolitan area is sometimes considered part of the Cascadia megaregion. Collectively, this region ranks 9th largest in North America as an interdependent center of commerce, culture, and mobility.

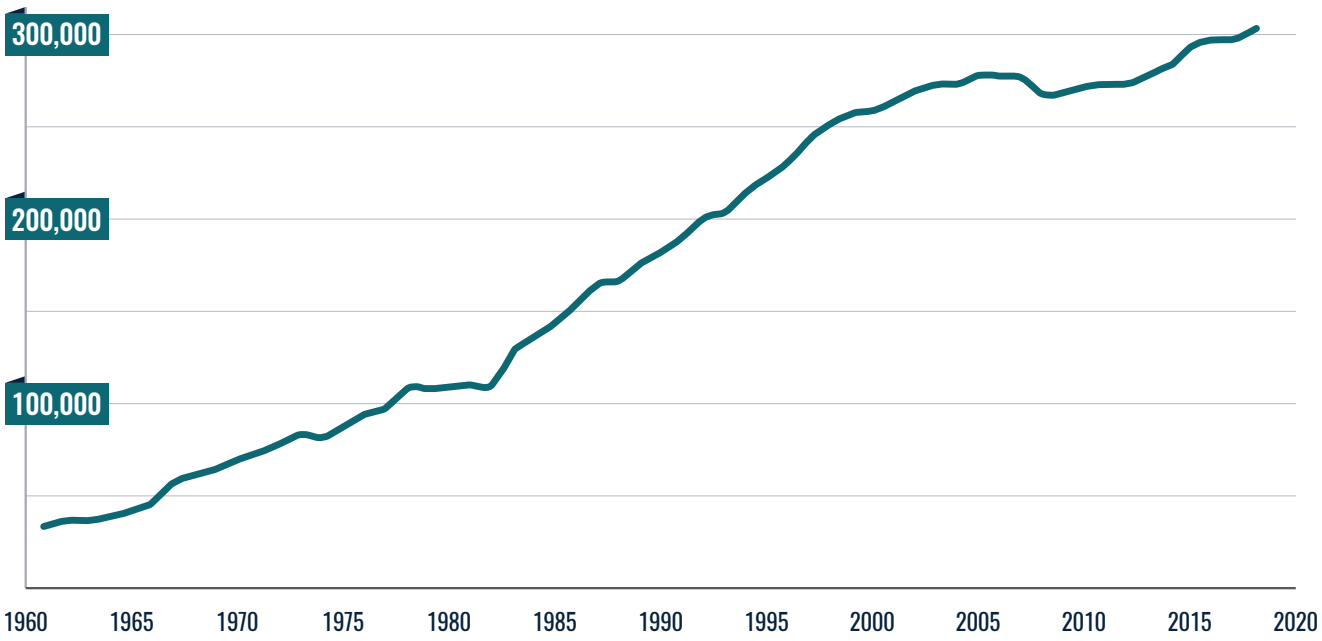
18 Engrossed Second Substitute House Bill 2042, 2019 Regular Legislative Session. Enacted as Chapter 287, Laws of 2019.

19 America 2050, a project of the Regional Plan Association, Transportation for America. Accessed August 13, 2019 at http://www.america2050.org/cascadia.html

Bordering two states (Oregon and Idaho) and the Canadian province of British Columbia, the number of cross-border travelers through Washington is higher than in many other parts of the US. For example, the Peace Arch border crossing in Blaine, Washington connects Interstate 5 with BC Highway 99 in Canada. This border crossing is the third busiest US/Canadian border crossing for passenger vehicles, with up to 4,800 cars per day.[20]

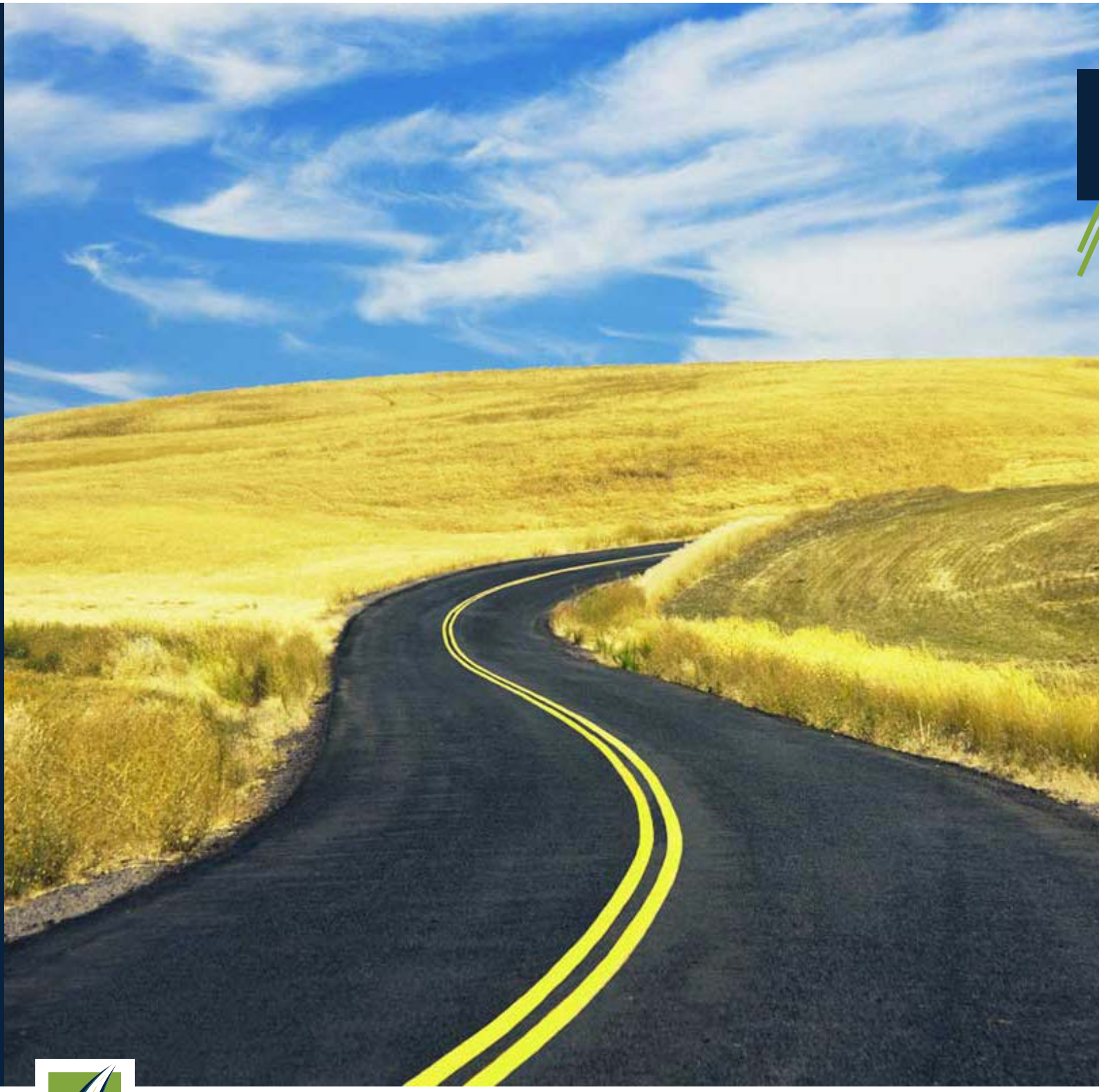
Along Washington's southern border, Vancouver, Washington is less than 10 miles from downtown Portland, Oregon. The US Census Bureau considers Vancouver, Washington and nearby Washington communities as part of the Greater Portland Metropolitan Statistical area. These two cities are separated by the Columbia River. Vehicle travel between the two areas is facilitated by the Columbia River bridges: the Interstate 5 Columbia River Bridge crossing, which most directly connects Vancouver with Portland; and the nearby I-205 (Glenn L. Jackson Memorial) Bridge crossing, which is about 8 miles to the east but still connects the greater Portland-Vancouver metropolitan area. Travel between the two states across these Columbia River bridges has increased every year since 1961 except for two years: 1974 (during the middle east oil embargo), and 2006 (during the great recession). Today, the average number of vehicle trips exceeds an average of 300,000 trips per weekday (see Exhibit 1.6).[21]

EXHIBIT 1.6
Change in Average Weekday Vehicle Trips Across Columbia River Bridges, 1961–2019



20 www.ezbordercrossing.com, Peace Arch Border Crossing. Accessed on August 13 2019 at https://www.ezbordercrossing.com/list-of-border-crossings/washington-state/peace-arch/

21 Historical traffic counts, Southwest Regional Transportation Council. Accessed on September 15, 2019 at https://www.rtc.wa.gov/data/traffic/bridges/daily.asp



chapter 2

GOALS & GUIDING PRINCIPLES

Early in its assessment of road usage charging, the Steering Committee recognized the importance of designing a system based on policy priorities rather than technology possibilities. To reinforce this, the Steering Committee adopted Guiding Principles for its assessment of RUC and, later, for its evaluation of the WA RUC prototype system. Ultimately, these principles also serve as a foundation for the design and implementation of a live RUC system.

Financial analysis, desktop models, and simulations provide useful but limited information. These tools lack the most important source of information to determine RUC's acceptability as a replacement to the state gas tax: motorists' reactions and preferences, based on direct experience. In accordance with the Guiding Principles for RUC, the WA RUC pilot allowed participants to experience a prototype system and offer their opinions on what works, what doesn't, and what must change before implementing RUC in the future.

key takeaways

1. Allowing Washington drivers to directly experience a pay-per-mile system and share their opinions on what matters most—and what must change in any future system—is the most important purpose of the pilot project.
2. As one of its first tasks in 2012, the Washington Road Usage Charge Steering Committee established Guiding Principles for a RUC system. These principles were developed to ensure that any future WA RUC system design is driven by public policy priorities and preferences, and not by technology capabilities or institutional interests.
3. The Steering Committee's Guiding Principles served as a common thread between the RUC assessment (2012-2016) and WA RUC pilot (2017-2019).
4. The Guiding Principles are also the basis for the Steering Committee's evaluation of the pilot test.
5. The State of Washington was awarded federal grant funding from FHWA to support all three Stages of the WA RUC Pilot Test, spanning 2016 through 2019. $8.4 million in federal funds covered system design and setup, live pilot operations, and analysis, evaluation and reporting to the WSTC, FHWA, the Washington State Legislature and the Governor's Office.

2.1 STEERING COMMITTEE'S GUIDING PRINCIPLES FOR RUC IN WASHINGTON

To ensure that its analysis and design remain driven by public policy priorities and preferences, and not by technology capabilities or institutional interests, the Steering Committee established Guiding Principles for a RUC system. These Guiding Principles served as the basis for the pilot's design and evaluation.

2.1.1 STEERING COMMITTEE'S ROLE IN WA RUC SYSTEM DESIGN

The legislatively created Steering Committee comprises transportation commissioners; legislators; public officials at the state, local and tribal levels; industry experts in transportation and technology, environmental and consumer advocates; and representatives of the motoring public.

As described in Chapter 1, the Steering Committee has led the RUC Assessment, including investigating the feasibility, costs, revenues, and policy implications of RUC since 2012. This work informed the pilot design, for which the Steering Committee provided direction on mileage reporting options; created recruitment targets to represent the diversity of Washington residents; measured the results and performance of the 12-month test drive; identified, analyzed, and provided guidance on a host of operational, administrative, legal, and policy issues related to a future RUC system; and generated findings and conclusions, and reported results of the pilot test to the WSTC.

2.1.2 GUIDING PRINCIPLES FOR A RUC SYSTEM IN WASHINGTON

Since its inception in 2012, the Steering Committee has been steadfast in its position that sound public policy must establish the boundaries for technology—not the other way around. To that end, at the outset the Steering Committee made clear that to achieve the vision of sustainable and equitable transportation funding in Washington, a revenue system must address the erosion of fuel tax revenues, and resolve equity issues related to who pays and who benefits from use of the system.

Over the course of its first several meetings in 2012, the Steering Committee embarked on a deliberative process to develop guiding principles for its exploration of a RUC. This began with a brainstorming session, followed by a survey of members, distillation of ideas, and further discussion.

At its June 2013 meeting, the Steering Committee unanimously adopted 13 Guiding Principles, set forth on the following page, for how it recommended implementing any transition away from motor fuel taxes and toward RUC. The Steering Committee reaffirmed these principles in December 2015 in advance of designing a pilot project.

The Steering Committee continuously referred to these Guiding Principles throughout its work, including in designing mileage reporting concepts, selecting evaluation measures for the pilot test, and assessing policy and system design alternatives for addressing unresolved questions.

guiding principles

- **Transparency.** A RUC system should provide transparency in how the transportation system is paid for.
- **Complementary policy objectives.** A RUC system should, to the extent possible, be aligned with Washington's energy, environmental, and congestion management goals.
- **Cost-effectiveness.** The administration of a RUC system should be cost effective and cost efficient.
- **Equity.** All road users should pay a fair share with a RUC.
- **Privacy.** A RUC system should respect an individual's right to privacy.
- **Data Security.** A RUC system should meet applicable standards for data security and access to data should be restricted to authorized people.
- **Simplicity.** A RUC system should be simple, convenient, transparent to the user, and compliance should not create an undue burden.
- **Accountability.** A RUC system should have clear assignment of responsibility and oversight and provide accurate reporting of usage and distribution of revenue collected.
- **Enforcement.** A RUC system should be costly to evade and easy to enforce.
- **System Flexibility.** A RUC system should be adaptive, open to competing vendors, and able to evolve over time.
- **User Options.** Consumer choice should be considered wherever possible.
- **Interoperability & Cooperation.** A RUC system should strive for interoperability with systems in other states, nationally, and internationally, as well as with other systems in Washington. Washington should proactively cooperate and collaborate with other entities that are also investigating RUC.
- **Phasing.** Phasing should be considered in the deployment of a RUC system.

2.2 OBJECTIVES OF THE WA RUC ASSESSMENT & PILOT

Allowing Washington drivers to directly experience a pay-per-mile system and share their opinions on what matters most—and what must change in any future system—is the most important purpose of the pilot project. The Steering Committee's Guiding Principles served as a common thread between the RUC assessment (2012-2016) and WA RUC pilot (2017–2019).

Having assessed the feasibility, business case, and operational design alternatives for a RUC system, in 2016, the Steering Committee recommended the creation of a pilot test to allow Washington drivers to experience RUC firsthand and provide feedback.

2.2.1 WHY CONDUCT A LIVE PUBLIC DEMONSTRATION OF RUC?

Recognizing an opportunity to tap into Washingtonians' desire for public involvement and active participation in developing potential transportation solutions, the Steering Committee decided on a large-scale public demonstration project as the best tool to gather public input on a potential RUC system. The pilot project could offer a mix of drivers throughout the state the opportunity to directly experience a prototype RUC system, yielding both operational and policy insights into what factors impact RUC acceptability.

The 12-month pilot project could also provide an opportunity to test administration of a RUC system. By monitoring the performance of the system and asking participants to periodically share their experience and opinions, the Steering Committee could discover additional operational and policy issues necessary to address before enacting RUC in Washington.

Primary pilot test objectives:

- **Gauge motorists' reactions and preferences** about a per-mile charge as an alternative to the gas tax, based on their direct experience with the WA RUC prototype.
- **Measure and assess public acceptance factors** to understand what matters most to Washington drivers and what must change in a future RUC system.
- **Test the WA RUC prototype under live operating** conditions to identify technical and operational issues that require further development and improvement.
- Based on driving data, operational reports and direct survey and focus group feedback from participants, **gather information so the Steering Committee and WSTC can make recommendations on a future RUC system** for Washington state.

2.2.2 FEDERAL INTEREST IN TRANSPORTATION FUNDING ALTERNATIVES

STSFA GRANT PROGRAM GOALS

In December 2015, as part of the federal transportation reauthorization bill (FAST Act), Congress created a federal grant program as an incentive for states to test new transportation user-fee systems.[1] The Surface Transportation System Funding Alternatives (STSFA) Program was established to provide grants to states or groups of states to demonstrate user-based alternative revenue mechanisms that utilize a user fee structure to maintain the long-term financial sustainability of highway funds. The STSFA program objectives are to:

- test the design, acceptance, and implementation of two or more future user-based alternative mechanisms;
- improve the functionality of the user-based alternative revenue mechanisms;
- conduct outreach to increase public awareness regarding the need for alternative funding sources for surface transportation programs and to provide information on possible approaches;
- provide recommendations regarding adoption and implementation of user-based alternative revenue mechanisms; and
- minimize the administrative cost of any potential user-based alternative revenue mechanisms.

1 Fixing America's Surface Transportation Act (FAST Act), Title VI, Section 6020 (hereafter cited as FAST Act § 6020).

This new STSFA grant program is administered by FHWA and provides funding for up to 50% of a state's pilot project costs. Over the five-year federal reauthorization period set to expire in 2020, a total of $95 million is available for the STSFA grant program. In the program's first year, federal fiscal year 2016, $15 million was awarded to states on a competitive basis.

WASHINGTON AWARDED STSFA GRANT FOR THE WA RUC PILOT PROJECT

In August 2016, FHWA announced $14.24 million in grants, with direct funding provided to six states (CA, HI, MN, MO, OR, WA) and two multi-state consortia (Western RUC Consortium and I-95 Corridor Coalition).

FHWA granted Washington $3.85 million for FFY 2016, representing 100% funding for all Stage 1 (pilot preparation and set-up) activities. Hawaii was the only other state to proposed carrying out a large-scale pilot. With Stage 1 funding secured and pilot set-up underway, in 2017 Washington applied for the next round of federal grants to fully fund the Live Pilot Test (Stage 2) and Evaluation (Stage 3) portions of the pilot project. Again, Washington was awarded an additional $4.6 million (full funding) to implement, evaluate, and report on the WA RUC pilot project.

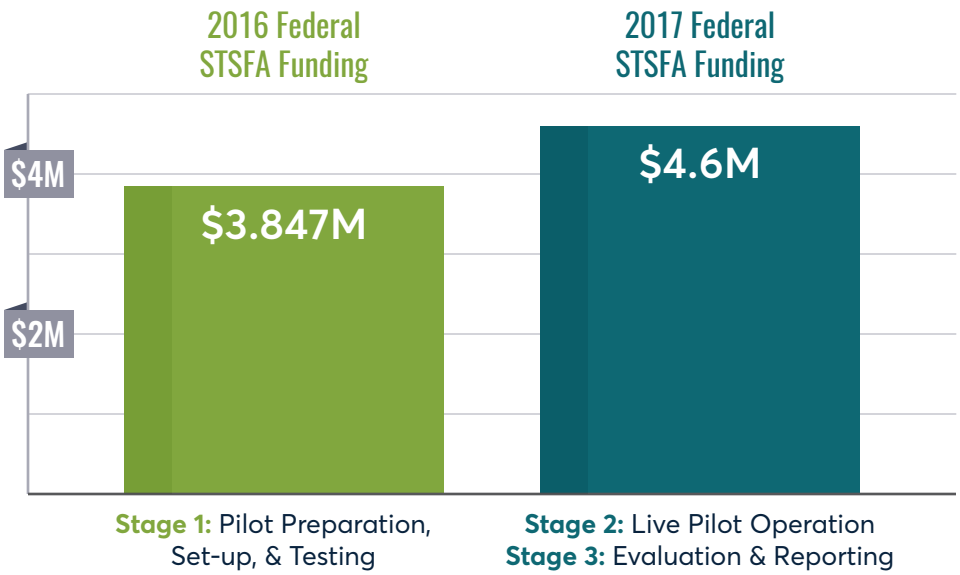


EXHIBIT 2.1
Surface Transportation System Funding Alternatives (STSFA) Grant Funding for WA RUC Pilot


Regular
87
Premium
92

chapter 3

DESIGNING & TESTING THE WA RUC PROTOTYPE

By directly engaging the public to understand their needs and expectations related to a possible RUC system, a prototype system was developed to provide ease of use, transparency, data security and privacy protection in mileage reporting. Drivers were offered choices in how to report their mileage—a design directive from the Steering Committee and also a hallmark of other successful RUC demonstration projects in the US.

Participatory design[1] principles were applied throughout development of the prototype system, from creating new mileage reporting methods, to designing consumer-oriented RUC invoices that illustrated differences between RUC and the state's current fuel tax.

To conduct the nation's first-ever live test of a multi-jurisdictional RUC system capable of transacting real cash and applying different mileage rates to different states, the project team collaborated with Oregon, Idaho, and British Columbia officials to develop the WA RUC Interoperability HUB.

After extensive end-to-end testing, the WA RUC prototype was readied for the year-long live pilot test.

1 Participatory design is characterized by a human-centered approach where different user profiles are invited into the design process and are given the opportunity to interact with product prototypes—users are encouraged to provide feedback and suggest ways to improve the end product and the user experience. In the pilot, system and product designers gathered insights and perspectives from users through focus groups and surveys to develop and test RUC invoice prototypes and the MileMapper smartphone app prototype before the final products were implemented.

key takeaways

1. As illustrated by the pilot, a range of technology solutions can be established based on policy guidelines. Thus, technologies that address drivers' primary reporting needs and provide effective support for RUC policy goals can be prioritized.

2. Choice is key to user acceptance. Providing a broad range of technology options to report mileage allows drivers to decide which trade-offs to make according to their needs, preferences, abilities, and sensitivities. Drivers who have privacy concerns can choose low- or no-technology options or no-GPS options, and drivers who wish to only pay for miles driven on taxable roads can use mileage reporting options with GPS. Drivers who need in-person assistance to report odometer readings can rely on a network of walk-in service centers, such as vehicle licensing offices.

3. Participatory design—involving users in the design of the end product—has shown to be beneficial. Using a participatory approach allowed the pilot team to develop and operate a stable version of a smartphone application in less than a year. The development team used feedback from users to continually refine and release improved versions of the smartphone app throughout the pilot.

4. Participatory design also allowed improvements to invoices before they were sent to participants. Users were invited to comment on the invoice prototypes during focus groups and surveys and that feedback improved invoice content and displays, which should have resulted in fewer invoice inquiries to the Helpdesk.

5. The pilot design and testing incorporated broad input representing different stakeholders' perspectives—the end user's perspective to ensure that the overall user experience would be positive and not burdensome; the technical perspective to ensure that systems and technologies would be robust, reliable, and respect security and privacy requirements; the customer support perspective to ensure that standard operating procedures would be respected, a quality service could be offered to users, and policy messages could be conveyed consistently; and the administrative perspective to make sure that systems and operations could be run as efficiently as possible in order to minimize administrative costs.

6. Conducting several rounds of testing helped uncover important system glitches that were corrected, which significantly stabilized the system and end-user processes before they were made accessible to a larger audience.

7. In 2015, the Steering Committee recommended that a rate of 2.4 cents per mile be tested in the statewide pilot project. That rate represents the amount per mile that the average Washington vehicle would pay if the State of Washington implemented a RUC system that raised the same total revenue as the gas tax does on the date of initial implementation. This gross "revenue neutral" rate does not reflect any legislative preference or policy direction. If RUC were implemented in the future, the Legislature would decide the actual per-mile rate.

8. Pilot testing revealed mileage reporting loopholes that present RUC evasion opportunities and will require counter measures to be implemented before the mileage reporting methods can be widely deployed in a RUC program. For example, smartphones would need to include a method to reliably identify the vehicle being driven.

3.1 DESIGN GUIDANCE FROM THE WASHINGTON LEGISLATURE & CONGRESS

Federal grant program requirements enacted by Congress echo most of the Guiding Principles that were used in the WA RUC Assessment and early design of the prototype system. The Washington State Legislature then set the final parameters for the Pilot Project Implementation Plan.

3.1.1 STATE LEGISLATIVE & FEDERAL SYSTEM REQUIREMENTS

During the 2016 legislative session, WSTC was appropriated $500,000 in federal funds to prepare a pilot project plan.[2] Along with this seed funding, the Legislature directed that the plan include:

- identification of all essential agency roles and responsibilities for the pilot project;
- a selection of the technologies and methodologies to be included;
- a target number of participants and participant characteristics;
- rigorous specific evaluation criteria by which the pilot project will be assessed;
- a communication plan for the pilot project that consists of a participant recruitment plan;
- a plan for communicating information about the launch and ongoing progress of the pilot project, and
- pilot project expenditure and revenue estimates.

The federal Surface Transportation System Funding Alternatives (STSFA) program contains several requirements that states must address in their projects.[3] Most (if not all) of these were already planned for examination by the Steering Committee, as reflected in their Guiding Principles and the accompanying evaluation measures. The Washington State Legislature also directed that the WA RUC pilot adhere to the design principles established by the Steering Committee.[4]

The federal STSFA program requires projects to address:

- the implementation, interoperability, public acceptance, and other potential hurdles to the adoption of the user-based alternative revenue mechanism;
- the protection of personal privacy;
- the use of independent and private third-party vendors to collect fees and operate the user-based alternative revenue mechanism;
- market-based congestion mitigation, if appropriate;
- equity concerns, including the impacts of the user-based alternative revenue mechanism on differing income groups, various geographic areas, and the relative burdens on rural and urban drivers;
- ease of compliance for different users of the transportation system; and
- the reliability and security of technology used to implement the user-based alternative revenue mechanism.

The federal program also allows or encourages (but does not require)[5] states to address:

- the flexibility and choices of user alternative revenue mechanisms, including the ability of users to select from various technology and payment options;
- the cost of administering the user-based alternative revenue mechanism; and
- the ability of the administering entity to audit and enforce user compliance.

2 ESHB 2424, Section 205, Laws of 2016.

3 FAST Act § 6020(d)(1).

4 See ESSB 6106, Section 205(1)(a), which provides in pertinent part: "The commission shall coordinate with the department of transportation to jointly pursue any federal or other funds that are or might become available to fund a road usage charge pilot project. Where feasible, grant application content prepared by the commission must reflect the direction provided by the road usage charge steering committee on the preferred road usage charge pilot project approach."

5 FAST Act § 6020(d)(2).

3.2 MILEAGE REPORTING METHODS FOR WASHINGTON DRIVERS

Policy guidelines oriented the decisions about which mileage reporting technologies to offer in the pilot. Mileage reporting options ranged from low (or no) tech to high-tech methods and reflected priorities related to technical performance, transparency, privacy protection, ease of use, and consumer choice.

3.2.1 MILEAGE REPORTING METHODS OFFERED TO PILOT TEST DRIVERS

Mileage reporting methods (MRMs) for the WA RUC pilot were designed and procured according to technical, usability, and administrative criteria that embodied the Guiding Principles adopted by the Steering Committee and the WSTC for the RUC pilot. The most relevant criteria for MRMs:

- **Transparency.** MRMs were required to have the capability to clearly disclose the basic data elements used to compute RUC. This included mileage driven, fuel consumed (estimated or measured), and applicable RUC and fuel tax rates. Participants choosing MRMs with GPS were shown a finer breakdown to help them understand how their road usage charges varied by location or trip.
- **Data security.** MRMs were required to have robust security mechanisms in line with latest industry standards to limit risk of participant data breaches, providing a measure of assurance to participants that their information was protected.
- **Privacy.** MRMs were required to respect strict requirements that support participants' right to privacy. Only data (other than mileage and fuel consumed data) specifically authorized by participants could be collected. The MRMs offered to participants in the pilot had to include a choice of non-GPS methods. Participants were informed that their data would be used for research purposes only, and that WSTC would not disclose any personally-identifying information without their consent.
- **Simplicity.** MRMs were required to be simple, quick to set up, convenient to use, and easy to understand to minimize the costs (time investment, hassle) imposed on the participant. Workflows to set up or activate methods had to be simple and seamless, provide a positive user experience in order not to tarnish the larger RUC evaluation efforts, and encourage compliance with mileage reporting requirements.
- **Cost-efficiency.** MRMs and their supporting systems were required to be reliable and simple to operate and administer so as not to consume an unreasonable proportion of pilot resources.
- **Choice.** Drivers have different levels of technology savviness, willingness to trust technology and constraints such as vehicle compatibility issues, equipment limitations, or limited cellular coverage. Providing drivers with mileage reporting choices that anticipate varying needs, constraints, preferences, and abilities has been a key determinant of user acceptance in previous RUC pilots in other states.

To support user choice, the Steering Committee decided that both high-technology MRMs (automated methods), and low- or no-technology MRMs (manual methods) should be offered in the pilot. Participants could choose between two service providers, and opt for automated methods with GPS (to allow miles driven on non-public roads to be deducted) or without GPS. They could also select manual methods that were either on a prepaid system where miles were charged at the start of an invoicing cycle or a postpaid system where miles were charged at the end of the invoicing cycle.

Automated and manual methods were required to operate on different invoicing cycles. Participants choosing automated methods received monthly invoices while those choosing manual methods received quarterly invoices. To determine RUC charges for miles driven by their vehicles, participants using manual methods took a photo of their odometer and submitted it to their service provider. If they were unable to do so, participants could go to one of eight participating vehicle licensing subagents for the Department of Licensing who could capture and

EXHIBIT 3.1
Mileage Reporting Options Offered to Participants

Mileage Reporting > Methods (MRMs)	Mileage Permit	Odometer Reading	Smartphone App (MileMapper)	Plug-in Device (with GPS)	Plug-in Device (no GPS)
Service Providers	2	2	1	2	1
Manual or Automated	Manual	Manual	Automated	Automated	Automated
Prepay or Post-pay	Prepay (upon acquisition)	Post-pay (quarterly)	Post-pay (quarterly)	Post-pay (monthly)	Post-pay (monthly)
Vehicle or Equipment Required	Smartphone (iPhone/ Android) or camera phone with internet browser	Smartphone (iPhone/ Android) or camera phone with internet browser	iPhone (iOS and higher)	Vehicles after 1996 Limited number of EVs	Vehicles after 1996
In-person Support	Vehicle Licensing Offices	Vehicle Licensing Offices			

submit their odometer readings on their behalf, using preconfigured smartphones. Exhibit 3.1 summarizes the mileage reporting choices offered to participants. Details regarding automated and manual mileage reporting methods are provided below.

AUTOMATED MILEAGE REPORTING

Automated methods use technology to automatically measure and report actual miles traveled by a vehicle. Two types of automated methods were offered in the pilot—plug-in devices and a smartphone app. Both methods were based on a post-pay system, in which miles driven were charged at the end of a mileage reporting period.

Plug-in Devices

Plug-in devices are one of the most mature and accurate technologies that have been used to collect RUC to date. They are specialized devices used in the usage-based insurance (UBI) industry since the late 1990s that have been continually upgraded. The devices are plugged directly into a vehicle's onboard diagnostic port (usually located under the vehicle's dashboard, beneath the steering wheel column) to retrieve mileage and, when available, fuel data collected by the vehicle's engine control unit. Fuel usage data collected by a plug-in device is more accurate than other methods as it is measured—not just estimated—for the vast majority of vehicle models currently on the road. Plug-in devices transmit data through the cellular network to the service providers' account management systems that process the data recorded to generate invoices.

EXHIBIT 3.2
Plug-in Device Provided in the Pilot

Both plug-in devices with GPS and without GPS were included in the pilot.

- Plug-in devices with GPS use GPS technology to determine location, and categorize miles driven in identified locations as taxable (public roads) or non-taxable (private roads, off-road, out-of-state). Taxable miles were charged at the RUC rate applicable in the jurisdiction where the miles were driven, while non-taxable miles were not charged.
- Plug-in devices without GPS were required to exclude all location-sensing technology or capability. The main reason for providing this method was to allow participants to benefit from the convenience of using a fully automated mileage reporting method with the assurance that their location data would not be collected. As there is no location differentiation capability, participants were invoiced for all miles driven, regardless of the roadway or jurisdiction.

From the end users' perspective, plug-in devices were generally seen as a quick and convenient method to report road usage information mainly because they did not have to perform any action other than driving their vehicle after initial setup. Action was only required in exceptional cases where a technical anomaly was detected requiring the device to be reinstalled.

However, plug-in devices have some drawbacks that need to be acknowledged, especially for a fully operational RUC program:

- Plug-in devices generally work on internal combustion engine vehicles manufactured in 1996 or later.[6] Plug-in electric vehicles are not required to follow the onboard diagnostic standard (OBDII standard). Thus, on electric vehicles with an onboard diagnostic port, location information is the only way to measure miles traveled with a plug-in device, instead of calculating distance using onboard diagnostic data (as is done with conventional vehicles). The Tesla 3 was offered without any onboard diagnostic port, which reinforces the need to offer other less prescriptive mileage reporting methods in a fully operational future RUC program.
- The devices are costlier than other methods, as plug-in device costs include the cost of the device, inventory management and distribution costs, and communications (cellular data) costs.
- Some individuals expressed privacy and security concerns in prior RUC pilots because they perceived the devices to be somewhat intrusive as they must be directly plugged into the vehicles.
- The start of active mileage reporting is generally later than for other methods because participants must wait several days after account creation to receive their device in the mail. After receipt, participants must install it to start reporting mileage. Any miles traveled before the device is installed will not be reported.
- Device unplugs, whether intentional or not, may result in revenue loss and are thus important to address in a RUC program. Devices may be removed for a variety of reasons—they can be removed at the mechanic's shop for an emissions check or a vehicle diagnostic session, or drivers may remove the device when their vehicle is not used for a long period. Drivers may neglect to replace the device before driving the vehicle again. Service providers in the pilot detected device unplugs and followed up with participants who left devices unplugged for more than two weeks to reduce the risk of missing mileage. In a RUC program, an additional measure to avoid revenue loss through device unplugs is to require drivers using plug-in devices to report an annual odometer photo.

Smartphone Applications

Smartphone applications (app) with GPS have had very limited testing in RUC pilots and programs to date. Smartphone apps are generally one of the most inexpensive, convenient, and non-intrusive ways to collect mileage automatically. The app is downloaded to a participant's smartphone which avoids the need for acquiring and distributing an additional device and incurring cellular communications costs to administer RUC. Furthermore, participants do not need to wait for device delivery and installation, which means that they can immediately start reporting their mileage, minimizing potential RUC revenue impacts between account creation and account activation.

Despite the above characteristics, prior smartphone apps have been somewhat disappointing for RUC mileage reporting because as a stand-alone mileage reporting method, the apps have struggled to accurately and independently identify the vehicle being driven. It can also be difficult to distinguish driver or passenger roles in a vehicle. Furthermore, smartphone apps can use significant amounts of battery energy and cellular data.

WA RUC SMARTPHONE INNOVATION CHALLENGE LEADS TO DEVELOPMENT OF MILEMAPPER

Given the relatively low maturity of available smartphone solutions, the Steering Committee elected to have a smartphone app specifically developed for the pilot project to attempt to address some of the drawbacks. The development started with a Smartphone Innovation Challenge,[7] a collaborative effort organized with the University of Washington. Student teams used a human-

6 All cars and light trucks built and sold in the US after January 1, 1996 were required to be OBDII equipped. Only a limited number of 1994 and 1995 vehicles are OBDII equipped.

7 See Appendix A-1, WA RUC Smartphone Innovation Challenge Final Report.

centered approach to design and prototype a smartphone app based on policy and functional guidelines provided by the WA RUC project team. The prototype was used to specify and develop MileMapper, the smartphone app that would be available for WA RUC participants equipped with iPhones.[8]

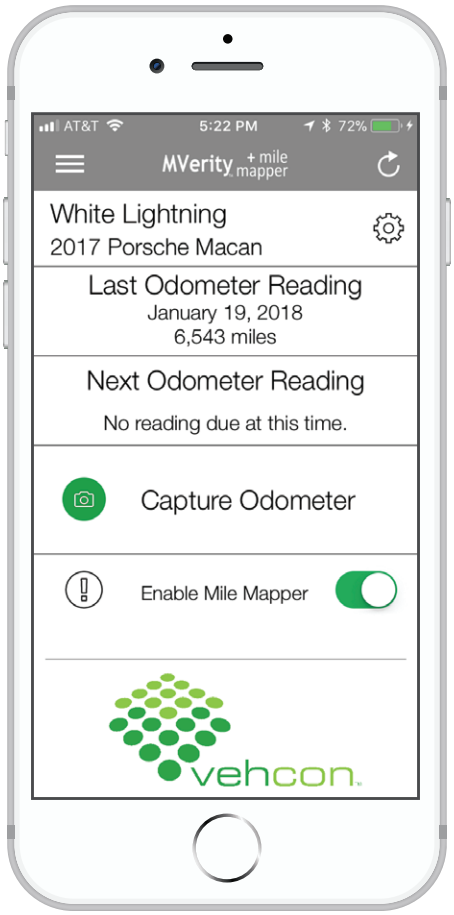
MileMapper measures location through iPhone location services (GPS) and movement of a vehicle over a period of time through the iPhone accelerometer. The app featured a toggle switch that allowed the participant to turn the GPS function on or off on the home screen of the app. The GPS was set to "off" by default on the app, which meant that all miles driven were considered to be taxable unless participants deliberately turned the GPS function on. Participants could choose to use GPS as they saw fit—either at all times or only when they were driving out of state or off public roads.[9] When the GPS function was on, the app essentially "tagged" miles driven out of state or off public roads as non-taxable miles. These non-taxable miles were deducted from the total number of miles recorded. Once the participant installed and logged into MileMapper, it started recording miles independently in the background, and transmitted that mileage data to the service provider's system over the cellular network.

MileMapper cannot reliably determine the specific vehicle being driven and driver/passenger roles because there is no straightforward solution to establish a connection between the smartphone and the vehicle without installing supplemental electronic tags or equipment. This means that an excessive number of non-taxable miles could potentially be deducted from the total number of miles recorded if the driver travels out of state or off public roads in another vehicle with the GPS option turned on. Thus, the MileMapper MRM was categorized as a "Lab" or beta version of an MRM to be tested in the pilot, since vehicle verification will be important to prevent mileage reporting fraud in a future full-scale RUC system.

Since MileMapper is not paired to a specific vehicle, the mileage can be potentially overstated (if the smartphone is traveling in another vehicle) or missed (if the smartphone is not in the vehicle at the time of taxable travel). To address this issue, the MileMapper app included an odometer image-capture function that reminded participants to capture and submit odometer readings at the start and end of each month. These odometer readings were used to "true-up" the miles automatically collected to avoid missing miles or collecting miles that were unrelated to the enrolled vehicle.

The need to report periodic odometer readings meant that MileMapper was not fully automated—it required that reminders be sent to encourage participants to comply with reporting requirements.

EXHIBIT 3.3
MileMapper Smartphone App



8 Due to time constraints, it was not possible for the pilot team to provide a mature version of the MileMapper smartphone app for Androids smartphones.

9 The MileMapper smartphone app was not capable of distinguishing private or off-road miles from public road miles, but the plug-in devices were capable of distinguishing such miles.

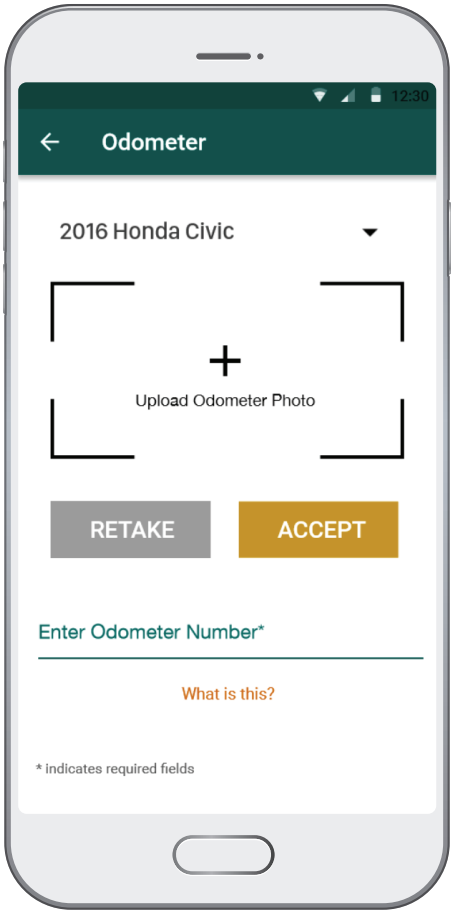
MANUAL MILEAGE REPORTING

Manual methods are the least intrusive of all MRMs as they rely entirely on official odometer readings reported by participants through an approved odometer-capture function. Odometer images captured and vehicle identification information were submitted to a back office where the vehicle and odometer mileage information was processed and verified, thus ensuring only reliable and verified odometer images are used to determine miles traveled and subsequent RUC charges. This approach to submitting odometer readings to determine RUC charges offered a viable and relatively easy way for participants to report mileage driven. More importantly, it offered an alternative method to drivers who did not wish to plug in a device in their vehicle or use GPS to participate in a RUC pilot.

Two manual methods were specified in the pilot, the mileage permit and the odometer reading. Both methods used the same odometer-image capture mileage reporting mechanisms by which all miles reported are charged, as there is no GPS or other location technology used to differentiate taxable from non-taxable miles.

- **Mileage permits** are based on a prepay system in which drivers pay in advance for a specific number or block of miles, which in the WA RUC pilot could be 1,000 miles, 5,000 miles or 10,000 miles. The cost for the mileage block is the net road usage charge determined by the per-mile rate times the number of miles driven, then minus a credit for fuel taxes that are calculated to have been paid by the same vehicle based on federal government MPG ratings for that specific vehicle. The net cost of the mileage permit was capped at $0—in other words, a mileage permit could not have a negative value. Thus, in situations where the fuel taxes paid exceeded the amount of road usage charges owed, pilot participants were not entitled to tax refunds in advance of actual travel. Participants were required to submit an official odometer reading, both at the time of acquiring a mileage permit and at the end of every quarterly driving period. The mileage permit was not valid until the odometer reading was submitted. Participants were required to submit quarterly odometer readings that allowed service providers to verify that the permit was still valid. When participants approached or exceeded permit limits based on the number of miles reported, they received quarterly reminders from the service provider to renew their permits and could select any mileage block to renew their permit. Participants were responsible for acquiring a new permit when their current permit was exhausted so as not to drive beyond permit limits.
- **Odometer Readings** are based on a post-pay system where participants report official odometer readings every quarter, and receive a quarterly invoice based on the mileage reported. Participants received notifications to submit their initial and quarterly odometer readings. The mileage of participants who failed to report their mileage during a reporting period was carried forward and added to the next invoicing period for which they submitted a reading.

EXHIBIT 3.4
Example of Odometer Image Capture for Reporting Mileage in the WA RUC Pilot



There were two solutions[10] to capture odometer readings in the pilot. One was to use an odometer-capture feature through a smartphone app, in which case participants needed a smartphone with a camera. The second was based on text messages sent to the participant's phone. The text messages included a link to a webpage that had an odometer-capture function. Participants using this text-based solution could use any phone with a camera (not necessarily a smartphone) and internet access.

Participants who did not own or wish to use smartphones or mobile phones with cameras could visit one of the eight selected Department of Licensing's vehicle licensing offices (VLOs) (subagents) that partnered with the pilot project to support mileage reporting. VLO customer service personnel verified participants' identities and provided them with specially enabled WA RUC smartphones that were loaded with the odometer-capture solution to capture and submit odometer readings.

The main drawback of manual methods is that they require regular reporting efforts from drivers and significant monitoring efforts to ensure participants were compliant with mileage reporting requirements. The WA RUC system was designed to send automated regular notifications to remind participants to report their miles—participants could receive emails and text reminders that included web links to the image-capture function or in-app notifications.

NON-MILEAGE RUC (TIME PERMIT)

A time permit would be a flat amount drivers would pay to allow them to drive unlimited miles over a specific time period (e.g., one week, one month, or one year), without reporting specific mileage information. Prior to the WA RUC Pilot, the Steering Committee recommended inclusion of a time permit in any prospective RUC program, for several reasons:

- The time permit does not require advanced technology or even mileage reporting. It requires the least effort and information from motorists, making it especially appropriate for those concerned with privacy.
- The time permit works for all vehicles, even those without functioning odometers.
- The time permit offers a fallback method in case of failure to record odometer readings or suspicion of fraud.

Despite support for offering a time permit in an actual RUC program, the Steering Committee elected not to include this reporting method in the WA RUC pilot. Since time permits closely resemble registration fees, with which drivers and the state possess ample familiarity, the Steering Committee deemed feedback on this method in a pilot to be of relatively little value compared to other methods.

Time permits can serve two distinct markets: long-term time permits (for example, one year) primarily serve in-state residents and short-term time permits (for example, a few days or one week) primarily serve out-of-state visitors.

The Steering Committee considered several approaches to pricing a time permit, all fundamentally based on multiplying an assumed number of miles by the per-mile rate. Regardless of price, time permits introduce a revenue risk: large numbers of high-mileage drivers choosing a time permit to avoid paying for all miles driven. Mitigating this risk requires a relatively high price for time permits. For example, setting the price of a time permit at the mileage equivalent of the 98th percentile (approximately 30,000 miles) gives only 2% of vehicles (those that drive more than 30,000 miles) the opportunity to avoid paying for miles by purchasing a time permit.

While the Steering Committee opted not to include a time permit in the pilot, this method is an appealing offering alongside mileage reporting options in any potential future RUC program, with rates set at appropriate levels to discourage gaming the system, while avoiding a potential constitutional issue.

10 DriveSync participants had to use the app to capture odometer readings, while emovis participants could use the text-based solution.

3.3 RUC SERVICE PROVIDERS IN WASHINGTON

The private sector can deliver important services in a future RUC system, including providing mileage reporting devices, mileage accounting and payment services, and customer support. WA RUC test drivers were offered a choice between two different service providers.

3.3.1 THE IMPORTANT ROLE OF SERVICE PROVIDERS IN A RUC SYSTEM

The way in which a RUC system is delivered will impact costs, the timetable for system implementation, risks, and complexity. By procuring one or more private sector entities for delivery, the government can assure the availability of necessary personnel, expertise, and systems. Using more than one private-sector provider introduces competition into delivery. Competition among service providers has the potential to reduce the cost of delivery while increasing the innovation and effectiveness of technologies and systems for RUC. Configuring delivery of a RUC system through an open commercial market of private-sector service providers makes the competition perpetual.

Using private-sector service providers to deliver RUC goes beyond theory. The use of private-sector service providers for delivery of a RUC system has already occurred for RUC pilots in California, Colorado, Delaware, Oregon, and Pennsylvania. Indeed, the rudiments of an open commercial market for RUC services have already appeared in Oregon's operational ORe*GO* program which currently has two commercial account managers under contract, one of whom is also under contract for services for Utah's impending operational RUC program.

3.3.2 MITIGATING PROJECT RISKS THROUGH PROCUREMENT & CONTRACTING

After developing the technical documents for the WA RUC pilot, potential risks to the successful delivery of the pilot project were identified including technical, operational, legal, policy, administrative, fiscal, and communications-related issues. With this knowledge, procurement documents were drafted and the project and contract requirements from industry partners specifically accounted for the risks identified through the work session. The final selection and contracting of partners to carry out the WA RUC pilot project reflected vendors' experience, capacity, skill, and approach to manage the risks identified by the project team.

Two firms were procured to provide mileage reporting technologies, mileage accounting, invoicing, and payment processing for the pilot. Another specialized software firm was selected to develop customized software and systems to operate the WA RUC HUB—the clearinghouse for all mileage reporting, processing and payment for out-of-state miles that would be tested among Washington, Oregon, Idaho, and British Columbia.

3.3.3 WA RUC SERVICE PROVIDERS INVITED TO PARTICIPATE IN THE PILOT

Service providers refer to private sector firms under contract to the State to administer participant-facing RUC accounts. RUC service providers distribute mileage reporting technology to participants, collect data from participants, prepare periodic RUC invoices, collect payments from participants, and send collected data and revenue to the State. In the pilot, only a small number of participants in the Oregon-Washington Interoperability Payments Demonstration paid real money for miles driven to fully test interstate travel reconciliation functions between states.

In reviewing service delivery capabilities between state government and the private sector, the following is noted:

- RUC service providers can offer the latest technology in mileage reporting options when it comes to the plug-in devices and smartphone apps.
- The time permit method could easily be administered by a state agency.
- Either the State or RUC service providers could administer mid-level technology options, such as the odometer reading.

In the WA RUC pilot, Service providers supported five mileage reporting options. The pilot included two service providers: **DriveSync** and **emovis**.

DriveSync is the consumer-facing brand of Intelligent Mechatronic Systems Inc (IMS), now part of Trak Global. **Emovis** is the service delivery and technology arm of Abertis. Both firms partnered with system providers and technology providers to deliver WA RUC services.

For the WA RUC project, IMS partnered with A-to-Be to deliver DriveSync solutions. DriveSync provided all five mileage reporting options, including a range of value-added services available on the DriveSync app. DriveSync supported the eight vehicle licensing offices (VLOs) that participated in the pilot. Participants who used either the odometer reading or the mileage permit reporting options but lacked or preferred not to use their own phone, could go to any of the eight participating VLOs to complete their mileage reporting.

DriveSync enrolled the largest numbers of vehicles and supported additional pilot tests: in addition to participants from Washington, DriveSync supported participants in British Columbia, Canada, and Idaho. DriveSync also supported the Washington state participants in the Payments Demonstration, in which select participants from Washington paid real money for their miles.

EXHIBIT 3.5
Mileage Reporting Options Supported by Service Providers

Mileage Reporting Methods	DriveSync	emovis
Mileage Permit	✓ (VLO support)	✓
Odometer Reading	✓ (VLO support)	○
Smartphone Mileage Meter	✓	○
Plug-in Device (with GPS)	✓	✓
Plug-in Device (no GPS)	✓	○

For the WA RUC pilot, **emovis** partnered with ClearRoad and Nexedi. ClearRoad provided mileage reporting support, and Nexedi provided account management software support for delivery of the emovis solutions. Emovis provided three mileage reporting options: the plug-in device with location, the mileage permit, and the odometer reading. For the plug-in device with location, emovis used the Automatic™ device, the first use of a retail off-the-shelf plug-in device in a RUC pilot. The Automatic device provided a range of value-added services to participants, and once linked with an emovis account, provided data for mileage reporting as well.

Due to the unique challenges[11] of integrating a retail device into a RUC pilot, emovis began enrolling participants about one month after DriveSync and, consequently, enrolled fewer participants.

11 The emovis RUC system experienced two challenges with the Automatic device in pre-launch testing. First, the devices require activation with a smartphone. This in turn required participants to use a smartphone and complete additional steps to fully enroll in the pilot, as many as 15 minutes more. Moreover, device activation could only be completed in locations with cellular data coverage. Secondly, emovis required participants to actively link their Automatic accounts to their emovis account at the start of the pilot, and each time the participant changed the associated password.

3.4 WA RUC INVOICES

The need to display and clearly communicate the potential cost differences between RUC and the current gas tax was enhanced with consumer-centric design principles to develop WA RUC invoices that provided meaningful information and insights to pilot participants.

3.4.1 WA RUC INVOICE DESIGN

Invoices primarily serve as a record of amounts due and transactions between parties for accounting or tax purposes. However, for a RUC pilot, invoices offer more than that. Since motorists never see invoices or receipts for gas taxes, they rarely experience transactions with road system owners and operators (tolls being a notable exception in the Puget Sound area).

Invoices are the most important, tangible opportunity to communicate meaningful information about RUC and its impacts to motorists in a personalized manner. Given the importance of invoices, the WA RUC project team developed attractive, user-friendly invoices containing information and insights for motorists. Working with designers and engineers, the RUC service providers produced distinct invoices for their customers for each mileage reporting option. The invoices conveyed not only information about the customer's own vehicle and charges,[12] but also comparisons to what that vehicle paid in gas taxes, comparisons to average vehicles, and trends over time.

Providing a more detailed document than a simple statement of charges had benefits beyond communication and raising awareness. Pilot evaluation surveys included questions that referred directly to participants' understanding of their invoices and the RUC concepts conveyed therein. Clear and informative invoices helped improve the level of participant engagement with the pilot and also the quality of their feedback.

3.4.2 DELIVERY OF INVOICES TO DRIVERS & "PAYMENT" OF RUC

Most participants in the WA RUC pilot received mock invoices, meaning they owed no real money. However, 25 participants volunteered to pay with real money to support the interoperability HUB demonstration with Oregon. These participants received invoices that they paid with a debit or credit card through the DriveSync web portal.

All participants received a RUC invoice either monthly (plug-in devices, smartphone app) or quarterly (odometer reading, mileage permit). The plug-in device and smartphone app had a greater amount of information than the odometer reading and mileage permit, so presenting this information to participants each month provided more value. The odometer reading and mileage permit required participants to actively submit odometer images in order to generate invoices, and the team decided to require participants on these mileage reporting options to submit images quarterly.

Service providers sent invoices for each calendar month or quarter of driving activity, regardless of enrollment date. Both service providers sent invoices between five and ten days following the conclusion of the calendar month(s) they included. Although service providers could send invoices in a live RUC program on a rolling basis (similar to credit cards and utilities), sending all invoices monthly streamlined the quality assurance process for pilot participants.

12 The invoice indicated the total miles reported for the billing period, the RUC charges incurred (determined by multiplying the RUC rate of 2.4 cents per mile by the total miles reported), and the amount of fuel taxes paid during the billing period.

DRIVESYNC®

WA RUC

EXHIBIT 3.6
Monthly Driving Invoice from the WA RUC Pilot Project (Plug-in Device with GPS)

6/4/18 Invoice date	5/1/18 - 5/31/18 Invoice period	INV----- Invoice number

Mercedes-Benz ML350 4matic — Plug-in Device

Odometer Reading

Day	Odometer Reading (mi.)	Reading Type	Distance Driven (mi.)

Charges

Jurisdiction	Distance Charged (mi.)	Distance Not Charged (mi.)	RUC Rate ($/mi.)	Road Usage Charge ($)	Gas Consumption (gal.)	Gas Tax Rate ($/gal.)	Gas Tax Credit ($)	Net RUC ($)
All other miles	**16.7**	**0.0**	**0.024**	**0.38**	**0.86**	**0.494**	**(0.36)**	**0.02**
WA	**1,092.0**	**5.1**	**0.024**	**26.20**	**55.59**	**0.494**	**(27.41)**	**(1.21)**

(1.19)
Total ($)

Invoices showed whether participants owed money or earned a credit, based on their estimated or measured fuel tax paid.[13] Graphs on the invoices illustrated the participant's historical monthly usage and how the participant compared to a typical Washington driver. The invoices also contained a special message in instances of no recorded activity, such as if a participant failed to keep their device plugged in or submit an odometer image.

13 Participants received a credit for fuel taxes paid. The difference between the fuel tax credit and RUC charges incurred determined if the participant either owed anything to the pilot (because they paid more RUC charges than fuel taxes for the miles driven) or received a credit from the pilot (because they paid more fuel taxes than RUC charges based on the miles driven). The determination of owing a net charge or receiving a credit is driven by the participant vehicle's MPG as compared to the state average 20.5 MPG (used to set the pilot revenue neutral RUC rate)—vehicles that get the state average MPG paid 2.4 cents per mile under the 49.4 cent fuel tax; vehicles with a higher than state average MPG paid less than 2.4 cents per mile and would thus have additional RUC charges on their invoice; and vehicles with a lower than state average MPG paid more than 2.4 cents per mile and would thus get a credit on their invoice.

EXHIBIT 3.7
Quarterly Driving Invoice from the WA RUC Pilot Project (Odometer Reading)

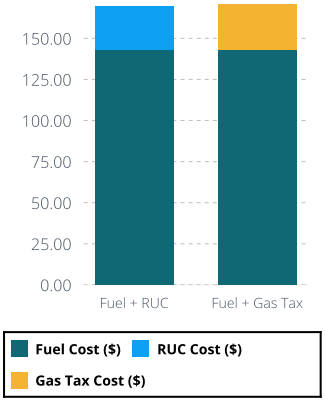
DRIVESYNC®

WA RUC

6/4/18	5/1/18 - 5/31/18	INV-----
Invoice date	Invoice period	Invoice number

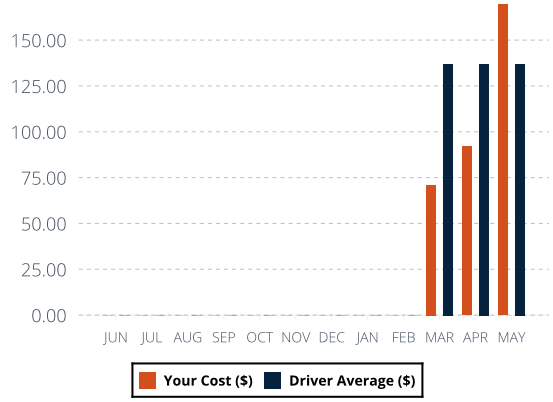
Your Current Usage Costs

RUC vs Gas Tax Comparison



Your Usage Costs History (Fuel + RUC)

You vs Average Washington Driver



Other Information

All amounts are in U.S. Dollars.

To view your invoices, payment history, and daily mileage or odometer readings, please visit our site at: waruc.drivesync.com.

Have you added or sold a vehicle recently? Please contact Customer Care so we can keep your account up to date.
For all customer inquires, please call or TTY Customer Care toll-free at 1-866-534-7243 or e-mail us at support@waruc.drivesync.com

Thanks for your participation in the Washington Road Usage Charge Pilot Project as we test drive the road ahead.

3.5 DEVELOPING THE WA RUC INTEROPERABILITY HUB

In order for RUC to become a viable long-term replacement for the state gas tax, the system must collect and accurately process mileage from drivers from out of state. WA RUC designed and tested a clearinghouse "HUB" to most efficiently and accurately meet this requirement.

The WA RUC pilot sought to develop and test the nation's first accounting and reconciliation of real funds through a central clearinghouse (known as the "HUB") for distances driven and RUC charges paid across multiple jurisdictions. WA RUC and Oregon's road usage charge program ORe*GO* collaborated in the recruitment and enrollment of participants in each state who drive regularly in the other state. The two states also collaborated on data reporting to the HUB for purposes of simulating multi-jurisdictional RUC reconciliation. Separately, WA RUC collaborated with the Idaho Transportation Department and the City of Surrey, BC, to recruit and enroll participants from those jurisdictions to experience simulated charging and payments, as well as simulated reconciliation of funds across multiple jurisdictions through the HUB.

Oregon participants who opted into the interoperability test continued their participation in ORe*GO* without interruption. The only change was charges for miles driven in Washington on their accounts at the Washington rate of 2.4 cents per mile.[14] Since Oregon participants use pre-paid accounts, the charges corresponding with Washington miles were funded by the participants' account manager, Azuga. Likewise, a select group of Washington participants using the account manager DriveSync opted in to pay real funds. Each month, they paid the net RUC due for Washington miles (at 2.4 cents per mile) and Oregon miles (at 1.7 cents per mile). Through the HUB, RUC account managers have the capability to reliably and accurately charge motorists for driving in multiple jurisdictions. For participants, beyond understanding a more comprehensive billing statement, paying RUC to multiple jurisdictions requires no additional effort compared to a single jurisdiction RUC.

For jurisdictions, however, reconciling RUC across borders does require additional effort. To address this gap in RUC systems capabilities, WA RUC designed and built a HUB consisting of: jurisdictional rules and reporting requirements, a database, regular report specifications for summary output data, and a process for exchanging funds with stakeholders.

- **Jurisdictional rules and reporting requirements.** The HUB design sought maximum flexibility in allowing each jurisdiction to design a RUC programs to its preferences. The HUB merely required each participating jurisdiction to report data in monthly. For WA RUC, the defined format of the data reporting consisted only of total miles driven by jurisdiction. Since both Oregon and Washington used existing open data standards that defined jurisdictions similarly, the HUB required no changes. Jurisdictions must also report their charge rates whenever there is a change.
- **HUB database.** The HUB database receives and stores monthly aggregate travel reports from each participating jurisdiction. The data lack personally identifiable information. The HUB database accepts incoming data from any jurisdiction in a variety of formats, including automated inputs using simple software script.
- **Periodic summary output reporting.** Based on the data received, the HUB database produces periodic reports (monthly and quarterly) summarizing travel data across jurisdictional boundaries in a matrix format. These summaries reflect miles driven by participating vehicles in any one jurisdiction in every other jurisdiction, as well as RUC amounts due based on applicable per-mile RUC rates.
- **Exchanging funds.** Based on the periodic HUB reports, WA RUC exchanged real funds collected from Oregon and Washington participants through a simulated HUB account and simulated treasuries for the two participating jurisdictions.

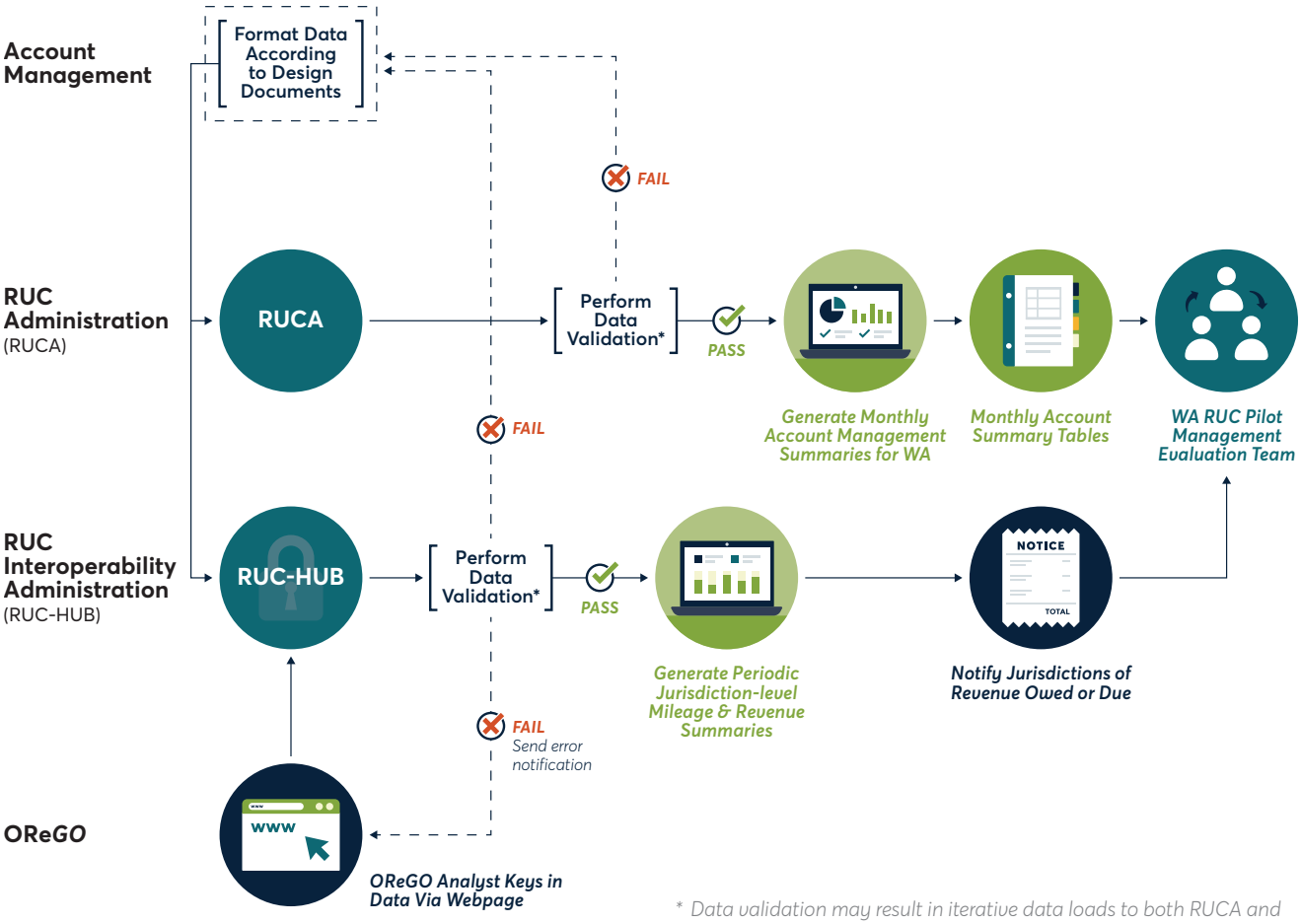
14 The Steering Committee recommended the rate of 2.4 cents per mile to be tested in the statewide pilot project. The rate represents the amount per mile that the average Washington vehicle would pay if the State of Washington decided to implement a RUC system that raised the same amount of total revenue as the gas tax does on the date of initial implementation. This gross "revenue neutral" rate does not reflect any legislative preference or policy direction. If RUC were implemented in the future, the Legislature would decide the actual per-mile rate.

The WA RUC HUB represents an open, multi-lateral tool for easily addressing RUC (and other funding mechanisms) across two or more jurisdictions. The HUB can accommodate reporting by one or more state agency, RUC account manager, or any other public or private entity. Utilizing the HUB has several benefits:

- it does not require numerous bilateral agreements between jurisdictions;
- it is independent of RUC account managers; and
- it has the capability to perform selected data management functions potentially reducing participating states' RUC administration costs.

Interjurisdictional challenges that the pilot HUB design did not address include legal authority for collection and remittance of other states' RUC, ownership and governance of the HUB itself, and the structure of the HUB entity, should one evolve.

EXHIBIT 3.8
Diagram of the Interoperability HUB Tested in the WA RUC Pilot Project



* *Data validation may result in iterative data loads to both RUCA and RUC-HUB database by account managers.*

3.6 PRE-LAUNCH WA RUC SYSTEM TESTING

A pilot strives to offer participants a simulated experience of a system that is as close to reality as possible. Although not as rigorous as a live RUC system, the WA RUC pilot underwent extensive pre-launch testing to reduce glitches and improve the overall experience to approximate what a motorist might expect from a live system.

3.6.1 DEVELOPMENT & TESTING OF MILEAGE REPORTING METHODS

Development efforts were dependent on the extent to which technologies already met requirements for accurate, secure mileage reporting for RUC purposes. Technologies like plug-in devices used by the insurance industry or smartphone odometer-image capture functionality required little to no development, as they met all RUC requirements and enjoyed successful prior deployments on RUC pilots and programs. However, the Automatic off-the-shelf commercial device required substantial development to integrate with the service provider's mileage reporting system.[15] MileMapper, the smartphone app, required the most development as it was purpose-built for the WA RUC pilot.

Four types of technical tests were established—unit tests, basic integration tests, full system integration tests and end-to-end tests. A series of user-oriented tests were conducted that included all user interfaces, workflows and communications, and helpdesks to address any remaining user experience issues before launch.

The pre-launch testing effort needed for each mileage reporting option depended on its level of maturity, accuracy, and usability. The MileMapper app and the Automatic plug-in device were classified as "Lab" (or beta version) methods given their low level of maturity and lack of prior RUC deployments, resulting in extensive testing. Pre-launch tests aimed to ensure that service providers' systems and technologies complied with system requirements, and were ready to deploy from both a technical and user experience perspective.

Exhibit 3.9 on page 39 summarizes the testing effort for each mileage reporting option.

- **The manual methods—**mileage permit and odometer reading—are low technology methods with frequent touchpoints with participants who received multiple text and/or email notifications and periodically reported their mileage through an odometer image-capture functionality. Testing focused on participant workflows to ensure a reasonable yet effective reminder frequency and synchronization of communications coming from two separate sources (the service provider's system and the technology provider's system). Significant resources were devoted to testing the timing, frequency, sequencing, and content of odometer notifications and reminders as they directly impact compliance levels.
- **Vehicle licensing office (VLO)** reporting was also tested prior to launch. Tests verified that the process from participant check-in at a VLO through to odometer-image capture and submission through the smartphone worked, that the systems successfully transmitted images, and that the back office correctly processed images.
- **Plug-in devices** used in the insurance industry (supported by DriveSync) had the most mature technology, previously shown to feature high accuracy rates in the Oregon and California RUC pilots, and in other applications. Tests mainly focused on consistency of the look and feel (branding, graphics), and content displayed on the user interfaces (website and the optional companion smartphone app).
- **Automatic™ branded plug-in device** (supported by emovis) tests focused on the new developments to integrate the separate Automatic application with the service provider's online participant enrollment workflow to ensure a smooth and quick enrollment

15 The Automatic device required activation with the Automatic application installed on the participant's smartphone and required that the participant link their Automatic account to their emovis account.

pre-launch wa ruc system testing

EXHIBIT 3.9
Testing Effort According to Maturity, Accuracy, & Usability

Mileage Reporting > Methods	Mileage Permit	Odometer Charge	Manual Reporting Support (Vehicle Licensing Offices)	Smartphone Application (MileMapper)	Plug-in Device (with & without GPS)	Automatic™ Plug-in Device (with GPS)
RUC Certified	Yes	Yes	No	No	Yes	No
Maturity	High	High	High	Low	High	Low
Accuracy	Medium	Medium	Medium	Low	High	Unknown
Usability	Low	Low	Low	Low	High	Unknown
Testing Effort (focus area)	Medium (odometer reporting)	Medium (odometer reporting)	Medium (participant identification to odometer reporting)	High (user interfaces, map-matching)	Low (app installation, user interfaces)	High (accuracy, integration, user experience)

and device activation experience. User-oriented tests resulted in reduction of steps in the enrollment process and development of device installation instructions. Integration testing and end-to-end testing validated that mileage collected by the device were complete, accurate, and correctly processed.[16]

› **MileMapper** testing focused on map-matching and user interfaces. Since the app relied on standard iPhone operating system functionalities and a RUC certified odometer capture method, mileage measurement accuracy testing was not the main focus. Tests revealed that some design choices (information displayed and default options) made it challenging for users to understand the goal of the application and expectations. Testing resulted in simplification of the interfaces to clarify what was measured (mileage), what configurations could be changed (whether to enable GPS) and what was required of participants (periodic odometer captures).

16 In some cases of low confidence GPS signal, Automatic did not share GPS data from the device for a significant amount of time, resulting in missing miles. After diagnosing the problem, the teams developed a solution for determining chargeable miles in accordance with the standards for the pilot.

chapter 4

RECRUITING & COMMUNICATING WITH PARTICIPANTS & PARTNERS

In advance of initiating the year-long pilot, intensive outreach and engagement efforts were implemented to cultivate a project interest list of approximately 5,000 drivers from across the state, from which over 2,000 volunteers were ultimately selected to participate as test drivers. This over-recruitment ensured that the invited pilot project participants were representative of the geographic and demographic diversity of Washington state.

A project help desk was established to ensure that interested individuals could contact the WA RUC project team to answer questions and seek information about the pilot via email or phone. Clear communication and strong customer service from the help desk by well-trained, knowledgeable staff were key to providing a positive experience for test drivers and the general public throughout the pilot, and further served as an important extension of the WA RUC Pilot Project.

key takeaways

1. WA RUC collaborated with neighboring jurisdictions—such as Oregon, Idaho and the City of Surrey, BC—throughout the pilot project to gather feedback and data on recruitment and enrollment processes, as well as simulate RUC across multiple jurisdictions.
2. Extensive communications and outreach activities, primarily through earned media strategies, paid digital media ads, paid social media ads and leveraging relationships with existing stakeholders and organizations, were critical to generating broad interest in participation and successfully recruit approximately 5,000 interested drivers before enrollment began. This intentional over-recruitment of volunteers allowed for the selection of a balanced participant pool of 2,000 that represented the geographic and demographic diversity of Washington state.
3. From the start, the help desk was operated by the same staff who helped write content for the pilot project website, frequently asked questions, presentations and fact sheets, and plans for recruitment and overall communications during the pilot. This ensured that the staff answering phone calls and emails had firsthand and in-depth knowledge of the pilot project and reduced the time needed to bring them up to speed.
4. The pilot project help desk was an important connection for participants and non-participants to connect with the project and ask any range of questions from customer service-oriented account questions to policy-level questions about road usage charging in Washington.
5. With assistance from the Washington State Department of Licensing, a network of eight vehicle licensing offices participated in the WA RUC project as delivery partners. Their services involved helping walk-in customers report their vehicle's odometer mileage and upload their mileage report to their service provider.

4.1 RECRUITMENT, ENROLLMENT, & SUPPORT FOR OVER 2,000 WASHINGTON PILOT TEST DRIVERS

Extensive communications infrastructure and activities were critical to successfully recruit over 2,000 Washington volunteers, help them enroll their vehicles, and provide them with continuous support for their year-long pilot driving test.

4.1.1 PROVIDING INFORMATION & HELPING PARTICIPANTS

HELP DESK ESTABLISHMENT

The help desk served as extension of the WA RUC communications team. The help desk was established in spring 2017, well ahead of the recruitment period, to ensure that potential volunteers, participants, and members of the public had the ability to contact the pilot project to answer questions, seek information about the pilot and details on how they might volunteer. Establishing the help desk prior to the recruitment period ensured that protocols were established and practiced prior to the anticipated high volume of calls and emails to the help desk during the enrollment period.

The help desk was staffed with the same people who helped develop content for the pilot project website, write content for frequently asked questions, draft materials like presentations and fact sheets, and develop plans for recruitment and overall communications during the pilot. This had several advantages, the primary one being that the staff answering phone calls and emails had firsthand and in-depth knowledge of the pilot project reducing the time needed to bring them up to speed on project details.

The methods established for the public, potential volunteers, and participants to contact the help desk included phone (initially established as a voicemail inbox and later transitioned to a live-answered phone line), an email address (info@waroadusagecharge.org) and an online form on the project website.

Establishing the help desk was important to support external communications during the enrollment period, providing an accessible venue for the public to ask questions and receive answers, as well as to prepare project staff for an anticipated busy enrollment period.

HELP DESK SUPPORT FOR THE LIVE PILOT

With the complexities of several different options for mileage reporting methods (MRMs) as well as the choice between two different service providers, it was important to provide strong customer support for invited participants, especially during the enrollment period. Key objectives for the pilot regarding customer service[1] were:

- Assist pilot participants for the following key activities:
  - Ongoing customer service during the pilot
  - Enrollment in the pilot
  - Closeout support
- Provide a prompt, pleasant, and informative experience
  - Answer questions quickly and correctly
  - Pro-actively resolve issues with a minimum number of customer contacts
  - Pass feedback on the pilot back to the project team

The help desk had several distinct phases, which mirror those of the pilot, before and after the live test drive:

- Pre-recruitment: December 2016–July 2017
- Recruitment and pre-enrollment: August 2017–January 2018
- Enrollment: February and March 2018
- Live test drive: February 2018–January 2019
- Close-out: February and March 2019

PREPARATION FOR ENROLLMENT

Ahead of enrollment, help desk staff coordinated with the overall project team to discuss and establish specific help desk protocols for the enrollment period, with the addition of customer service from the two WA RUC service providers, and the need for the service providers to have

1 Adapted from the WA RUC Overall Customer Service Plan, February 23, 2018.

access to participants in order to answer and support specific topics, especially technical difficulties related to a participant's chosen mileage reporting method.

In preparation for enrollment, clear roles and responsibilities were defined, as follows:

- Milestone Solutions (D'Artagnan Consulting)
  - Overall pilot project coordination
  - Liaison with eight vehicle licensing offices (VLOs)
  - Oversight and monitoring of customer service issues
- EnviroIssues
  - Manage WA RUC Pilot Project help desk
  - Answer general WA RUC pilot questions, general RUC inquiries, simple inquiries about participation
  - Transfer participants to service providers for specific or technology-related questions
  - Track and log incoming and outgoing help desk correspondence (through phone or email) via EnviroLytical outreach software
- Service providers: DriveSync and emovis
  - Manage participant accounts set-up
  - Manage their own participant account pages

Help desk staff developed specific protocols for receiving, recording, and responding to incoming correspondence. Help desk staff prepared detailed guidelines and protocols, which included sample scripts for greetings/closing, determining the urgency or importance of an inquiry, staffing and scheduling, handling media requests, and responding to calls and emails.

Help desk staff were prepared for calls received in Spanish, with Spanish-speaking staff on hand to support questions about participation. DriveSync also had Spanish-speaking staff on-hand if participants preferred to discuss participation, account set-up, or other account questions in Spanish.

4.1.2 RECRUITING & ENROLLING VOLUNTEERS AS PILOT TEST DRIVERS

The WA RUC Pilot Project recruited just under 5,000 interested drivers to fill 2,000 test driving slots in the 12-month live test drive. The following is an overview of the pilot's recruitment and enrollment process.

RECRUITMENT

Building from lessons learned from previous RUC pilots, the project team anticipated potential challenges posed by recruiting and retaining the desired number of pilot participants and ensuring that those participants reflected the geographic and socio-economic diversity of the state. Recruitment began in August 2017 and concluded in December 2017. Overall, the goals of the recruitment process were to:

- represent the geographic and socio-economic diversity of the entire state and region;
- provide equitable access for residents to sign-up, enroll and complete the pilot, while remaining mindful of the overall budget and timeline for the pilot;
- identify, communicate, and mitigate risks that could negatively impact the experience of pilot participants; and
- continue to build a broad understanding of working expectations for recruitment among stakeholders, including the private sector and businesses, as well as other agencies and organizations.

A key objective was to over-recruit potential participants or volunteers, so that the eventual, enrolled participant pool could be balanced geographically and demographically. To meet the objective of 2,000 enrolled participants, the pilot project aimed to recruit between 4,000 and 6,000 volunteers.

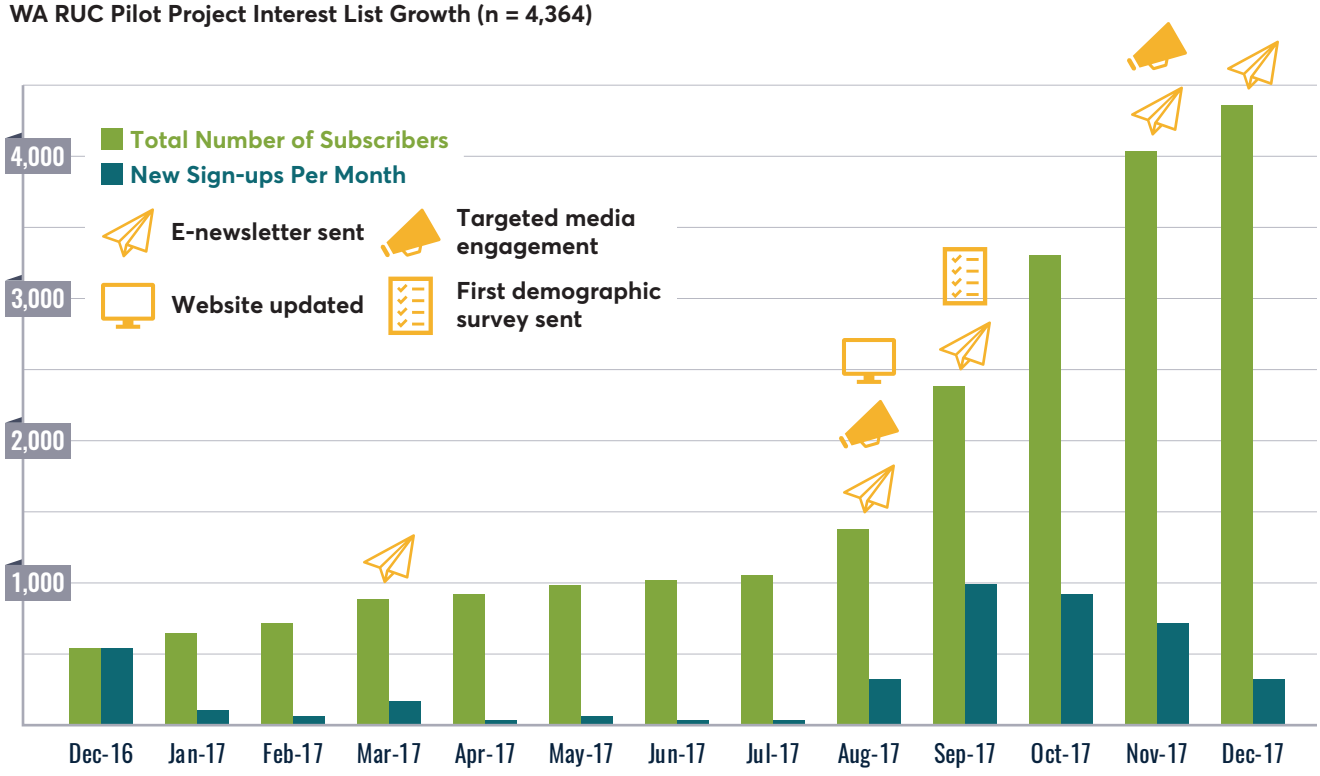
There were two key steps in the recruitment process. The first was to drive potential participants to sign-up for the project's email interest list, and the second was to request that those further interested in participating complete a demographic survey to understand their vehicle type, driving habits, and demographics.

Interest List Sign-up

Driving potential participants to sign-up on the project's email interest list was a low-barrier approach to gauging initial interest from potential participants. The interest list sign-up form was embedded on the project website and asked potential volunteers to provide their name and email address.

A variety of strategies and tactics were used to drive potential participants to the website, and to encourage them to sign up on the interest list. These included earned

EXHIBIT 4.1
WA RUC Pilot Project Interest List Growth (n = 4,364)



Data as of December 11, 2017.

media strategies, paid digital media ads, paid social media ads and leveraging relationships with existing stakeholders and organizations to tap into their communities and networks to drive interest in participations.

Website

The pilot project website played a foundational role in providing information about the pilot project and was the essential landing page for potential participants to sign-up for the project interest list (to be considered for participation), as outlined below. Originally launched in 2016, it served as the home for meeting materials and information on the WA RUC Steering Committee, as well as general road usage charging and WA RUC pilot information.

As the project transitioned to recruitment, the website was updated to provide clear, concise, and easy-to-understand graphics and information on mileage reporting methods, how to sign-up, the enrollment process, and more.

EXHIBIT 4.2
WA RUC Pilot Project Recruitment & Enrollment Process

STEP 1: Let us know you're interested in being a participant in the pilot by signing up here. SIGN UP NOW

STEP 2: Reply to your confirmation email to finalize your sign up.

STEP 3: Complete the short interest survey, which will be mailed to you after you sign up for the interest list.

STEP 4: To ensure we have a diverse set of people from all over the state, we will invite at least 2,000 drivers to participate in the pilot.

STEP 5: In January 2018, invited participants will select a mileage reporting method. CONGRATULATIONS!

STEP 6: Start recording your miles!

STEP 7: During the pilot, review mock invoices and complete quarterly surveys. We will recognize your efforts with periodic gift cards.

EXHIBIT 4.3
Earned Media: Kitsap Sun, August 24, 2017 Article

Drivers sought for pay-per-mile pilot program

Ed Friedrich, ed.friedrich@kitsapsun.com Published 2:45 p.m. PT Aug. 24, 2017 | Updated 3:17 p.m. PT Aug. 24, 2017

(Photo: Getty Images)

OLYMPIA — A pay-per-mile fee has been studied to death. Now it's time to put it to the test.

The Washington State Transportation Commission and a 25-person steering committee for five years have been assessing a road use charge as a possible replacement for the declining gas tax. Soon they'll ask the public to test drive the potential new method for funding roads and ferries.

They're seeking 2,000 drivers to participate in the 12-month Washington Road Usage Charge Project that will help them and the Legislature better understand whether paying by the mile is a viable option for future road funding. Recruitment of volunteer drivers will begin in September and continue through late 2017.

"It's simply a scientific test to see how it works from a technical, mechanical and operations aspect, but more importantly it's an opportunity for residents across the state to experience it and give feedback to the state on what worked and what didn't work and what they liked and didn't like," said Reema Griffith, Transportation Commission executive director.

As more efficient vehicles consume less fuel or — in the case of the growing number of electric cars — none at all, gas tax revenues decline. Forecasts say the average mile per gallon in Washington will dip from 20.5 now to 35 in 2035, resulting in 45 percent less revenue per mile. The state gas tax rate now is 49.9 cents per gallon, second highest in the nation behind Pennsylvania. A road use charge could provide a more sustainable source.

Earned Media

Starting in August 2017, a press release was sent to media outlets statewide. Immediately following issuance of the press release, follow-up calls were made to targeted journalists at publications in each region of the state to encourage them to learn more about the project and publish stories about how drivers can sign-up.

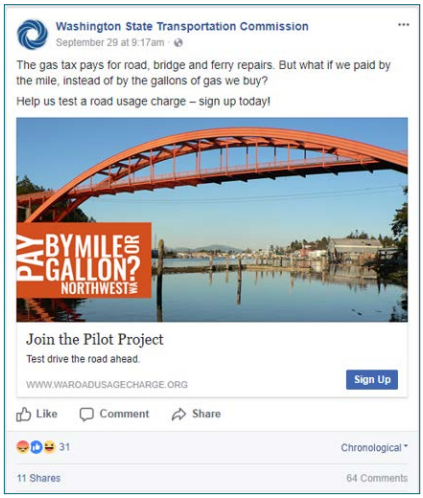
The media interest in road usage charging and WA RUC was strong, and from August through October 2017, over 50 stories were published. Earned media stories were one of the primary drivers of potential participants to the interest list. Anecdotally, anytime a new earned media story ran, there was an immediate jump in sign-ups on the interest list. Interest from the news media played a strong role in driving interest list sign-ups, and the project meeting the goal of garnering more interest list sign-ups than available participant driving slots.

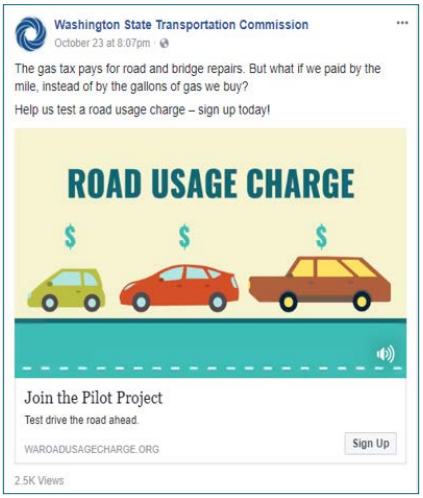
Paid Advertisements

Paid advertisements, in print and online sources, on social media and radio were a strategy used to reach audiences that may not be reached via other means. Ads were placed statewide, with print ads focused on rural communities and ethnic media. Short radio ads were translated into Spanish and ran in markets with concentrations of Spanish-speaking populations.

Social and digital media ads were also effective at reaching our targeted populations and ensuring statewide

EXHIBIT 4.4
WA RUC Social Media Recruitment Advertisements





reach. In particular, targeted Facebook ads were essential to reaching specific geographic and demographic audiences. Over the Fall 2017 recruitment period, interest list sign-ups were monitored, as were responses to the demographic survey to help inform the need to continue to advertise and target certain populations to ensure a diverse pool of potential pilot participants.

Print and digital ads were also run in ethnic media publications statewide, many of which are geared toward specific audiences and populations. Social media ads also ran in Spanish in specific geographic areas of the state.

Ad artwork was also targeted to connect with audiences in geographic regions across the state. Ads that ran in Eastern Washington, for example, showed the rolling hills of the Palouse, while ads that ran in Northwest Washington showed a bridge over the Skagit River.

With an advertising budget of under $30,000 to reach a statewide audience, leveraging the powerful tools of social media advertising along with traditional advertising methods were critical to reaching a goal of strong interest list sign-ups. This allowed the project to be selective in enrollment invitations to best reflect the population and demographics of Washington state.

Video

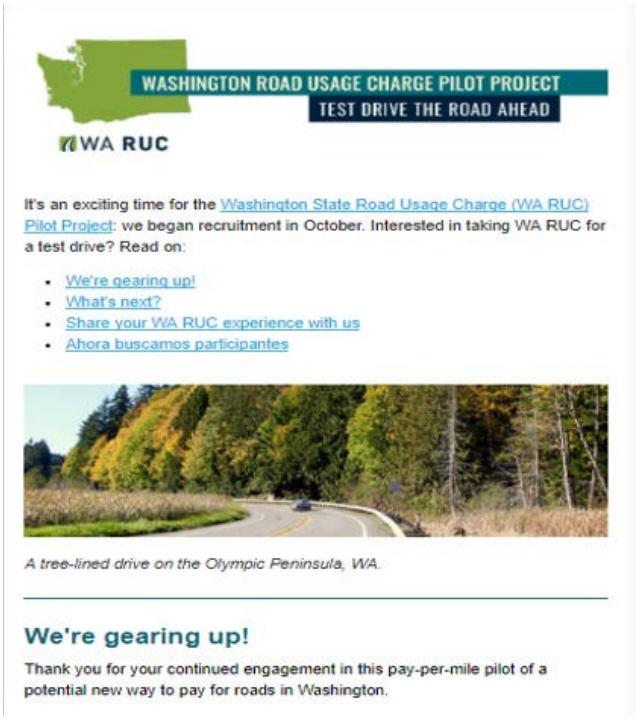
The project also developed a short video that was used and leveraged as part of the social media advertising campaign. This video was succinct, utilizing animation to provide education about road usage charging and encouraging potential participants to sign-up on the interest list. While the primary purpose of the video was as a recruiting tool, the content was overarching enough that once recruitment was completed, the team was able to change a few words of the video so that it could continue to be relevant and useful as an ongoing educational material.

EXHIBIT 4.5
WA RUC Recruitment Video, Link to YouTube

E-newsletters

E-newsletters provided continued information about the upcoming pilot and education about road usage charging. E-newsletters were sent approximately monthly to those on the project interest list. The first e-newsletter was sent in March 2017, well before active recruitment began. Over the four enewsletters sent from August through December 2017, the average open rate was 60%, which is a strong indication of the interest that potential participants showed in this demonstration project and the potential to participate in it.

EXHIBIT 4.6
WA RUC Pilot Project November 2017 E-newsletter


WASHINGTON ROAD USAGE CHARGE PILOT PROJECT
TEST DRIVE THE ROAD AHEAD
WA RUC

It's an exciting time for the Washington State Road Usage Charge (WA RUC) Pilot Project: we began recruitment in October. Interested in taking WA RUC for a test drive? Read on:

- We're gearing up!
- What's next?
- Share your WA RUC experience with us
- Ahora buscamos participantes

A tree-lined drive on the Olympic Peninsula, WA.

We're gearing up!

Thank you for your continued engagement in this pay-per-mile pilot of a potential new way to pay for roads in Washington.

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Demographic survey

Once the project had a strong response to interest list sign-ups, the pilot sent a demographic and participation survey to everyone on the interest list. The first survey was sent in October 2017 and at regular intervals thereafter through mid-December as there were additional sign-ups to the interest list.

The intent of the survey was to gather more specific information about potential participants so that the project could balance the final participant pool during the enrollment process. Survey topics included:

- Confirm residency
- Full address and contact information
- How they heard about the project
- Detailed vehicle information, such as fuel/engine type, ownership status, approximate miles driven per year
- Demographic information including age, identified gender (including transgender and non-binary), identified race/ethnicity, household income, and whether the potential participant drives a vehicle modified to be accessible for disabilities

We also offered an option for the demographic survey to be taken in Spanish.

Through mid-December, the project had just under 4,500 completed demographic surveys, with at least one respondent from all but two counties in the state.

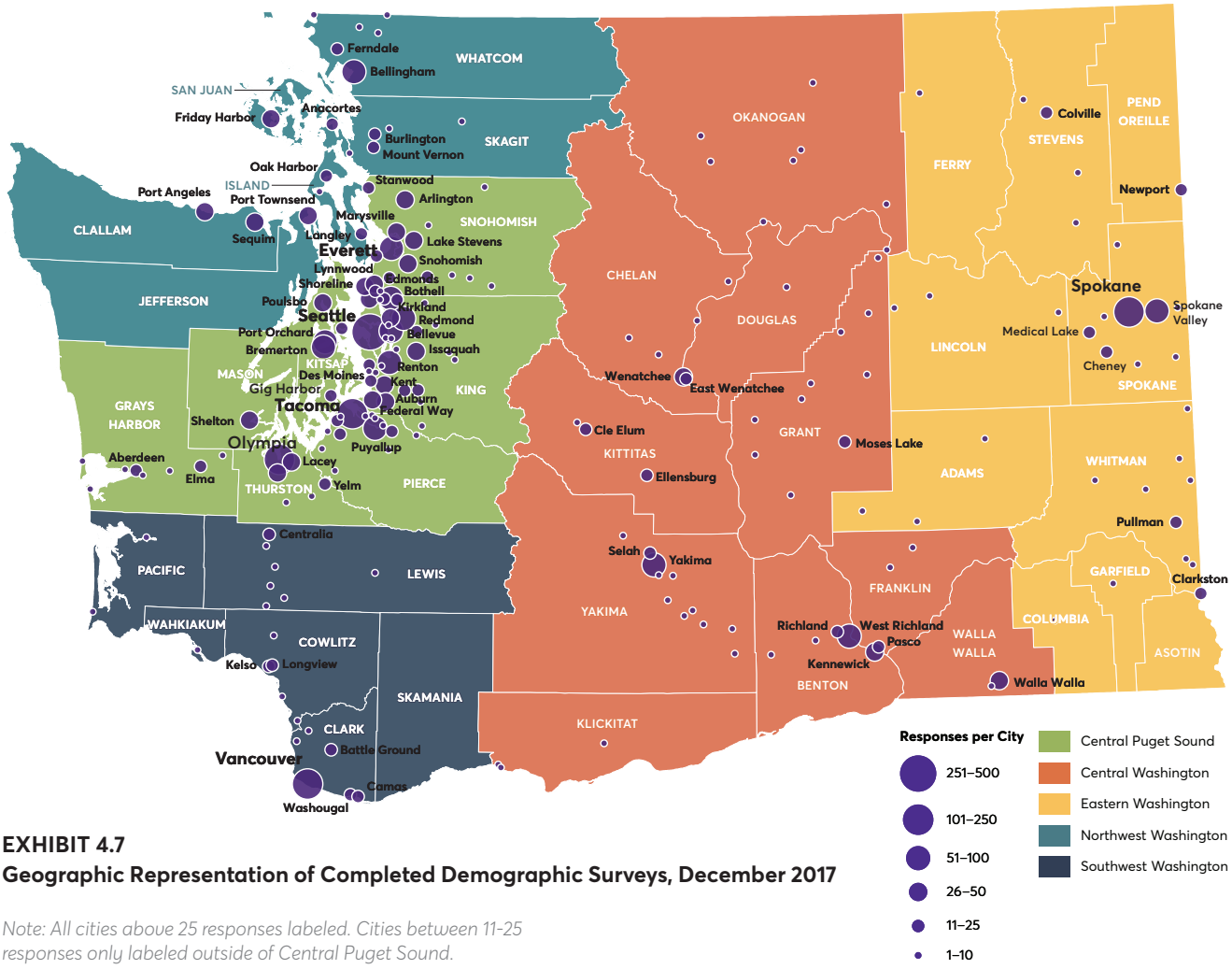


EXHIBIT 4.7
Geographic Representation of Completed Demographic Surveys, December 2017

Note: All cities above 25 responses labeled. Cities between 11-25 responses only labeled outside of Central Puget Sound.

ENROLLMENT

Once the recruitment period concluded, the team began planning enrollment. With a final recruitment push in December, nearly 5,000 potential participants had volunteered to fill 2,000 spots in the pilot. The over-recruitment of potential participants was essential to ensuring the participant pool was balanced geographically and reflected the demographics of the state.

The enrollment process began in February 2018 and concluded in March 2019.

Enrollment and invitation process

During the enrollment period (February through March 2018), invitees were prompted to visit the enrollment portal of the WA RUC Pilot Project website (available only to invited participants). The communications team worked closely with the technical team and service providers to structure this site to allow enrollees to easily set up their participant accounts, and provide a smooth hand-off to one of the service providers to finish account set-up, choose a mileage reporting method, and start driving.

The enrollment process was as follows:

- Sent an initial invite (in batches) to the 2,000 potential participants who completed the interest survey and matched initial enrollment priorities (as noted below)
- Subsequent invites sent in batches (of approximately 200-250) until the project was fully enrolled, continuing to prioritize geography

Invitations were prioritized as follows:

- Ensuring participation/enrollment from each county in the state
- Geographical representation by survey regions (ensuring a balance of urban/suburban/rural as well as eastern/western Washington)
- Balancing demographics of the participant pool by:
  - Identified race or ethnicity
  - Gender
  - Income
  - Vehicle type

Invitations were batched throughout the enrollment period, first by the prioritization listed above, and then to fill all 2,000 slots. Invitations were batched to ensure that the participant pool would be as close to our geographic and demographic goals as possible.

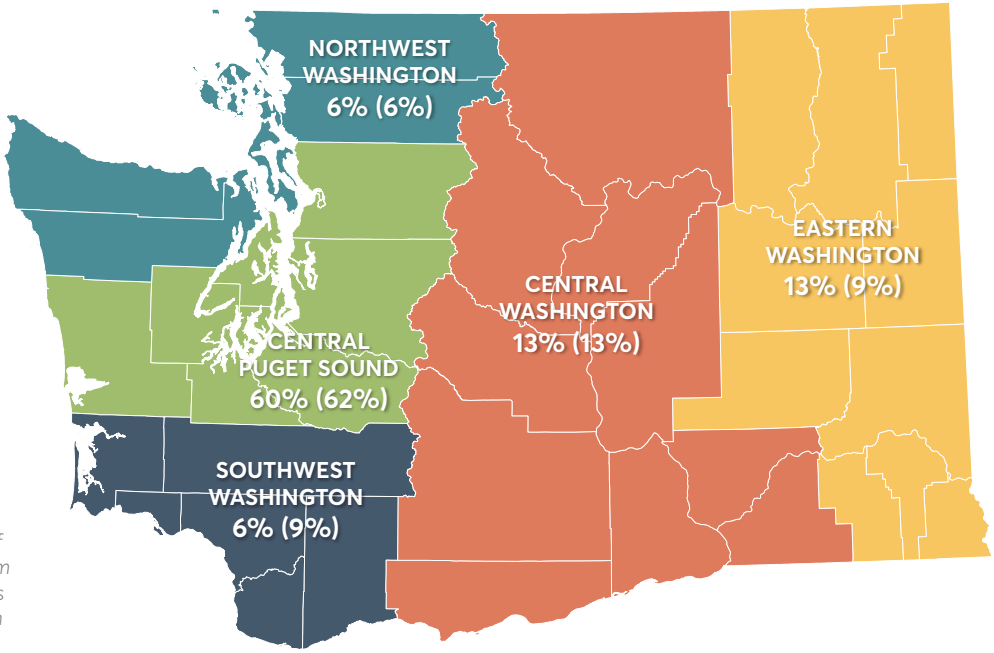


EXHIBIT 4.8
Geographic Representation of the Enrolled WA RUC Pilot Participant Pool

Note: The first number for each geographic area is the percentage of participants enrolled in WA RUC from that area; the number in parentheses is the percentage of state population that lives in that area.

Enrollment Results

As the tables at right show, the enrolled participant pool was closely balanced particularly with geography and gender, and less balanced with regard to identified race or ethnicity and household income.

Other demographic characteristics of the WA RUC pilot participants include gender, identified race or ethnicity, and household income and are shown at right.

With the enrollment process complete, the communications team shifted its focus to ensuring the following objectives:

- The demonstration pilot could run smoothly and effectively.
- Participants had the information they needed to continue participating successfully.
- The general public, elected officials, decision-makers and interested parties on the email subscriber list were kept informed of the pilot project and current events.

EXHIBIT 4.9
Identified Gender of WA RUC Pilot Participants

	% of WA Population	% of WA RUC Participants	Difference
Male	50%	49%	-1%
Female	50%	49%	-1%
Prefer not to answer		1%	
Prefer to self-describe		0%	
Unknown		1%	

Source: American Community Survey, 2010–16 5-year estimates.

EXHIBIT 4.10
Identified Race or Ethnicity of WA RUC Pilot Participants

	% of WA Population	% of WA RUC Participants*	Difference
African-American	3%	2%	-1%
American Indian or Alaskan Native	1%	3%	2%
Asian (excl. Indian)	7%	5%	-2%
Caucasian or White	71%	85%	14%
Hispanic	12%	4%	-8%
Indian subcontinent	1%	1%	0%
Native Hawaiian or other Pacific Islander	1%	1%	0%
Other/None of the above		2%	
Prefer not to answer		3%	

Source: American Community Survey, 2010–16 5-year estimates
**As participants could select more than one option, the total equals more than 100%.*

EXHIBIT 4.11
Household Income of WA RUC Pilot Participants

	% of WA Population	Household Income*	% of WA RUC Participants	Difference
Less than $25K	12%	Less than $30K	7%	-5%
$25K–50K	1%	$30K–60K	20%	1%
$50K–100K	1%	$60K–120K	43%	9%
$100K–200K	1%	$120K–200K	17%	-10%
More than $200K		More than $200K	6%	-2%
Prefer not to answer		Prefer not to answer	5%	-3%
		Unknown	1%	

Source: American Community Survey, 2010–16 5-year estimates
**Participant categories varied slightly from American Community Survey categories.*

4.1.3 MEDIA ENGAGEMENT

To signal the transition from enrollment to live test driving and to keep media, interested parties, and other stakeholders informed, an in-person media was event held on Mercer Island, Washington. This event provided an in-depth look at what the project participation experience might look like, as well as how the project was able to balance the enrolled participant pool, in relation to the population and demographics of Washington state.

As the enrollment and account activation period wrapped up in March 2018, the communications goals and activities transitioned from recruitment and enrollment to ensuring participants, interested parties, legislators, decision-makers and media remained informed about the project's progress and next steps.

Most of the external communications activities were centered toward providing information, and keeping stakeholders engaged at regular intervals, including regular website updates and e-newsletters, and responding to media inquiries.

Media engagement throughout the 12-month pilot was focused on responding to media inquiries and requests, as well as preparing for the pilot's completion. As part of the mid-pilot focus groups and case studies conducted in fall 2018, the communications team filmed several pilot participants to better understand their experiences driving in the pilot thus far. This footage was used for a participant experience video, released in spring 2019 after the conclusion of the pilot project.

EXHIBIT 4.12
WA RUC Participant Experience Video, Link to YouTube

4.2 OREGON, IDAHO, & BRITISH COLUMBIA AS PILOT PARTICIPANTS

Seeking support from public officials and recruiting test drivers from among Washington's neighboring states and British Columbia was critical for testing the ability of the WA RUC system to accurately process mileage driven within the vast Pacific Northwest region.

As described in Chapter 1, Washington is at the center of the vibrant Cascadia megaregion, which spans Washington, Oregon, parts of Idaho and British Columbia. This region depends on a functional transportation system for the movement of people and goods across the borders of four different jurisdictions.

Mileage reporting and tax accounting systems exist for commercial trucks engaged in interstate commerce throughout the region. The International Fuel Tax Agreement (IFTA) is an agreement between the lower 48 states of the US and the provinces in Canada to simplify the reporting of fuel use (and thus, taxes owed) by motor carriers operating across borders.

For light duty vehicles, no such arrangement exists. Taxes are paid where the driver buys fuel, regardless of where the miles may ultimately be driven. A RUC system for light duty vehicles would need to account for how travel between the states and Canadian provinces would be charged, given that these drivers would have no legal or financial relationship with states other than the owner's home state or province.

To help explore the issues presented by a multi-jurisdictional RUC system, the WA RUC pilot project developed a system where miles could be reported, the appropriate tax rates applied, RUC charges collected, and resulting revenues distributed back to the jurisdictions where the miles were driven

4.2.1 RECRUITING DRIVERS FROM OREGON, IDAHO, & BRITISH COLUMBIA AS PILOT PARTICIPANTS

WA RUC sought to develop the nation's first accounting and reconciliation of real funds through a central clearinghouse (known as the HUB) for distances driven and RUC paid across multiple jurisdictions. WA RUC and ORe*GO*, Oregon's road usage charge program, collaborated in the recruitment and enrollment of participants residing in each state who drive regularly in the other state as well as data reporting to the HUB for purposes of simulating multi-jurisdictional RUC reconciliation. Separately, WA RUC collaborated with the Idaho Transportation Department and the City of Surrey, BC to recruit and enroll participants from those jurisdictions to experience simulated charging and payments, as well as simulated reconciliation of funds across multiple jurisdictions through the HUB.

EXHIBIT 4.13
Pacific Northwest Region Participating Jurisdictions


Bellingham
NORTHWEST LICENSING
Marysville
Everett
UNIVERSITY LICENSE AGENCY
Kirkland
Redmond
Sammamish
Bellevue
Renton
Seattle
Kent
KENT LICENSING AGENCY
Tacoma
Olympia
RALPH'S THRIFTWAY
MARKET STREET LICENSING
Spokane Valley
Spokane
AUTO LICENSING PLUS
Wenatchee
Moses Lake
Ellensburg
Yakima
TRI-CITIES AUTO LICENSING
Richland
Pasco
Kennewick
BATTLE GROUND AUTO LICENSE
Vancouver

4.3 RECRUITING INDEPENDENT BUSINESSES (VEHICLE LICENSING OFFICES) TO SUPPORT PILOT PARTICIPANTS

Partnering with private businesses who already provide many licensing related services to the public was an effective way to support drivers who needed in-person assistance with RUC mileage reporting.

4.3.1 RECRUITING INDEPENDENT BUSINESSES (VEHICLE LICENSING OFFICES) TO PROVIDE IN-PERSON SUPPORT FOR VOLUNTEER TEST DRIVERS

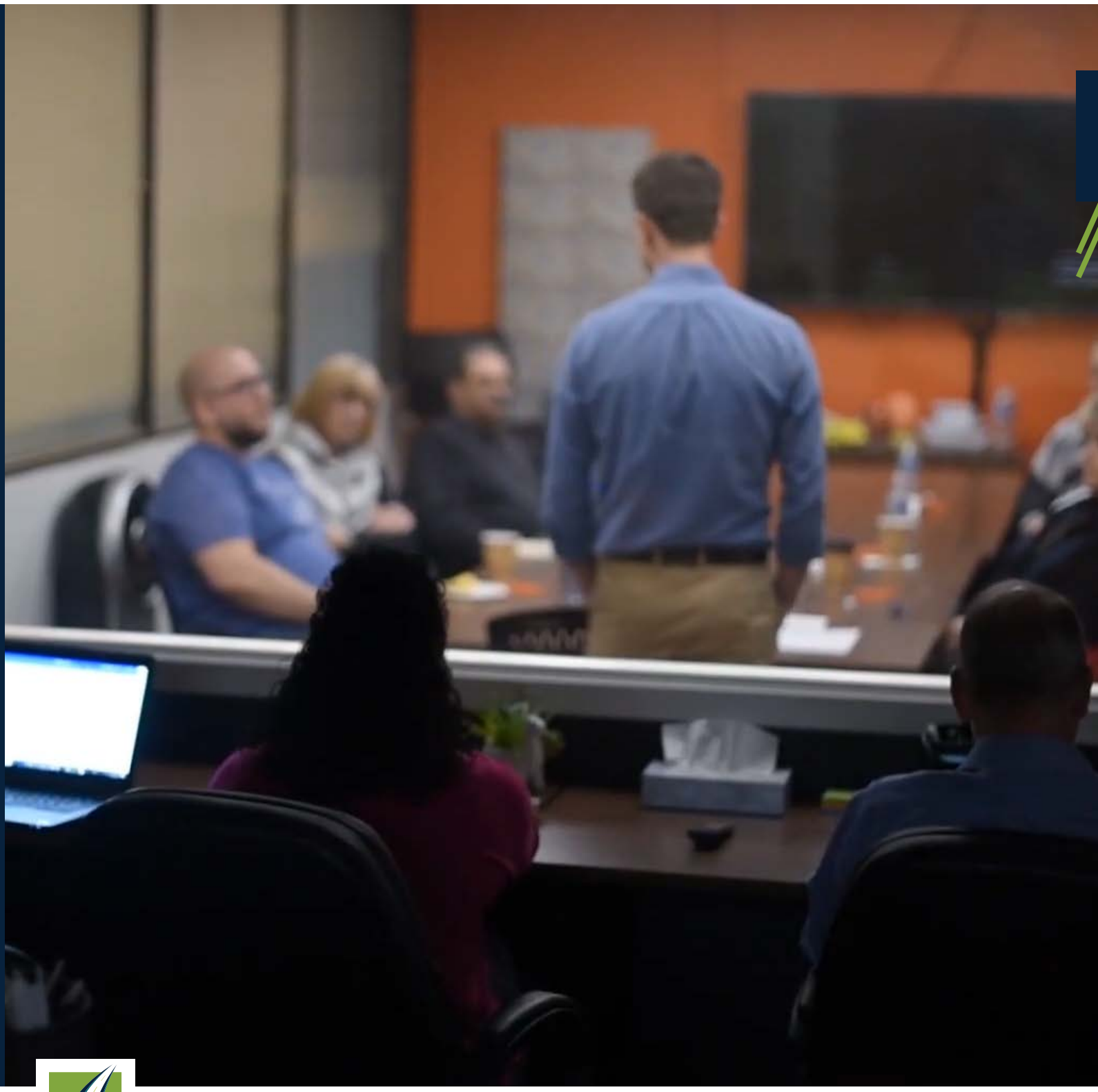
In Washington, a statewide network of privately-owned businesses (vehicle licensing offices, or VLOs) provide a wide array of licensing-related services to walk-in customers on behalf of the Washington State Department of Licensing. These services range from transferring ownership of vehicles, to reporting (and paying) taxes owed on vehicle sales, to licensing new vehicles and renewing vehicle registrations. VLOs receive a fixed per-transaction fee for each licensing-related service for a customer.

When the WA RUC pilot project activities began, a key objective was to develop and test a method for drivers who do not have a camera-equipped smartphone or prefer not to use their personal smartphone, to receive in-person assistance with their RUC mileage reporting. To provide this support, the WA RUC project team reached out to the Department of Licensing (DOL) to seek their help in recruiting VLOs strategically located throughout the state to become participating businesses in the pilot. DOL agreed this type of test would be beneficial to the pilot participants, and informative for the VLOs and DOL.

The project team secured commitments from eight VLOs from around the state to help pilot test drivers submit their required RUC mileage reports.

Prior to launch of the live pilot, all VLOs received on-site training, a User Manual, a Transaction Logbook, and a specially configured iPhone to take the required odometer photos and upload them via a special iPhone app to the RUC Service Provider for mileage processing. To help offset some of their costs of participating in the pilot, the VLOs were compensated for their training time (approximately 2 hours) and provided with a fixed fee per transaction of $5 per mileage reporting service provided during the pilot.

EXHIBIT 4.14
Participating Vehicle Licensing Offices in Washington State



chapter 5

PILOT EVALUATION PLAN: MEASURING ATTITUDES & SYSTEM PERFORMANCE

Using the adopted Guiding Principles as the starting point, the project team developed evaluation measures to test how well the WA RUC prototype system performed. While testing the operational performance of the WA RUC system and analyzing driving data is important, the most critical measure of the system's performance is how drivers react to the system and what issues they identify after testing it for a full year.

The Evaluation Plan called for data collection from three participant surveys, six focus group sessions, several individual case studies, and numerous interviews with administrative agencies. An initial public attitude assessment (via telephone poll) was conducted so that the Steering Committee could ensure that issues most important to the public would be investigated during the pilot. All evaluation activities were carried out over the course of 18 months.

key takeaways

1. The Evaluation Plan incorporated the Steering Committee's 13 Guiding Principles for a RUC system in Washington. From these principles, 24 separate pilot evaluation measures were developed and used to assess the performance of the pilot from a systems perspective as well as from the driver's perspective.
2. Prior to the pilot launch, a statewide telephone poll was conducted to gauge initial public reaction to a potential road usage charge in Washington. These pre-pilot opinions were used to help the project team better understand areas of public concern or confusion, so that these issues could be investigated through the pilot and in participant surveys and focus groups.
3. Six focus group sessions were held throughout the state at the mid-point of the pilot, in September and October 2018. To explore certain aspects of RUC more deeply, special focus groups consisted of people who drive electric vehicles; people who drive commercial vehicles; individuals with low- and moderate-income; people who drive higher than average miles per year; and people who are rural residents.
4. Three separate participant surveys were administered: one at the launch of the 12-month test drive period, one at the mid-point, and one at the conclusion of the test drive.
5. The final results of the surveys, focus group sessions, and help desk inquiries are reported in Chapter 7, with full details available in Appendix A-2, A-3, and A-4.

5.1 EVALUATING THE PILOT PROJECT

Using the adopted WA RUC Guiding Principles as the starting point, the project team developed 24 pilot evaluation measures to assess performance of the WA RUC prototype system.

5.1.1 THE EVALUATION PLAN

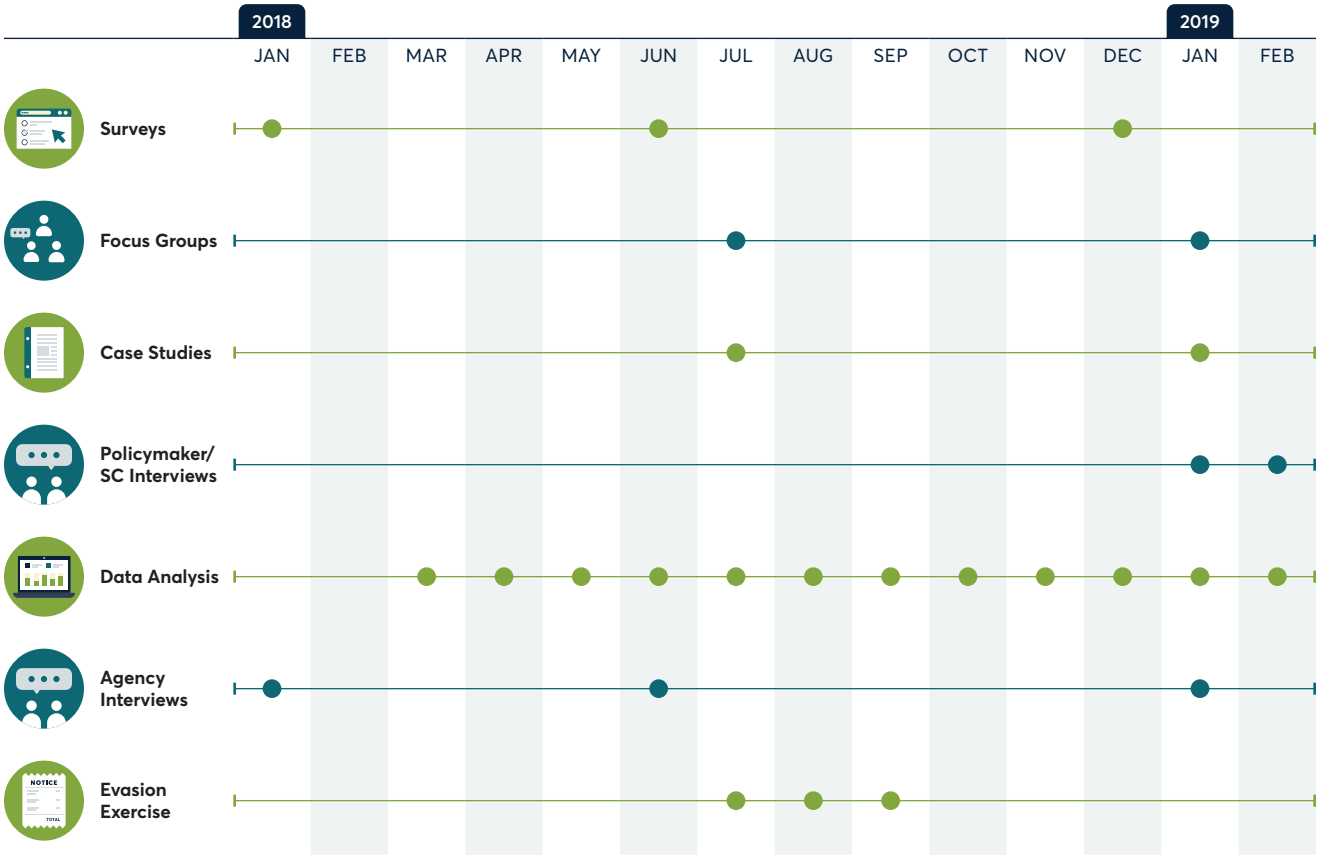
In 2015, the RUC Steering Committee recognized the importance of formally evaluating the pilot as a means of addressing outstanding policy, public acceptance, and technical questions and issues in a rigorous manner. Subsequently, the Steering Committee developed 24 pilot evaluation measures. Each measure relates to one of the 13 RUC guiding principles, reaffirmed at the same time as the creation of the measures.

EXHIBIT 5.1
Guiding Principles & Evaluation Measures

Guiding Principle	Evaluation Measures
Transparency	1. Change in participant understanding of gas tax rate, collection method, and use. 2. Change in participant understanding of RUC rate, collection method, and use.
Complementary Policy Objectives	3. Impact of pilot on driving habits of participants. 4. Impact of pilot on stated vehicle purchasing preferences of participants.
Cost-effectiveness	*No measures established*
Equity	5. Total and per-mile gas tax vs. RUC paid by urban, suburban, vs. rural status of participant. 6. Total and per-mile gas tax vs. RUC paid by participant income. 7. Total and per-mile gas tax vs. RUC paid by in-state vs. out-of-state participants. 8. Participant expectations and before-and-after perceptions of RUC equity, relative to gas taxes.
Privacy	9. Participant perception of privacy protection, including any changes in perception during the pilot. 10. Relative ability of mileage reporting methods to protect participant privacy.
Data Security	11. Participant perception of data security, including any changes in perception during the pilot. 12. Relative ability of mileage reporting methods to provide data security.
Simplicity	13. Time and indirect costs expended by participants to comply with pilot tasks. 14. Participant understanding of compliance requirements.
Accountability	15. Description of assignment of responsibility and oversight for Washington agencies and other entities involved in pilot. 16. Accuracy of reported road usage, revenue collected, and revenue distributed.
Enforcement	17. Participant perceptions of relative effectiveness of enforcement methods in maintaining compliance. 18. Reasons for non-compliance expressed by participants (e.g., confusion, negligence, fraud). 19. Participant-stated locations of fuel purchases (potentially only for interoperability participants).
System Flexibility	*No measures established*
User Options	20. Participant overall satisfaction and relative satisfaction with choices available in the pilot project. 21. Reason for participant preferences of various mileage reporting methods.
Interoperability & Cooperation	22. Description of assignment of responsibility and oversight for Washington agencies and other jurisdiction agencies involved in pilot. 23. Participant understanding of interoperable RUC. 24. Relative ease of compliance for interoperability test participants vs. others.
Phasing	*No measures established*

The pilot evaluation team assembled a plan for assessing the Steering Committee measures through participant surveys, focus groups, case studies, interviews, data analysis, and a special RUC evasion tabletop exercise. Following presentation and discussion, the Steering Committee adopted the plan in December 2017 as the basis for the pilot evaluation team's work.

EXHIBIT 5.2
Evaluation Activities & Schedule



5.2 BASELINE PUBLIC ATTITUDE ASSESSMENT

To ensure issues most important to the public were addressed in the pilot, public opinion research was conducted prior to launching the 12-month live pilot.

Washingtonians provided information about their baseline knowledge, impressions, and inclinations toward transportation funding and road usage charging through public opinion research conducted in 2017.[1] A statewide telephone survey and six statewide focus groups revealed the following key insights leading into the pilot test:

- Transportation is often a top priority for Washington residents, especially those in urban areas. However, they do not know the details of transportation funding.
- Residents are receptive to the notion that increasing fuel efficiency of the vehicle fleet will impair transportation funding. Most agreed that fairness is a critical feature of transportation tax policy, but residents define fairness differently.
- When surveyed, most residents oppose RUC, but many asked for additional information about how it would impact their lives and expressed willingness to participate in research.

The pilot recruitment and outreach effort thus focused on engaging a curious public who cares about transportation, understands it little, but remains eager to learn more and be part of a policy experiment.

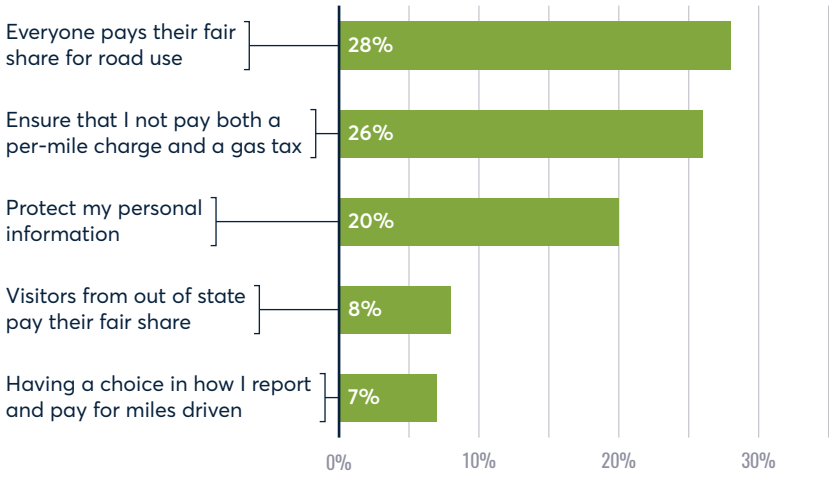
EXHIBIT 5.3
Telephone Poll: Familiarity with Road Usage Charge

How familiar are you with the concept of a road usage charge, where drivers pay for the miles they drive (n = 602)?

EXHIBIT 5.4
Telephone Poll: Most Important Issue

Thinking about paying a road charge based on the number of miles driven instead of the gas tax, tell me which is the most important issue to you (n=602)?

(Randomized responses)



1 "Washington Transportation Funding Public Opinion Assessment," December 2017. Appendix A-5.

5.3 PARTICIPANT FOCUS GROUPS

Focus groups allow researchers to probe reasons for people's attitudes and opinions. Six focus group sessions were held in different parts of the state to further explore RUC issues and concerns.

The participant focus groups explored perceptions on topics such as RUC equity relative to gas taxes, privacy protection, data security, and ease of participation and compliance. These discussions complemented the surveys sent to approximately 2,000 participants by providing more depth into the "what, how, and why" of participant perceptions.

Participants first completed an eight-question written exercise to avoid being influenced by others and then participated in a facilitated group discussion. The evaluation team convened six focus groups in late September and early October 2018: three in Federal Way, and one each in Spokane, Yakima, and Vancouver, Washington. In total, 51 individuals participated.

5.3.1 RECRUITING FOCUS GROUP PARTICIPANTS

Participants were recruited from a pool of interested pilot project participants who expressed interest and provided some demographic information through an online questionnaire. The team invited participants from this pool with a goal of providing balance and diversity in demographics (age, gender, race, income); perspective (support for or against a RUC); and vehicles and driving behavior (vehicle type, number of miles driven). The list below summarizes the driver populations targeted for each focus group.

- **Federal Way 1—**commercial and EV drivers
- **Federal Way 2—**rural and/or high mileage
- **Federal Way 3—**low- and moderate-income
- **Spokane—**general population
- **Vancouver—**general population
- **Yakima—**rural and/or high mileage

PARTICIPANT CHARACTERISTIC COMPARISONS

All pilot participants provided information during a pre-enrollment questionnaire and as part of the pilot project's voluntary surveys. A comparison of characteristics between focus group participants and overall participant pool is summarized here and detailed in Appendix A-3. When an individual enrollee's information is unavailable, they are not counted in the share of enrollees shown in the comparison results.

- The share of participants who enrolled an electric or hybrid vehicle is greater in focus groups than among all enrollees (32% compared to 16%).
- The distribution of where participants live is similar between focus group participants and survey participants.
- The share of people who drive 15,000 miles or more per year is higher in focus groups than among all enrollees (29% compared to 18%).
- The share of people who drive fewer than 5,000 miles or less per year is similar across both the focus groups and among all enrollees (10% compared to 12%).
- The share of people who support or oppose a RUC is similar in focus groups and survey participants.
- Over the pilot, participants became more supportive of a RUC (from 50% to 65%) and less uncertain. There is a stable cohort who oppose a RUC (17-20% in the surveys and 21% in the focus groups).
- 57% of focus group participants, compared to 51% of all enrollees, identify as male. 43% of focus group participants, compared to 49% of all enrollees, identify as female.
- 20% of focus group participants, compared to 15% of all enrollees, identify as people of color.
- Age distribution was similar across both groups.
- The share of participants reporting a household income under $30,000 is greater in focus groups than among all enrollees.

5.4 PARTICIPANT SURVEYS

The heart of the WA RUC Pilot Evaluation Plan are surveys of the pilot test drivers at key milestones: before the live test-drive period; at the mid-point; and at the conclusion of the live test drive.

5.4.1 PILOT PROJECT PARTICIPANT SURVEYS

Three surveys were administered during the pilot to collect participant feedback and gauge perceptions of a potential road usage charge. The surveys were emailed to participants using SurveyMonkey at the beginning, middle, and end of the pilot. Participants who were members of the public (not identified as public officials or government employees) were offered a $100 gift card as an incentive to complete all three surveys.

Details about the survey distribution are shown Exhibit 5.5. Some questions were asked across multiple surveys to gauge changes in opinion over time, while some questions were only asked once. Key questions were used to crosstab responses by participant category, such as by where they lived (urban/suburban/rural) or by the reporting method selected. While most questions were close-ended with specified response options, Survey 3 included five open-ended questions where participants could provide more detail on their responses.

The results of the participants surveys are reported in Chapter 7, with full details provided in Appendix A-2.

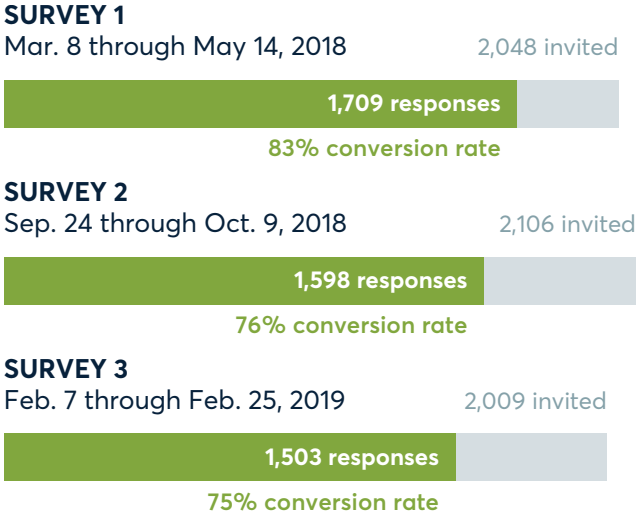


EXHIBIT 5.5
Response Rates for Participant Surveys 1, 2, and 3

chapter 6

LIVE PILOT OPERATIONS & DRIVING DATA

This chapter summarizes lessons learned and driving data from the 12-month period of live pilot operations. The pilot began with a soft launch, where a small number of vehicles began mileage reporting ahead of the 2,000 pilot test drivers. This soft launch allowed the project team to identify and resolve any unforeseen bugs in the system. The pilot continued with open enrollment periods, when volunteer participants enrolled and selected their service provider and mileage reporting method.

The pilot generated useful data and lessons learned. Driving-related data included demographic data, mileage reporting method ease of use data, and invoicing data. The pilot also generated interstate and international interoperability data and lessons learned. The pilot included a RUC avoidance tabletop exercise to determine how RUC payment could be avoided and what measures could prevent such activities. The pilot was closed out in an orderly manner.

key takeaways

1. Using a soft launch helped to minimize glitches in the participant experience.
2. The frequency, timing, and wording of odometer image reporting reminders must be optimized to improve the participant experience while maximizing compliance.
3. When given the choice of mileage reporting options, most participants gravitated toward the automated methods, which required the least mileage reporting effort from drivers. Among the offered automated mileage reporting methods, the majority of test drivers chose methods that use location data (GPS). Nonetheless, a significant number of participants chose an odometer image-based method, so it is important to offer at least one non-GPS, non-automated method.
4. Pilot test demographics generally followed the state's demographics, indicating that the pilot was a reflective makeup of participants, except that plug-in electric vehicle owners were intentionally recruited into the pilot at a higher rate than they exist in the state. The purpose was to gain the broadest possible impressions from this small but growing subset of vehicle drivers.
5. Plug-in device mileage reporting methods had the highest compliance rates and were reportedly convenient to set up and use.
6. RUC invoices are a vital communications tool. While the invoices used in the pilot were effective, further improvements are possible.
7. A RUC Interoperability HUB is a simple, effective way to achieve interstate and international interoperability for distance-based road usage charge systems.
8. Although enforcement activities were not included in the pilot, a tabletop exercise identified several ways to avoid paying RUC. Measures were developed to minimize the occurrence or impact of RUC avoidance. However, more work is required in the area of compliance and enforcement.

6.1 ISSUES RESOLVED IN THE "SOFT LAUNCH" START OF OPERATIONS

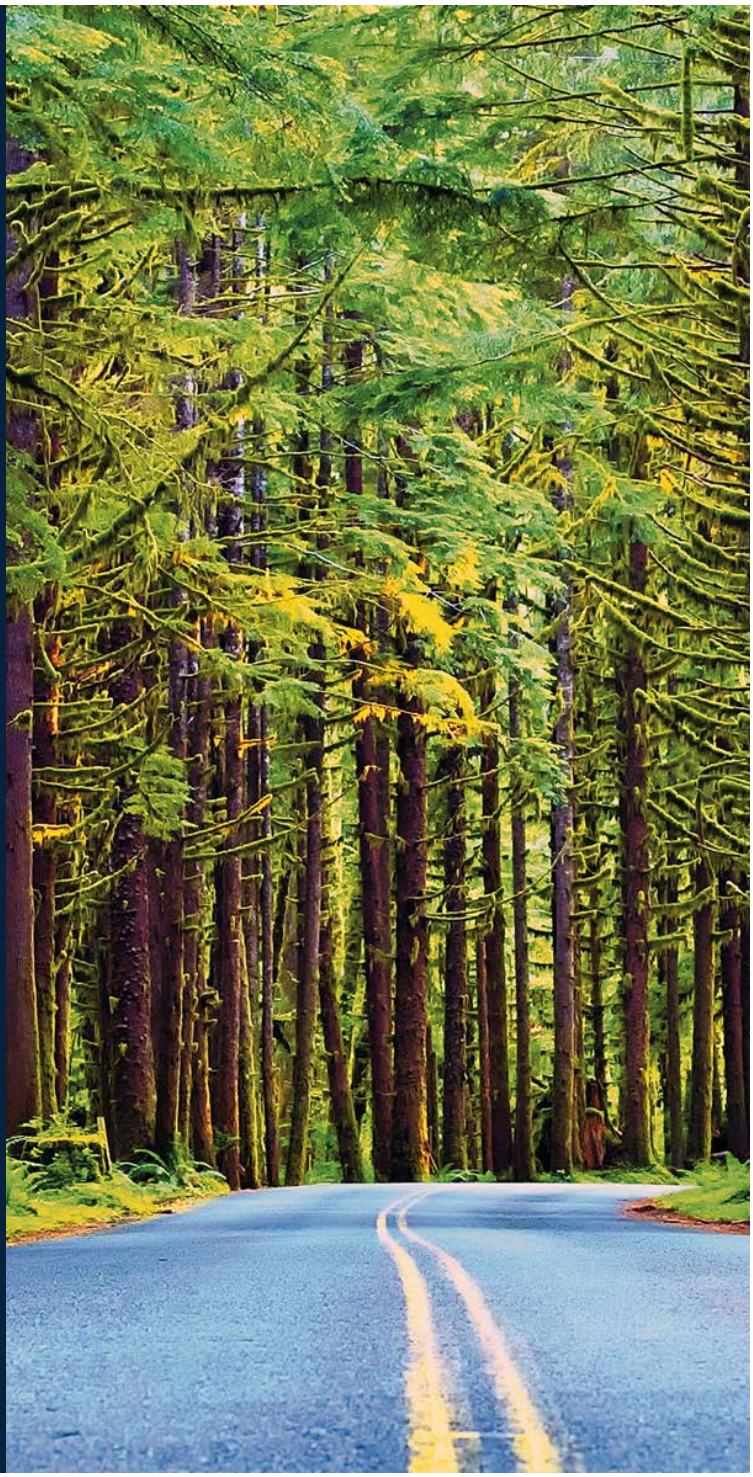
Pilot operations began with a "soft launch," where a small number of vehicles were enrolled early to begin mileage reporting. This allowed the project team to detect and resolve any unforeseen bugs in the system.

Pilot operations began with a "soft launch," which included only a small number of "observation" participants to detect and resolve any unforeseen bugs in the system. For these observation participants, service providers created "observation" accounts—special accounts set up for known individuals (including pilot test team members) from which data was segregated from the rest of the pilot data. This allowed the project team to experience the WA RUC system for each mileage reporting method (MRM) and receive WA RUC communications in advance of the live launch with over 2,000 pilot test drivers.

Enrollment for these observation accounts began one week prior to volunteer participant enrollment. Observation account holders received invitation emails and text messages from the service provider, enrolled in the pilot on the project website, set up their account on the service providers' website, set up their MRM (either plug-in device delivery and vehicle installation, or smartphone application setup, or odometer reporting), and received driving invoices. Observation account holders reported anomalies and suggested workflow optimizations to the service providers, who in turn fixed the system and optimized workflows before opening enrollment to general pilot participants.

The soft launch allowed the pilot team to anticipate and proactively manage operational issues. However, some processes and scenarios were difficult to predict or simulate, resulting in newly discovered operational issues that were managed during live operations. Notable issues are described below:

- **Requirements to report odometer readings raised confusion among some participants who used plug-in devices.** Initially, all participants (including those selecting automated mileage reporting methods) were required to report their odometer readings through an odometer-capture smartphone function at both the start and end of the pilot. This measure allowed the administrators of the pilot project to avoid missing mileage in situations where the mileage reporting device ceased to function, was removed from the vehicle, or the participant switched mileage reporting periods. Participants that had selected plug-in devices were confused by this requirement as the plug-in device had been described as a fully automated and hassle-free method. Participants perceived the text and email reminders to submit their odometer image as disruptions in the user experience. This feedback led the pilot team to eliminate requirements for plug-in participants to provide odometer images.
- **The frequency and timing of odometer reporting notifications and reminders was sometimes burdensome and confusing for participants.** For example, participants who could not access their vehicles during the required reporting period (e.g., due to travel away from their vehicles) could not report their odometer readings; sometimes when participants switched between manual and automated methods, they received confusing odometer notifications and had to call the help desk for assistance; and some participants were confused by the absence of an acknowledgment message after submitting their odometer image, and so re-submitted their odometer image, sometimes several times. These experiences prompted the odometer notification and submission process to be streamlined. Service providers simplified the process so that a maximum of three reminder notifications were sent within the first five days of account creation, and a maximum of three reminder notifications were sent within the last ten days of the reporting periods. Service providers improved their systems so participants received an acknowledgment



message when their reading was submitted and also when their reading was successfully processed and validated. Service providers also improved their systems so participants who knew they would be away from their vehicle during reporting periods could report their readings outside of the regular reporting periods. These optimizations improved the ease of use and general compliance level of manual mileage reporting methods. In a potential future operational program, it is advisable that users have the flexibility to submit odometer readings when it is convenient in order to increase usability and level of compliance.

Finally, certain exceptional scenarios had to be treated on a case by case basis. For instance, a few participants had difficulty installing the companion application on their smartphones. In some rare situations, participants did not have consistent cellular phone coverage to enable their plug-in device to transmit mileage reports or their smartphone to receive odometer notifications. These cases were handled through the help desk teams who redirected participants to another MRM, or even the other service provider. Coordination between the pilot project help desk and the service provider customer service teams improved customer experience in these cases.

6.2 OPEN ENROLLMENT PERIODS: ALLOWING PARTICIPANTS TO CHOOSE MILEAGE REPORTING METHODS

Volunteer Participants entered the pilot in an Open Enrollment period, during which participants chose their service provider and mileage reporting method. A second "Open Enrollment" period was held halfway through the pilot, in which the pilot team issued an additional 500 invitations.

Pilot operations for volunteer participants began with the initial Open Enrollment period, which started on January 31, 2018 with only one of the two service providers, DriveSync, offering RUC service. The other service provider, Emovis, began enrolling participants three weeks later, after Automatic™ device glitches identified were corrected and stabilized. Participants chose their service provider and mileage reporting method (MRM) based on information on the project website and on the service provider websites. They could also contact the project help desk for further guidance.

To avoid overwhelming the service providers' help desks and back office systems, the pilot team sent out invitations in batches of a few hundred every day or two. The pilot team closely monitored enrollment on a daily basis and sent new invitation batches depending on the cumulative number of enrolled vehicles—the target for the pilot was to enroll at least 2,000 vehicles. About 3,300 invitations were sent out to volunteers during the first open enrollment period. About 500 more invitations were sent during a second open enrollment period (held in early August 2018), which resulted in a cumulative number of 2,475 enrolled vehicles. Of those enrolled vehicles, 2,044 vehicles became active, i.e., had completely enrolled through to activation of their MRM, as shown in Exhibit 6.1. Participants who had partially enrolled their vehicles received reminders throughout the pilot to activate their vehicle. The pilot team ultimately unenrolled the remaining 431 participants who never completed the activation of their MRM.

Participants were free to choose their service providers and MRMs, provided the MRMs were compatible with

EXHIBIT 6.1
Participant Vehicle Enrollment Levels Over 12-Month Live Pilot Period

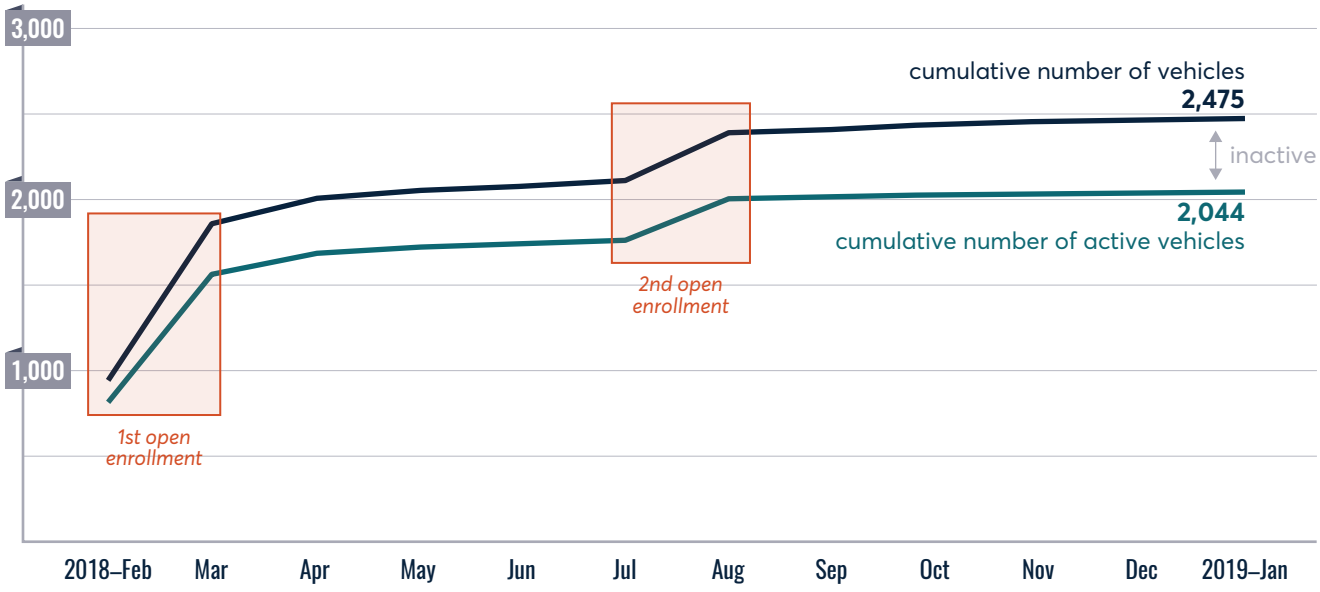
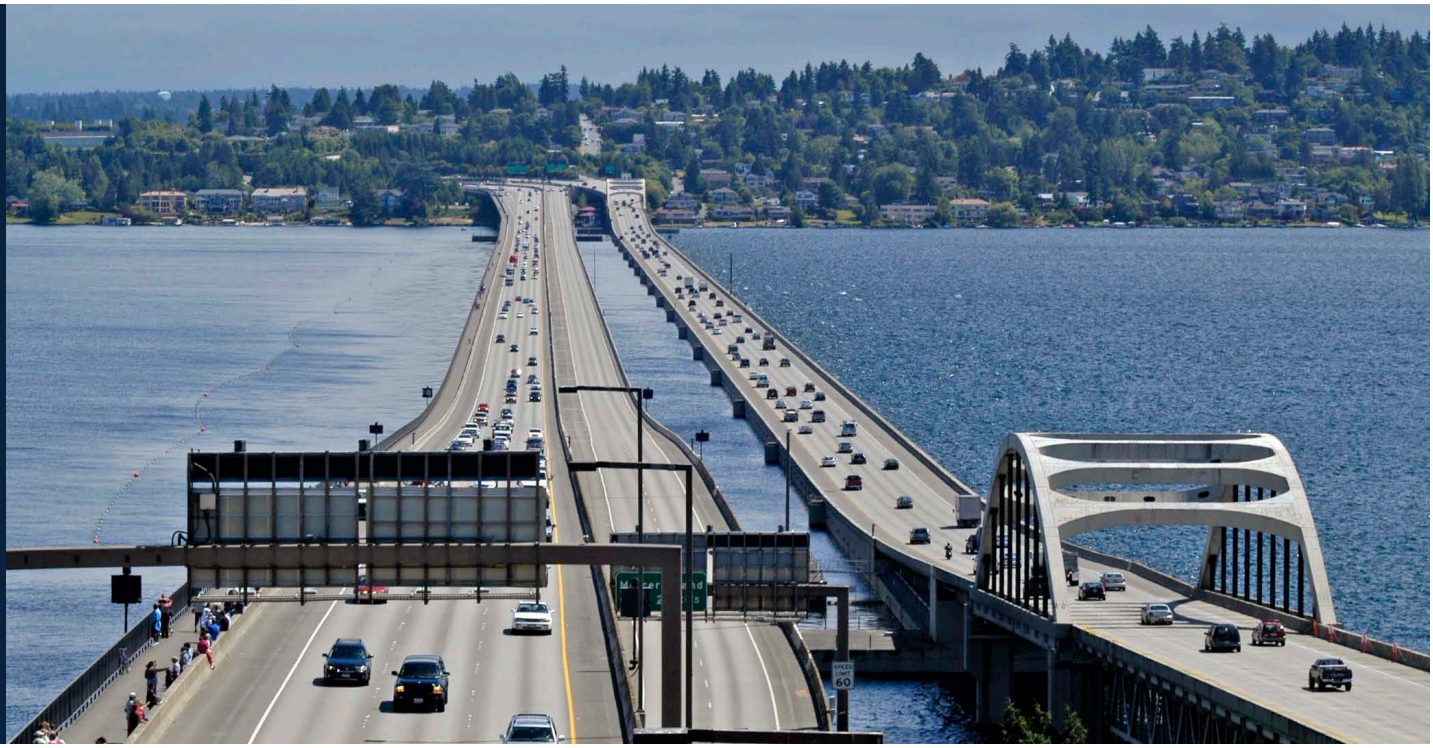


EXHIBIT 6.2
Mileage Reporting Methods Chosen by WA RUC Pilot Participants

Mileage Reporting > Methods (MRMs)	Mileage Permit	Odometer Reading	Smartphone App (MileMapper)	Plug-in Device (with GPS)	Plug-in Device (no GPS)
DriveSync (91%)	1%	22%	14%	35%	19%
Emovis (9%)	0.3%	6%	*Not offered*	3%	*Not offered*
Total	**1.3%**	**28%**	**14%**	**38%**	**19%**

their vehicles (for plug-in devices) and phones (for manual methods). DriveSync supported 91% of the participants while emovis supported the remaining 9% participants. This breakdown can be explained by the fact that DriveSync started enrolling participants three weeks earlier than emovis and supported more MRMs—five MRMs for DriveSync compared to three MRMs for emovis. Participants were made aware of the possibility of switching MRMs or service providers halfway through the pilot (during the second enrollment period held in August), but only 1% of all participants changed their service provider and only 4% changed their method of reporting mileage.

Automated methods had the highest percentage of enrolled participants with 71% enrolled participants. Plug-in methods with GPS was the most selected method with 38% participants while mileage permits were the least selected with only 1.3% participants as shown in Exhibit 6.2.



6.3 DRIVING-RELATED DATA FROM THE LIVE PILOT TEST

Pilot participant demographics generally followed the demographic makeup of the state. Ease of mileage reporting varied by method, with plug-in devices generally the easiest to use. Invoices were generally clear, but further improvements are possible.

6.3.1 DRIVING DATA BY VEHICLE TYPE, GEOGRAPHY, & DEMOGRAPHIC PROFILES

Pilot operations covered a period of twelve months, from February 1, 2018 to January 31, 2019. The pilot performed as expected—the first month was dedicated to ramp-up activities, i.e., service providers enrolled participants and helped them set up their mileage reporting methods (MRMs). Regular pilot operations started in March 2019, when most participants began actively reporting their mileage to their service providers, and the pilot team had complete months of mileage reporting data.

The pilot team analyzed the technical and demographic data collected from participants who actively reported their mileage until the end of the pilot. Participants who never actively reported mileage (e.g., never plugged in a plug-in device or submitted at least two odometer images) were considered to be noncompliant participants, and their data was not included in the analysis. The pilot data analysis was based on data collected for 1,983 compliant participants who had 2,003 active vehicles enrolled in the pilot. Participants could only have one enrolled vehicle at any time in the pilot. There was a slightly higher number of active vehicles than number of compliant participants as 24 participants changed vehicles during the pilot and had two active vehicles enrolled during different periods in the pilot.

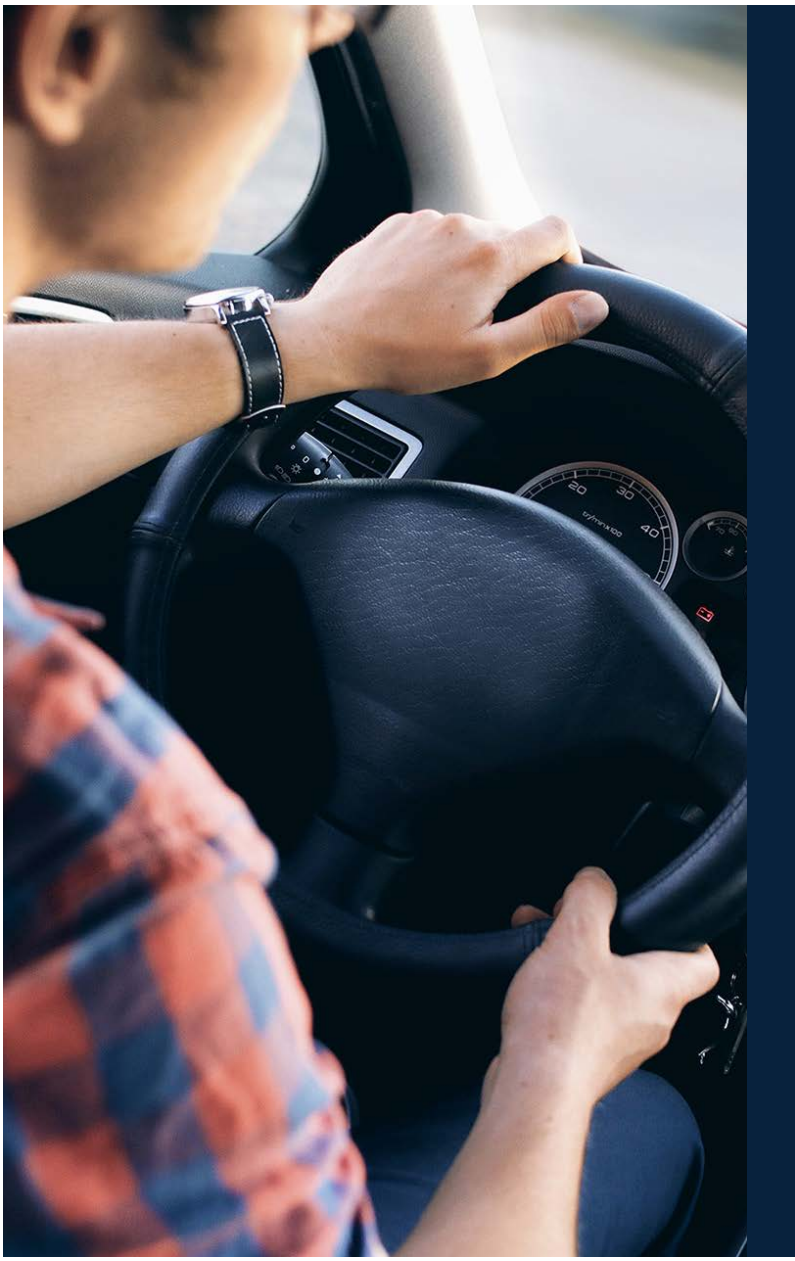


EXHIBIT 6.3
Vehicles Participating in the Pilot Test, by Propulsion Type

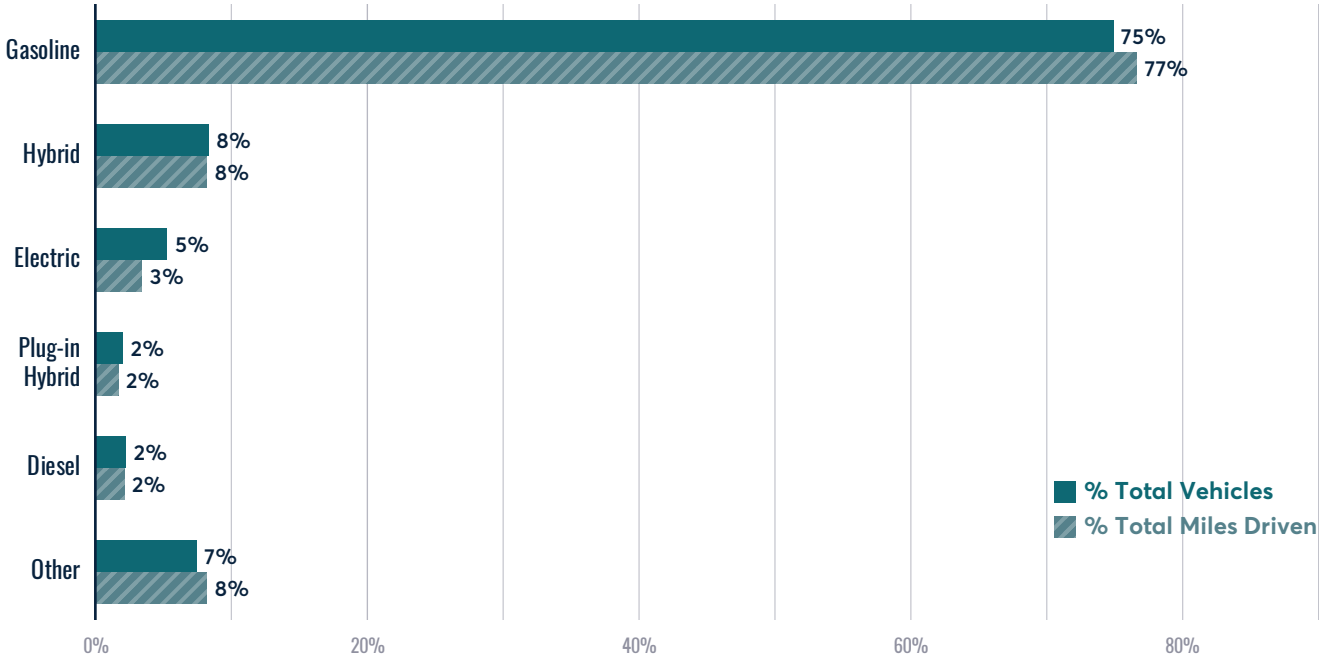


EXHIBIT 6.4
Fuel Economy, by Propulsion Type

Propulsion Type	Average MPG
Gasoline	21.9
Hybrid	36.8
Electric	N/A
Plug-in Hybrid	66.7
Diesel	21.0
Other	24.5

Average Fuel efficiency of WA RUC pilot fleet: 23.1 MPG

DRIVING DATA BY VEHICLE (PROPULSION) TYPE

The breakdown of participants by vehicle propulsion type shows that the fleet of vehicles in the pilot test is representative of the overall vehicle fleet in Washington state (noting that plug-in electric vehicles are slightly oversampled in the pilot, which was by design since they could be most impacted by any future requirements that all vehicles pay by mileage rather than gas tax).

Exhibit 6.3 shows that gasoline vehicles were driven more miles than the average pilot participant vehicle, while electric and plug-in hybrids were driven fewer miles than the average pilot participant vehicle. This confirms what owners of electric vehicles have previously reported (but until now, not measured)—that on average, electric vehicles drive fewer miles than conventional gas-powered vehicles.

Exhibit 6.4 summarizes fuel efficiency by propulsion type. The average mpg of the WA RUC pilot fleet was 23.1, which is slightly higher fuel economy than the average vehicle in Washington (20.5 mpg as of 2014) that was used as a reference to set the revenue neutral pilot test RUC rate.[1]

1 The overall RUC rate of 2.4 cents was designed to be revenue neutral and was based on the average fuel efficiency of the Washington light vehicle fleet (20.5 mpg in 2014).

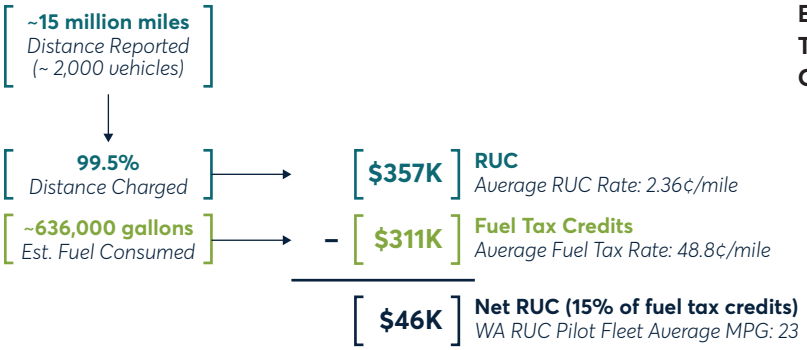


EXHIBIT 6.5
Total Mileage & Revenue Collected in the Pilot Test

TOTAL MILEAGE & REVENUE COLLECTED
Exhibit 6.5

A total of 15,239,284 miles were collected from the 2,003 active pilot test vehicles. These miles translated to net RUC revenue of $46,657. This positive net RUC revenue reflects the fact that the average fuel economy of pilot project participant vehicles was 23.1 mpg, i.e., about 13% higher than the average fuel economy of 20.5 mpg that was used to set the overall revenue neutral rate. The average RUC rate was 2.36 cents per mile, which is slightly lower than the RUC pilot test rate set for Washington (2.4 cents). This is because vehicles with location-sensing (GPS-enabled) mileage reporting methods could differentiate miles driven in other jurisdictions that had lower[2] RUC rates than the Washington RUC pilot test rate, causing the overall average rate paid by participants to be slightly lower than the Washington pilot test rate. Similarly, the average fuel tax rate was at 48.8 cents, slightly lower[3] than the Washington state fuel tax rate (49.4 cents).

MILEAGE & REVENUE COLLECTED FOR THE AVERAGE PILOT PARTICIPANT VEHICLE

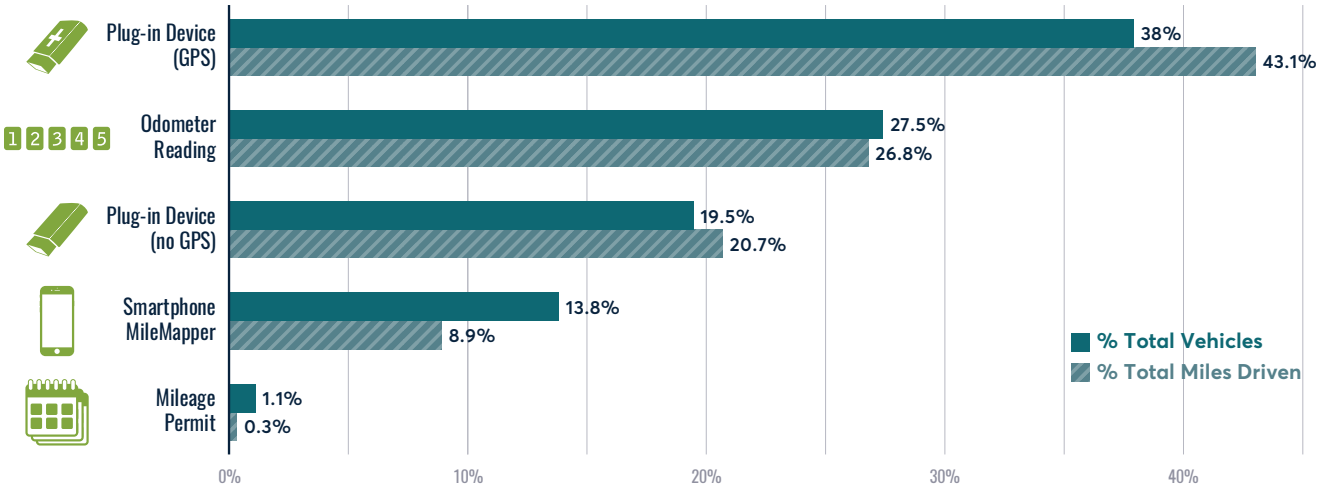
The average mileage reported per vehicle in the pilot was 11,155 miles,[4] of which 11,100 miles (99.5%) were chargeable miles traveled, totaling $261. The fuel consumed by the average vehicle was 469 gallons, which resulted in fuel tax credits of $229. Thus, the net RUC incurred by an average pilot participant vehicle, i.e., vehicle with average fuel economy of 23 mpg and driven 11,155 miles, was $32.

2 Miles charges on public roads in other out-of-state jurisdictions were charged at a lower rate than the WA RUC—Oregon (1.7 cents), Idaho (1.6 cents), British Columbia and other states were charged at $0.

3 Fuel tax applied for other out-of-state jurisdictions—Oregon (34 cents); Idaho (32 cents); British Columbia and other states earned $0 fuel tax credit.

4 The weighted average, computed (i.e., as average number of miles per month) as the number of vehicles enrolled per month, varied as shown in Exhibit 6.1.

EXHIBIT 6.6
Total Mileage Driven in the Pilot, by Mileage Reporting Method

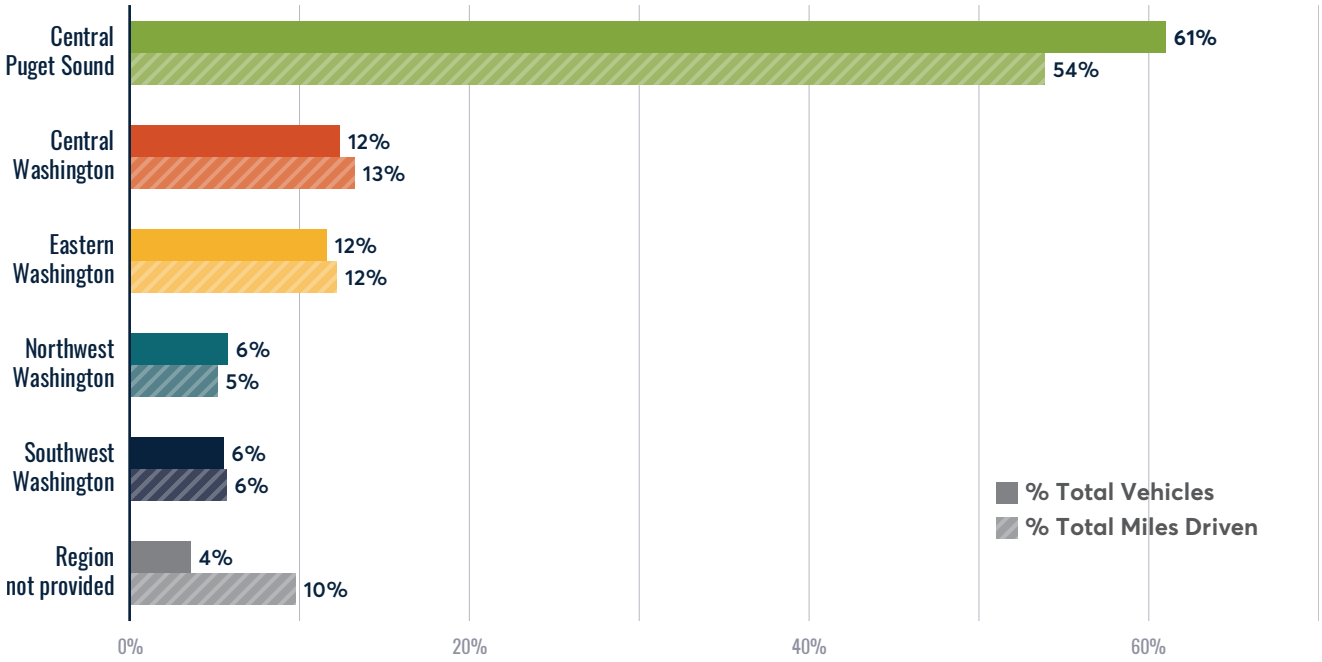


BREAKDOWN BY MILEAGE REPORTING METHOD (MRM)

Exhibit 6.6

The plug-in device with GPS was chosen by the highest percentage of active participant vehicles, while the mileage permit had the lowest selection among participants. More miles were collected proportionally on plug-in devices than for other MRMs—43% of total miles driven were collected for 38% of the participant vehicles that were fitted with plug-in devices with GPS, and about 21% of total miles driven were collected from the 19.5% of the participant vehicles that had plug-in devices without GPS. The overall number of miles collected by each method is correlated with the proportion of participants using the method and also reflects typical compliance. Plug-in devices had the highest enrollment rates (more than 50% vehicles) and also had the highest compliance rates (more than 80% compliant vehicles), resulting in their overall top position. The enrollment rate for the odometer reading method was relatively high for a manual method and had the second highest enrollment with 27.5% enrolled vehicles, but generally had low compliance levels (35% compliant vehicles).

EXHIBIT 6.7
Total Mileage Driven in the Pilot, by Region in Washington



MILEAGE REPORTED BY REGION

Exhibit 6.7

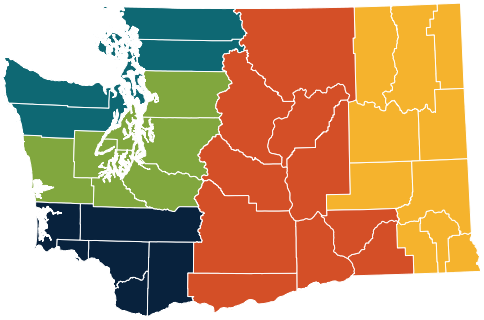
Central Puget Sound and Northwest Washington participants drove fewer miles than the statewide average. The graph in Exhibit 6.7 reflects both the breakdown of participants by region and the variation of typical driving distances among various regions of the state.

VEHICLE FUEL ECONOMY BY REGION

Exhibit 6.8

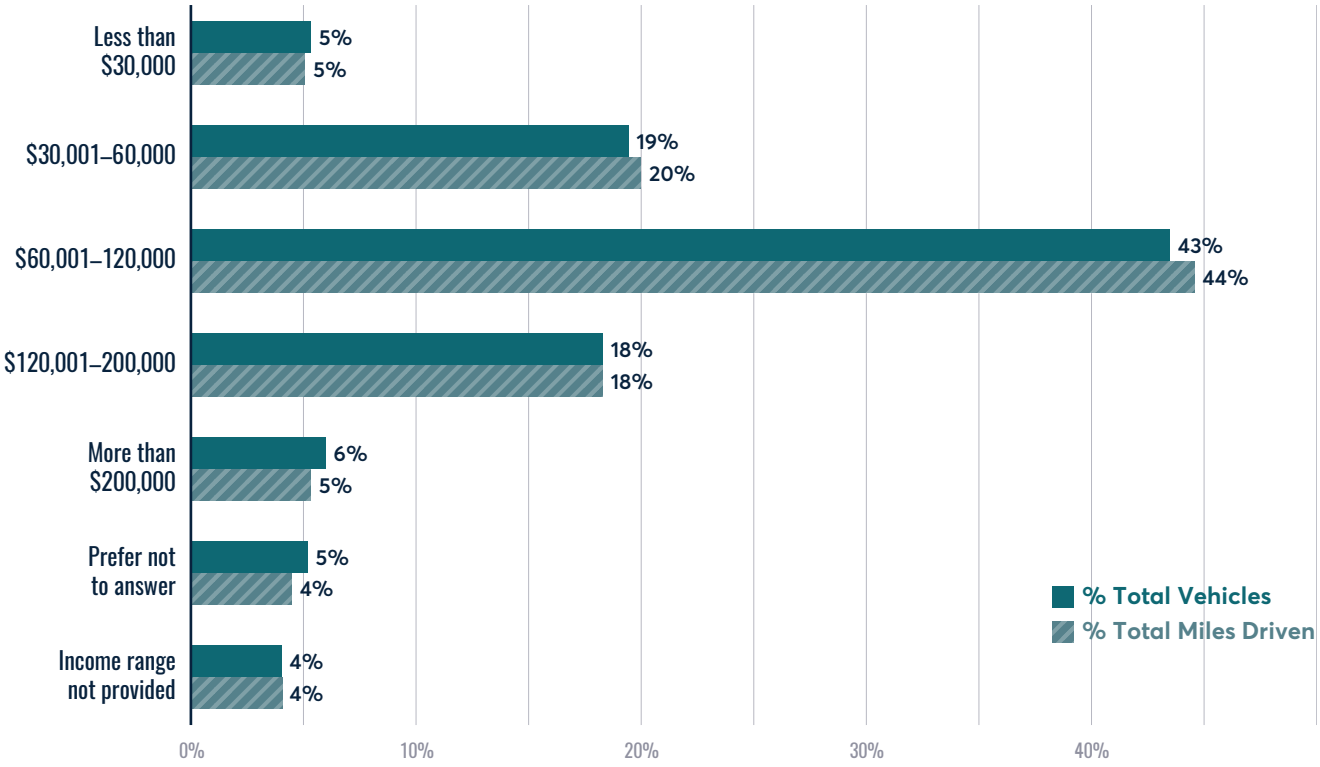
Participants in Northwest Washington enrolled more gas-powered fuel-efficient vehicles on average than participants in other regions. Central Puget Sound and Northwest Washington participants had the highest proportion of enrolled Plug-in Electric Vehicles (PEVs) per participant.

EXHIBIT 6.8
Vehicle Fuel Economy, by Region in Washington



Average MPG	% Enrolled Vehicles that are EVs	% Total EVs Enrolled in Pilot
22.9	6.7%	78.1%
23.2	2.0%	4.8%
22.0	2.6%	5.7%
24.1	6.9%	7.6%
22.8	1.8%	1.9%
26.4	2.8%	1.9%

EXHIBIT 6.9
Mileage Driven in the WA RUC Pilot Project, by Household Income



MILEAGE REPORTED BY HOUSEHOLD INCOME

Exhibit 6.9

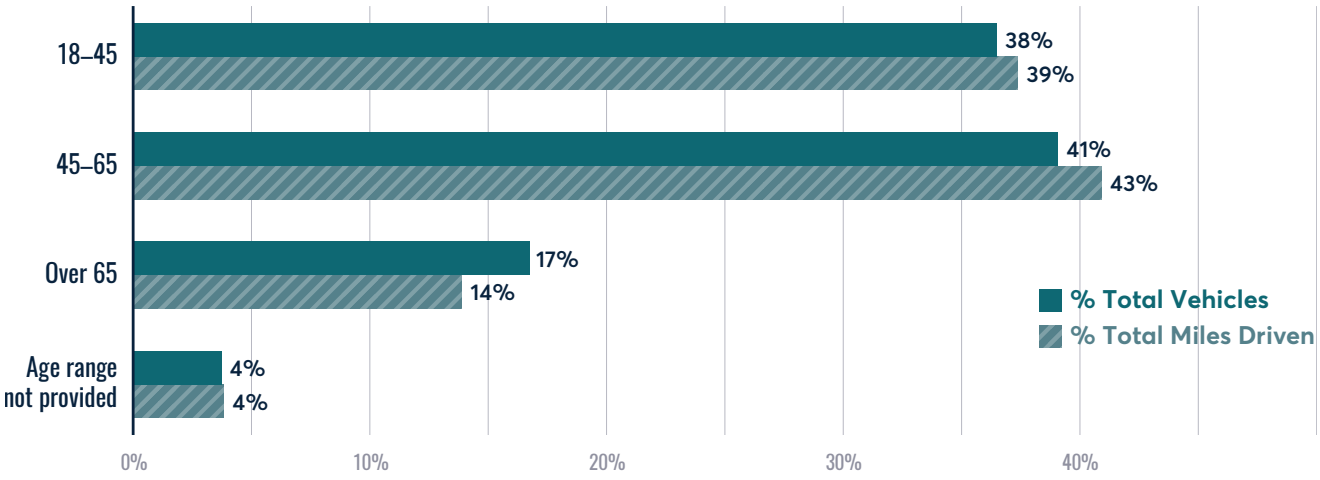
Participants with household incomes less than $30,000 and those with more than $200,000 income drove fewer miles than the average pilot participant. The pilot results did not conclusively demonstrate a relationship between household income and number of miles driven among participants.

Based on pilot data, vehicle fuel-economy of gas-powered vehicles was not correlated to household income (see Exhibit 6.10). However, the percentage of electric vehicles enrolled increased with income range—participants in the two lowest income categories had 3% of all enrolled vehicles that were EVs, while participants in the highest income category had 12% EVs.

EXHIBIT 6.10
Vehicle Fuel Economy in the WA RUC Pilot Project, by Household Income

Household Income	Average MPG	% Enrolled Vehicles that are EVs	% Total EVs Enrolled in Pilot
Less than $30,000	23.6	3%	3%
$30,001–60,000	23.7	3%	11%
$60,001–120,000	22.6	4%	32%
$120,001–200,000	22.7	8%	29%
More than $200,000	23	12%	13%
Prefer not to answer	22.7	10%	10%
Income not provided	29.8	3%	2%

EXHIBIT 6.11
Mileage Driven in the WA RUC Pilot Project, by Age Group



MILEAGE REPORTED BY AGE GROUP

Exhibit 6.11

Participants ages 18 to 45 and from 46 to 65 drove more than the average participate, while participants over 65 drove less than the average pilot vehicle. Overall, variations in miles reported by age were as expected.

Fuel efficiency of gas-powered vehicles increased with age group (see Exhibit 6.12). The percentage of enrolled EVs was the lowest for the youngest age group (4%).

EXHIBIT 6.12
Vehicle Fuel Economy in the WA RUC Pilot Project, by Age Group

Age Group	Average MPG	% Enrolled Vehicles that are EVs	% Total EVs Enrolled in Pilot
18–45	22.2	4%	30%
46–65	23.2	6%	48%
Over 65	24.1	6%	20%
Age range not provided	29.8	3%	2%

EXHIBIT 6.13
Mileage Driven in the WA RUC Pilot Project, by Race & Ethnicity

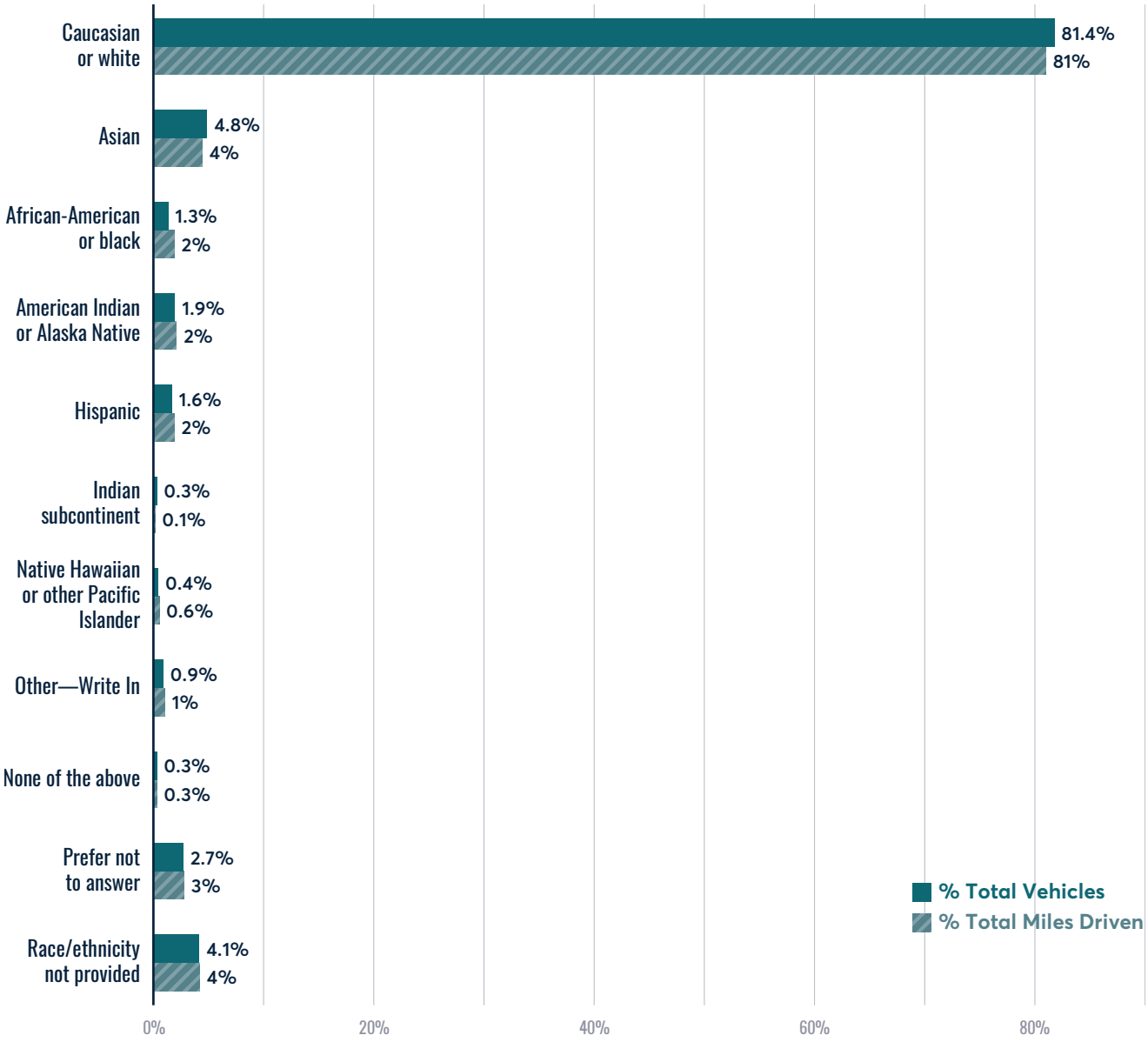


EXHIBIT 6.14
Vehicle Fuel Economy in the WA RUC Pilot Project, by Race & Ethnicity

Race/Ethnicity	Average MPG	% Enrolled Vehicles that are EVs	% Total EVs Enrolled in Pilot
Caucasian or white	22.8	5%	73%
Asian	25.8	11%	10%
African-American or black	25.0	4%	1%
American Indian or Alaska Native	20.1	0%	0%
Hispanic	25.4	6%	2%
Indian subcontinent	25.5	17%	1%
Native Hawaiian or other Pacific Islander	22.8	11%	1%
Other—Write In	21.3	28%	5%
None of the above	25.6	17%	1%
Prefer not to answer	22.8	7%	4%
Race/ethnicity not provided	29.4	2%	2%

MILEAGE REPORTED BY RACE & ETHNICITY

Exhibit 6.13

The graph in Exhibit 6.13 shows the distribution of mileage reported by race and ethnicity. Other than participants who identified as Caucasian and Asian, the proportion of participants identifying with other race and ethnicities was not significant enough to indicate any relationship between race/ethnicity and the number of miles driven in the pilot.

Other than for participants who identified as Caucasian and Asian, the proportion of gas-powered and electric vehicles for participants identifying with other race and ethnicities was not significant enough to indicate any relationship between race/ethnicity and vehicle fuel economy.

6.3.2 EASE OF MILEAGE REPORTING DURING THE LIVE PILOT TEST

Based on the pilot data, including input from pilot test drivers, findings emerged regarding the level of effort required at various points in the mileage account setup, activation, and reporting stages of the year-long pilot test.

Mileage reporting methods (MRMs) required different levels of participant effort and time at each stage of the enrollment process, summarized in Exhibit 6.15 below. The effort required in the two last stages of the pilot—activating the MRM (if required) and reporting mileage for the period—influenced the level of compliance based on the MRM chosen by the participant. Compliance requirements varied by MRM. Participants using manual methods or the smartphone application were required to submit an initial odometer reading to activate their MRM in order to achieve initial compliance, followed by further odometer readings quarterly to remain compliant. Participants using plug-in devices had to install their devices in the vehicle to start automatically reporting mileage in order to be compliant. The level of effort required also indicates the level of customer assistance and monitoring that had to be provided from the time of enrollment to the start of active mileage reporting.

From the pilot data and direct feedback from test drivers, some general findings emerged:

- Manual methods are low technology methods that required a lower level of effort from the participant during the account setup stage than during the activation and reporting stages. This meant that the service providers had to send regular prompts to the participant to first activate the method (submission of a first odometer reading) and then periodically report mileage (submission of quarterly odometer readings). Participants choosing mileage permits and odometer readings had the lowest level of compliance of all MRMs, as shown in Exhibit 6.15, because despite the multiple reminders to submit odometer images, many participants failed to do so on time.
- Participants on the MileMapper smartphone application had to spend time during setup to download and log in to the application (estimated to be 3-5 minutes on average per participant). Some participants required assistance at the setup stage due to phone compatibility issues. Once they set up

EXHIBIT 6.15
Level of Effort & Time Required to Start Actively Reporting Mileage, by Mileage Reporting Method

Mileage Reporting > Methods (MRMs)	Mileage Permit	Odometer Charge	Smartphone App (MileMapper)	DriveSync Plug-in Device	Off-the-shelf Plug-in Device*
Enroll	○	○	○	○	○
Create Account	○	○	○	○	○
Enroll vehicle	○	○	○	○	◐
Set-up method	○	○	◐	●	●
Activate method	●	●	◐	○	●
Drive and Report Mileage	●	●	●	○	○

**Automatic™ brand commercial off-the-shelf plug-in device.*

Effort/time required: ○ *Low* ◐ *Medium* ● *High*

the application, participants immediately received in-app and text prompts to report their mileage. As with the manual methods, the main effort required was to go to their vehicle to take a photo of their odometer. Compliance levels were relatively high for a method that required regular manual reports. User interfaces that summarized reporting requirements and availability of direct links to the odometer-capture function (embedded in the smartphone application) likely encouraged compliance.

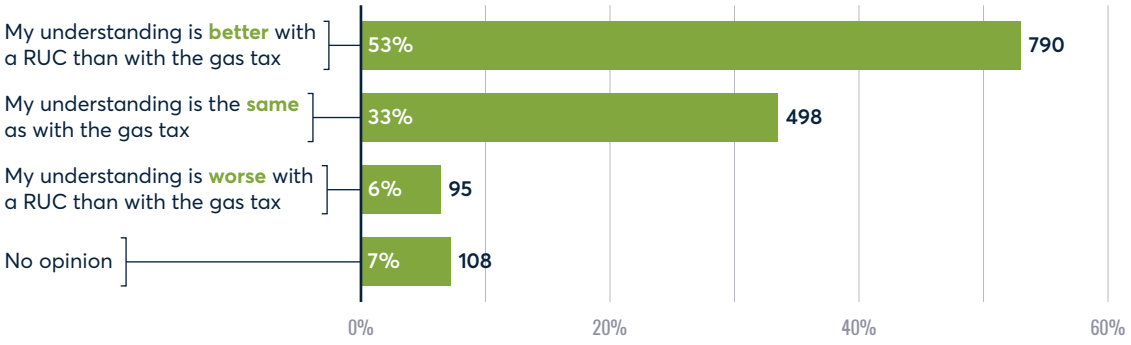
› Few participants using the automated mileage reporting (plug-in devices) required assistance during setup and activation process. Participants mainly had to be nudged into setting up their device once they received it by mail. After plugging the device in the vehicle, almost all participants actively reported mileage and were compliant. Service providers' help desk teams mostly managed exceptional cases where faulty devices had to be replaced because they did not automatically transmit the vehicle mileage. Compliance levels were high, and the instances of non-compliant participants was mostly due to the devices in the vehicle getting unplugged.

› The Automatic™ plug-in device required a high level of participant support due to the multiple steps required to enroll and setup a vehicle on the Automatic™ platform. After creating their account on the service provider's website, participants had to create a separate Automatic account which was then linked to the service provider's system. Some accounts were not successfully linked and required the service provider to closely monitor enrollment and follow-up with participants who had unlinked their Automatic accounts. The service provider's help desk team also had to follow up with participants who did not complete all device activation steps.[5]

6.3.3 INVOICES & PAYMENT

As described in Chapter 3, RUC invoices were a main tool of communication with participants, and the pilot team devoted significant resources to designing user-friendly invoices. Discussions with participants and survey results indicated that invoices helped participants to understand what they pay and how this supports transportation (see Exhibit 6.16).

EXHIBIT 6.16
Participant Understanding of Transportation Funding After RUC Invoices Sent



5 After receiving the Automatic™ device, participants had to install the Automatic application on their smartphone, plug the device in the vehicle, activate the device through a PIN code, and then drive the vehicle a short distance to activate the device.

During live pilot operations, the pilot team learned several lessons about invoice design:

1. **It is important to have a prominent "No Activity" message.** This message was used to inform participants that they had submitted no mileage data for the given invoicing period—either they had not submitted an odometer image, their plug-in device had remained unplugged for the entire period, or they had not used their vehicle at all for the given invoicing period. This message encouraged those who had neglected to report mileage to take action so they would again report mileage in a future invoicing period.
2. **Invoices should be kept concise and clear.** DriveSync's invoices, while graphically appealing, spread on too many pages, and in cases where participants switched vehicles during the pilot, former vehicles remained on the invoices on earlier pages than current vehicles. Lessons learned are that invoices should be kept to as few pages as possible to convey the information, and former vehicles should be omitted from invoices where they have no driving activity.
3. **There were a range of unique use cases that required different handling on invoices.** For example, participants who switched between MRMs had different invoicing cycles (monthly or quarterly), participants who changed service providers were sometimes confused by the differing invoice formats of the two providers, and participants who changed vehicles during the pilot had multiple vehicles on the same invoice. Also, MRMs had different invoicing requirements, and the select number of participants who volunteered to participate in the real payment demonstration between Washington and Oregon experienced an additional set of operating requirements. Because the participant received a unique invoice that summarized all the driving activity (including MRM change and vehicle changes), invoice layouts could sometimes appear complex and potentially be vulnerable to processing errors.

To mitigate the risk of processing errors indicated in #3 above, the project team set up a monthly invoice review process to review samples of invoices for each use case and MRM before the invoices were distributed to participants. Issuing all invoices on one single day was also challenging for service providers. In a large-scale program (hundreds of thousands or millions of participants), generating invoices on a rolling basis (instead of synchronizing them with a calendar month) can help reduce load management issues.

As mentioned in Chapter 3, only the payments demonstration participants paid real money for their invoices. These 25 participants were selected based on the fact that they had chosen a plug-in device with location on DriveSync and lived relatively close to the Oregon border, so they were most likely to have driving activity in Oregon. There were also approximately 90 participants from Oregon's ORe*GO* program that participated by paying real money for their travel in Washington. Payments Demonstration participants received Visa-branded cash cards, which they used each month to pay for their driving. The DriveSync web portal stored the cash card numbers, so once loaded, payment was automatic, only requiring participant activity when the cash card was used up. Lessons learned from the payment demonstration experience were that:

1. Real money payments are straightforward to establish.
2. It is vital to allow the ability to store payment card information, as this improves the customer experience.
3. The interoperability HUB could support interstate and international funds transfers in a straightforward manner, as described in the next section.

6.4 INTEROPERABILITY HUB RESULTS: CROSS-BORDER TRAVEL & PAYMENTS

The interoperability HUB successfully demonstrated interstate and international RUC payment interoperability. It also successfully demonstrated real money payment interoperability. This section includes an invoice to illustrate the participant experience of owing RUC in multiple states.

6.4.1 SUCCESSFUL PROCESSING OF MILEAGE REPORTS & PAYMENTS FROM ALL PARTICIPATING JURISDICTIONS

As described in Section 3.5, the WA RUC pilot sought to develop and test the nation's first accounting and reconciliation of real funds through a central clearinghouse (known as the "HUB") for distances driven and RUC charges paid across multiple jurisdictions. WA RUC and Oregon's road usage charge program ORe*GO* collaborated in the recruitment and enrollment of residents in each state who drive regularly in the other state as well as the reporting of data to the HUB for purposes of simulating multi-jurisdictional RUC reconciliation. Separately, WA RUC collaborated with the Idaho Transportation Department and the City of Surrey, BC, to recruit and enroll participants from those jurisdictions to experience simulated charging and payments, as well as simulated reconciliation of funds across multiple jurisdictions through the HUB. Details of setting up the HUB are described in Section 3.5 of this report.

The HUB successfully processed four quarters of multi-jurisdictional driving data from Washington, Oregon, Idaho, and British Columbia. In addition, the HUB successfully demonstrated a real-money multi-jurisdictional reconciliation of RUC funds between Oregon and Washington.

The WA RUC pilot featured about 20 drivers from British Columbia and 7 drivers from Idaho. All participants successfully reported their miles driven to their account manager DriveSync, and DriveSync in turn successfully reported mileage and RUC due to the HUB. This allowed for a theoretical calculation of the RUC due among jurisdictions.

More interestingly, the Oregon-Washington interoperability test featured about 90 Oregon vehicles actively enrolled with account manager Azuga in the ORe*GO* program and about 25 Washington vehicles enrolled with DriveSync. To be eligible, participants had to choose the plug-in device with GPS option, which was the most reliable reporting method used in the pilot for distinguishing miles driven by states. Although the project team seeded participant accounts so no one would incur out-of-pocket costs for their participation, participants nonetheless paid real money for their miles driven in both states.

Exhibit 6.17 below illustrates the quarterly totals for the RUC reconciliation between Oregon and Washington. Across the 115 or so participants for one year, the net amount due (and transferred) between jurisdictions was $94.12 from Oregon to Washington.

EXHIBIT 6.17
RUC Reconciliation Between Washington & Oregon, by Fiscal Quarter

	Q1	Q2	Q3	Q4	Total
Miles driven in Oregon by Washington drivers	2,406	11,191	10,483	7,906	**31,986**
Amount owed by Washington to Oregon	$2.79	$42.77	$49.35	$29.28	**$124.19**
Miles driven in Washington by Oregon drivers	2,855	14,692	13,142	13,489	**44,178**
Amount owed by Oregon to Washington	$11.84	$77.47	$81.42	$47.58	**$218.31**
Net transferred from ⟶ to	$9.05 OR ⟶ WA	$34.70 OR ⟶ WA	$32.07 OR ⟶ WA	$18.30 OR ⟶ WA	**$94.12 OR ⟶ WA**

6.4.2 DRIVING INVOICES FOR CROSS-BORDER TRAVEL & RUC OWED

Exhibit 6.18 below shows the pages of an actual WA RUC invoice for a driver who volunteered for the multi-state interoperability test, where mileage and payments were made to DriveSync and reported to the WA RUC HUB, accounts were reconciled, and funds were transferred to each respective jurisdiction.

DRIVESYNC.

WA RUC

Bill to

INV-----
Invoice number

7/2/18
Invoice date

6/1/18 - 6/30/18
Invoice period

$8.83
AMOUNT DUE BY 8/2/18

Thank you for volunteering for the Washington road usage charge pilot

Road Usage and Payment Summary

Distance Charged (mi.)	Road Usage Charge ($)	Gas Consumption (gal.)	Gas Tax Credit ($)	Net RUC ($)
2,014.0	42.64	82.67	(33.81)	8.83

Previous Balance ($)	12.11
Payments Received ($)	
June 6, 2018	(12.11)
Outstanding Balance ($)	0.00
Invoice Total ($)	8.83
Total Amount Due ($) by August 2, 2018	8.83

More information about your invoice

Online at waruc.drivesync.com

EXHIBIT 6.18
WA RUC Pilot Participant's Driving Invoice for Differentiated Mileage Between Jurisdictions

Personally identifiable information removed.

DRIVESYNC.

WA RUC

7/2/18
Invoice date

6/1/18 - 6/30/18
Invoice period

INV-----
Invoice number

Nissan

Plug-in Device

Odometer Reading

Day	Odometer Reading (mi.)	Reading Type	Distance Driven (mi.)

Charges

Jurisdiction	Distance Charged (mi.)	Distance Not Charged (mi.)	RUC Rate ($/mi.)	Road Usage Charge ($)	Gas Consumption (gal.)	Gas Tax Rate ($/gal.)	Gas Tax Credit ($)	Net RUC ($)
OR	286.1	3.8	0.017	4.86	13.79	0.340	(4.70)	0.16
All other miles	48.8	0.0	0.024	1.18	2.39	0.494	(1.16)	0.02
BC	154.6	8.5	0.000	0.00	9.75	0.000	0.00	0.00
WA	1,524.5	6.5	0.024	36.60	56.74	0.494	(27.95)	8.65

8.83
Total ($)

6.5 TABLETOP EXERCISE: TESTING RUC COMPLIANCE & ENFORCEMENT

While the pilot did not include enforcement measures, a RUC avoidance tabletop exercise was held to gain insights into RUC avoidance methods and countermeasures to prevent avoidance.

6.5.1 METHODS OF AVOIDING RUC

The WA RUC pilot did not include enforcement, since a voluntary activity offers little value for assessing the effectiveness of enforcement measures. Instead, the pilot detected instances of noncompliance, attempted to diagnose the reasons, and encouraged voluntary compliance, for example by reminding participants via text, email, and phone to submit an odometer image or plug in a device.

Despite the limited ability to test enforcement measures in a pilot, the Steering Committee recognized the importance of deterring evasion and other forms of noncompliance in a RUC system. To supplement pilot noncompliance detection and voluntary compliance encouragement, a RUC avoidance tabletop exercise was conducted to determine all the ways motorists could avoid RUC, including intentional evasion and unintentional negligence. This began with brainstorming possible methods of avoid enrollment in a RUC program and failing to report or mis-reporting mileage driven, based on the pilot experience. The pilot team then developed preventive and mitigation approaches for detecting and/or deterring avoidance of RUC in a live system.

The possible methods of avoiding RUC fall into two basic categories: deliberate (evasion) and accidental (negligence). Both have the same effect: reducing revenue.

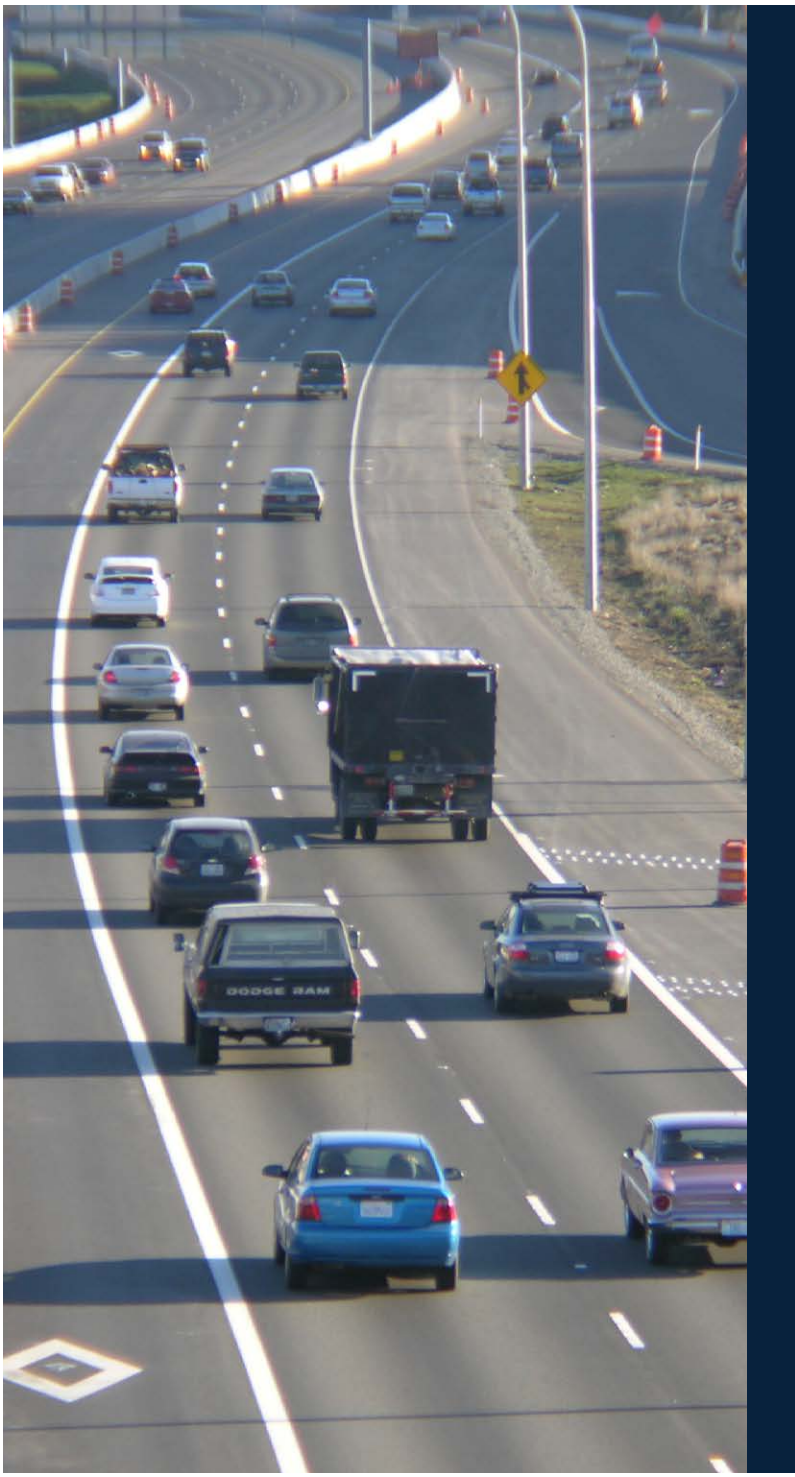
Deliberate evasion ranges from attempts to avoid RUC altogether (enrollment, account maintenance, or payment) to attempting to reduce the amount owed fraudulently to undermining the RUC system. Within each category of deliberate evasion exists a wide range of active steps a motorist could undertake to avoid paying RUC. Examples include misrepresenting the type or characteristics of a vehicle to avoid being subject to RUC in the first instance, attempting to register a car out of state, tampering with mileage measuring equipment or RUC reporting software.

Some evasion attempts require little effort or cost on the part of a motorist, such as avoiding enrollment in a RUC program. Other evasion attempts require extensive effort, such as hacking into the RUC accounting software to manipulate data. And some attempts require a moderate effort, such as digital odometer rollback. Given the modest amount of RUC any single vehicle might incur (up to, perhaps, several hundred dollars per year), the effort and cost of avoiding or interfering with proper mileage measurement and RUC payment likely exceeds the benefit of the reduced cost in most cases. Nonetheless, the Steering Committee appreciates the importance of preparing for as many possibilities as reasonably possible for a revenue collection program to remain robust and achieve its purpose of funding the road system.

6.5.2 MEASURES TO ADDRESS RUC AVOIDANCE

The project team created three categories of measures to address and combat evasion: policy and legal, operational, and technological. These measures aim to address possible evasion techniques in aggregate, so as to balance the level of effort, cost, and complexity for the state relative to the risk of revenue loss. Examples of key measures include:[6] requiring pre-payment of RUC, requiring outstanding RUC obligations to follow the vehicle (not the owner), not allowing net refunds for fuel taxes (or not applying RUC to vehicles who already pay more per mile in fuel taxes), developing smart algorithms for initiating audits of motorists, applying escalating civil penalties for noncompliance, and applying the time permit as a "backstop" for vehicles who fail to comply.

Two evasion scenarios remain challenging to detect and prevent even with effective countermeasures in place. The first is digital odometer rollback on vehicles never served by a licensed mechanic. Although significant penalties for odometer rollback exist in state and federal law, it still occurs, primarily for the benefit of higher vehicle resale values (which likely exceeds the benefit of avoided RUC). Licensed mechanics report odometers, which the state can access through services such as CarFAX and can be used in this scenario to determine whether an odometer has been rolled back. The frequency of this scenario occurring is likely low, but worthy of monitoring and, at least in the near term, addressed by continuing to collect the gas tax, which minimizes the financial losses to the state in instances of such fraud. The second scenario involves two identical vehicles (same year, make, and model) submitting odometer images from one another. Although difficult to detect, this scenario can be discovered through targeted audits and, in any case, is likely to seldom occur.



6 See RUC Evasion Tabletop Exercise, presentation materials at May 2, 2019 Washington State Road Usage Charge Steering Committee meeting, SeaTac, Washington.


58TH AVE

6.6 END OF LIVE TEST DRIVE: DECOMMISSIONING THE WA RUC SYSTEM

The RUC system was decommissioned in an orderly manner after a year of operations. This involved closing test drivers' RUC accounts and collecting mileage reporting devices.

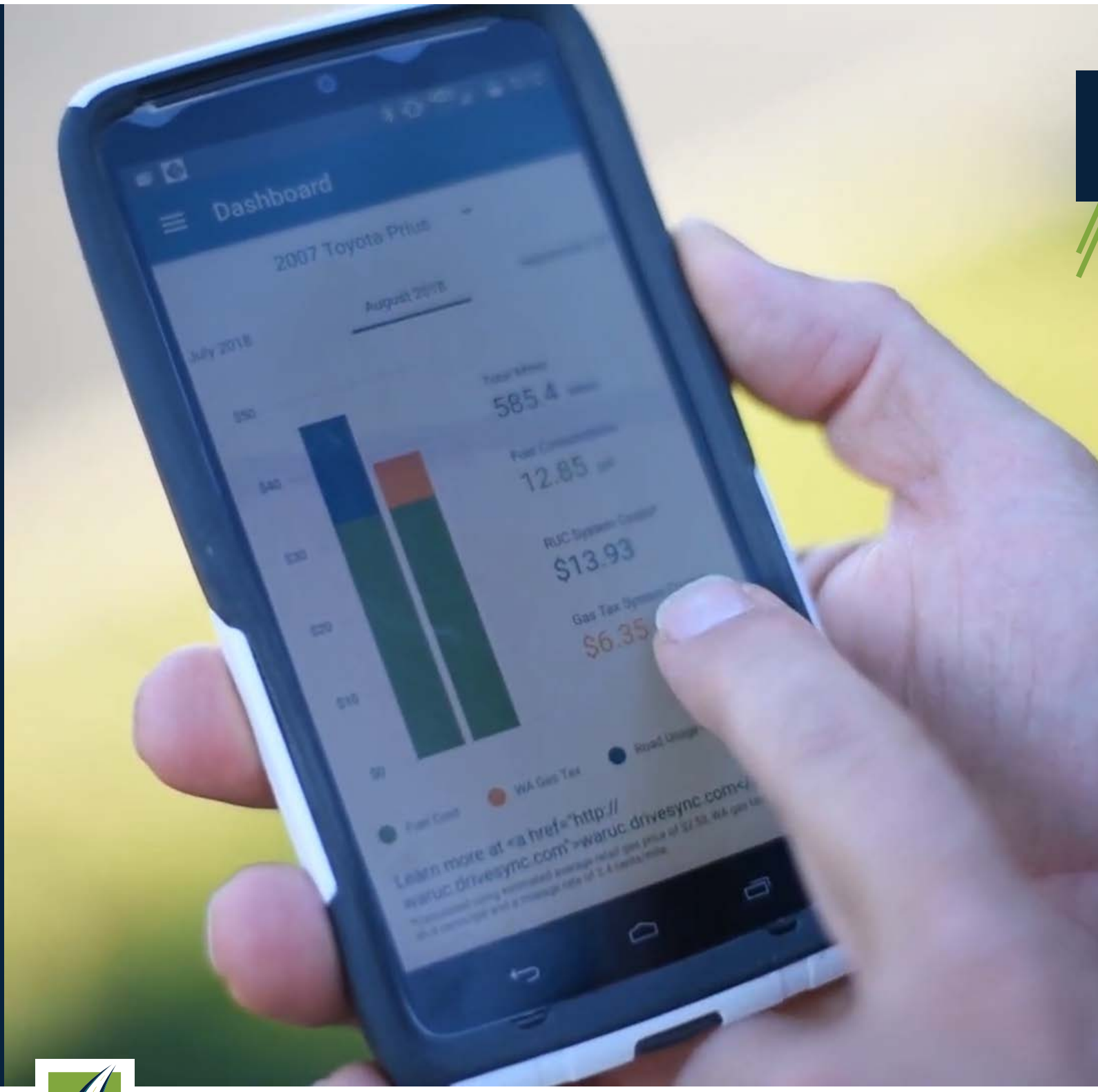
Pilot operations ended on January 31, 2019 for all pilot participants from Washington, Idaho, and British Columbia. The pilot team coordinated close-out activities with service providers and vendor teams two months ahead of the close-out date. Close out activities included account deactivation by service providers, rewards distribution for participants who completed all requested research tasks and surveys, destruction of individual driving data, and final WA RUC Pilot Project driving test communications with participants.

Service providers and the pilot team signaled the key close-out dates and processes to participants in advance so that they would be warned when their pilot account and service provider accounts were deactivated and when their data would be purged from the service providers' systems. The sign-in pages on the pilot website and the service providers' website landing and Frequently Asked Questions (FAQ) page began displaying key information (dates and contact information) on the closeout about one month before the pilot end.

Service providers sent emails with close-out instructions to participants two weeks before the pilot ended. The closeout notification e-mail was tailored to each MRM. Emails for participants on UBI plug-in devices included information on how to return the devices and emails for the other methods, instructions to report final odometer readings and, when applicable, instructions to uninstall smartphone applications.

Participants who followed the closeout instructions received farewell emails from their service provider after they sent in their devices or odometer images. The emails confirmed that the participant's account had been closed, and that the participant would receive no further communications from the service provider after the pilot ended. Participants who were eligible for rewards were informed that they would receive an end-of-pilot reward. The service providers used final odometer readings and mileage reports to issue final close-out invoices to participants.

After the pilot team completed pilot data analysis for the Steering Committee, all Personally Identifiable Information (PII) generated during the pilot was purged. This involves permanently, irrecoverably deleting data from all their systems, including the primary production environment, backup systems, and test environments.


Dashboard
2007 Toyota Prius
August 2018
July 2018
585.4
12.85
$13.93
$6.35
WA Gas Tax
Road Usage
Fuel Cost

chapter 7

THE RESULTS: PILOT PARTICIPANT SURVEYS, FOCUS GROUPS, & HELP DESK FEEDBACK

After a year participating in the WA RUC Pilot, drivers from all over Washington weighed in with their views on the system. Based on the results of surveys administered at different intervals in the project, test drivers became more in favor of RUC over the gas tax throughout the year, with 68% of respondents preferring RUC over the gas tax or preferring it equally to the gas tax by the end of the pilot, while 19% preferred the gas tax. Moreover, the number of undecided participants dropped from 28% at the beginning of the pilot to just 8% by the end. The year-long pilot appears to have provided most drivers with enough information to form opinions.

Six focus group sessions yielded insights into the beliefs and concerns of test drivers. The conversational nature of focus groups allowed participants to explain their views in more detail.

Inquiries from both participants and the general public were fielded by the WA RUC Help Desk, and their questions and comments were documented and summarized in monthly communications reports, which helped the project team spot emerging issues in the pilot or trends in public interest in a RUC.

key takeaways

1. The WA RUC Pilot Project appears to have succeeded in allowing the public to test out a new tax system to pay for roadways and weigh in with their preferences and concerns. At the outset, 28% of participants said they needed more information before they could form an opinion about a RUC as a future replacement for the gas tax. By the end of the 12-month live pilot test, only 8% said they still needed more information.
2. The public overwhelmingly appreciated the opportunity to participate in a RUC pilot before any decisions are made about whether or how to move forward with this revenue system in Washington. Ninety-one percent (91%) said they were satisfied or very satisfied with their overall pilot experience, regardless of how they felt about RUC as a future funding method.
3. Open-ended responses to survey questions as well as focus group discussions revealed that many drivers are concerned about the potential complexity and cost of a RUC system that would apply to all registered vehicles in Washington. Collecting the gas tax is a long-standing method of revenue collection that people are familiar with and has relatively low administrative overhead. Moving to a per-mile charge will require new reporting and payment systems, and participants had concerns about how this could be done most efficiently.
4. Although they generally felt their privacy was protected in the pilot,[1] participants were unwavering in their priority: protection of personal privacy is their top concern. This was the top concern for 89% of participants, which held steady when asked before launch, at the mid-point, and at the end of the pilot project.
5. Other commonly expressed views from the open-ended survey questions, focus groups and help desk comments included concern for how RUC would be enforced (especially since compliance and enforcement was not tested in the pilot project). Some felt the mileage reporting system would be subject to cheating or people "gaming" the system to avoid payment, while others expressed concern about how drivers from out-of-state would be required to pay.
6. When asked for their advice to elected officials as they consider the next steps in implementing a RUC system statewide, 61% said move forward with RUC implementation, either immediately or to be phased in over a 5 to 10 year period; 28% said move forward but apply RUC more narrowly, such as requiring high-mileage vehicles like hybrids and/or plug-in electric vehicles to pay; 10% said take no further action on RUC.

1 See Appendix A-2, Survey 2 Results.

7.1 PARTICIPANT SURVEYS: WHAT TEST DRIVERS SAID

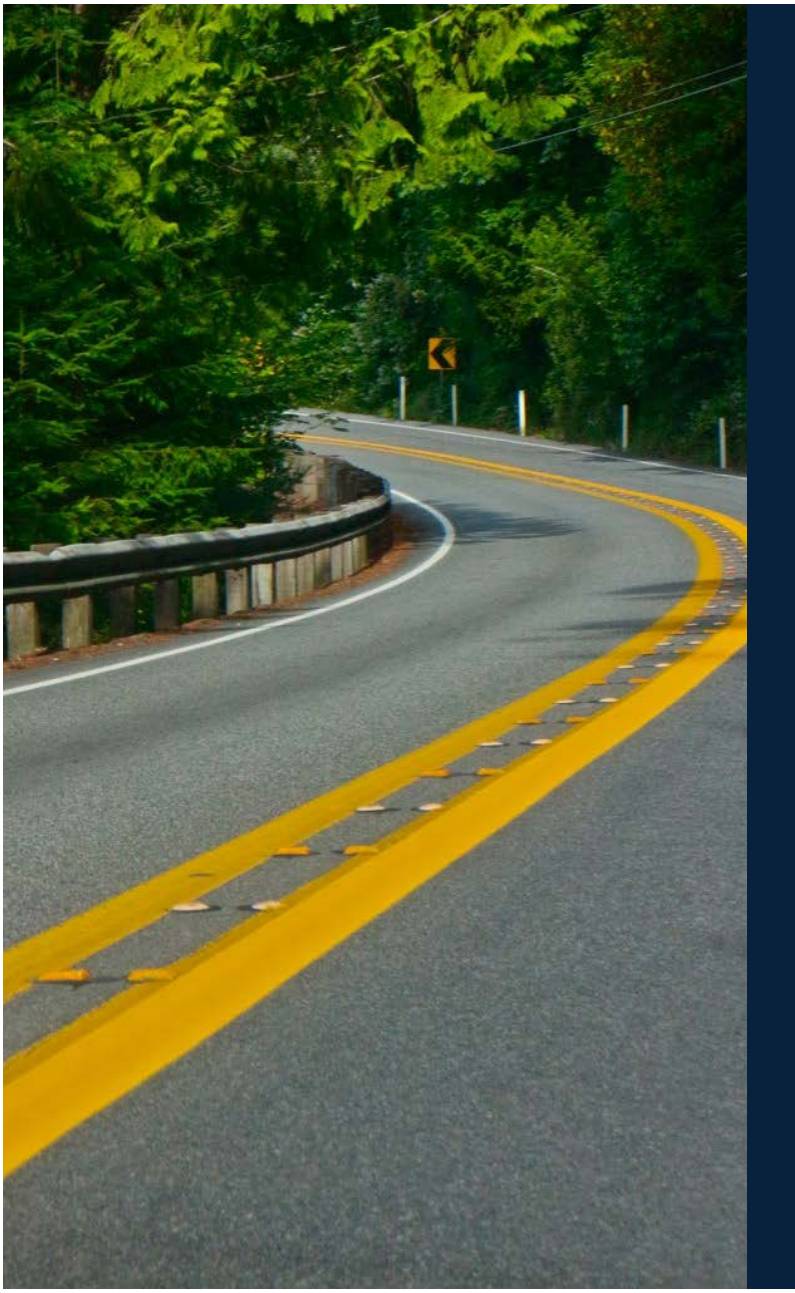
Test drivers responded to three different surveys—at the beginning, at the mid-point, and at the conclusion of the pilot project. Their experience testing a RUC system allowed them to form opinions and draw conclusions.

Participants were surveyed about their perspectives on transportation funding and how the pilot was going. A complete list of questions and responses for each survey is in Appendix A-2.

Survey 1 was administered in March to May 2018, at the outset of the 12-month live test drive. Survey 2 was administered at the mid-point of the live test, and Survey 3 was administered in February 2019, at the conclusion of the live test.

Survey results are organized in this section as follows:

- **RUC and Transportation Policy Findings—**high-level perspectives about transportation funding.
- **Guiding Principles Findings—**views on the RUC Pilot's Guiding Principles.
- **Pilot Administration Findings—**views of the pilot itself, such as the technical assistances from service providers.
- **About Pilot Participants—**characteristics of survey respondents, such as geographic location and reporting device.



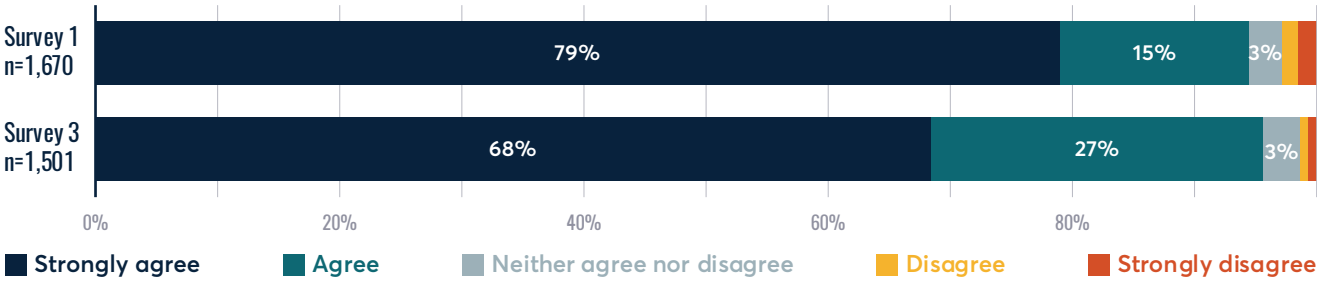
7.1.1 RUC & TRANSPORTATION POLICY FINDINGS

TRANSPORTATION FUNDING

Respondents strongly believe the State needs to adequately fund transportation infrastructure (Exhibit 7.1). Over 90% of respondents agreed that adequate funding for transportation structure is needed, though the share responding strongly agree was lower in Survey 3 than in Survey 1.

EXHIBIT 7.1
Survey Summary: Adequate Funding

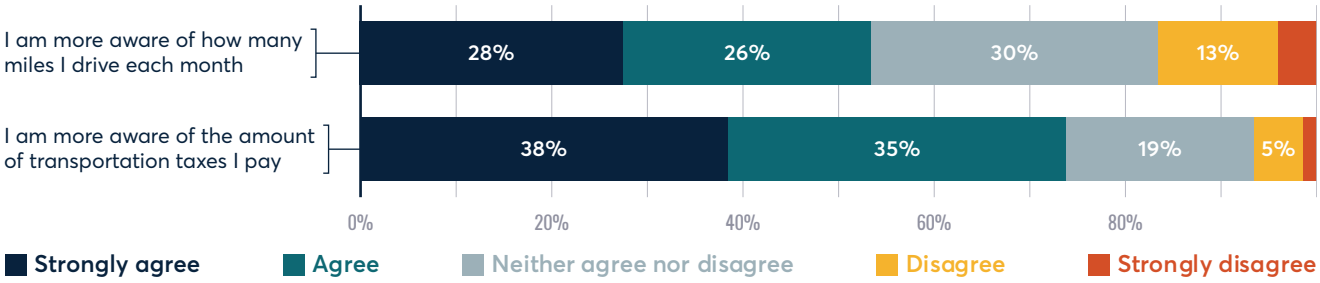
Please indicate your level of agreement with the following statement: Washington State needs to ensure adequate funding is available to keep our transportation infrastructure safe, effective, and properly maintained.



Survey respondents were more aware of transportation taxes paid and more aware of their miles driven at the end of the pilot (Exhibit 7.2). Survey takers were asked to estimate the annual amount of gas taxes they paid, and only about 20% were accurate at the start of the pilot (based on an analysis of reported miles driven and vehicle miles per gallon). By the end of the pilot, over 70% of respondents said they are more aware of the amount of transportation taxes they paid than they were at the start of the pilot.

EXHIBIT 7.2
Survey Summary: Driver Awareness

Based on your participation in the RUC pilot, please indicate your level of agreement with each of the following:



Survey respondents preferred a road usage charge to fund transportation, with preference for a RUC increasing over time (Exhibit 7.3). Overall, 68% of respondents preferred a RUC over the gas tax or preferred it equally to the gas tax by the end of the pilot. Of those who were not sure or needed more information at the start of the pilot, by the end of the pilot 59% preferred a RUC or preferred it equally to the gas tax (Exhibit 7.4).

EXHIBIT 7.3
Survey Summary: Methods to Fund Transportation

Fairness aside, knowing what you know today, which method to fund transportation would you prefer?

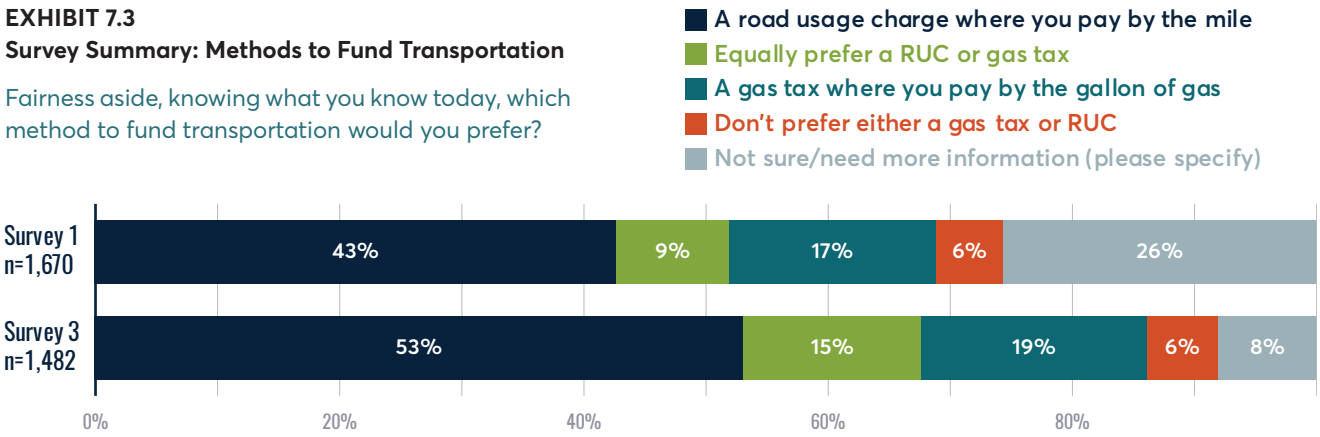


EXHIBIT 7.4
Survey Summary: Funding Preferences

Funding preferences in Survey 3 for those that answered "not sure/need more information" in Survey 1 (i.e., the question asked in Exhibit 7.3):

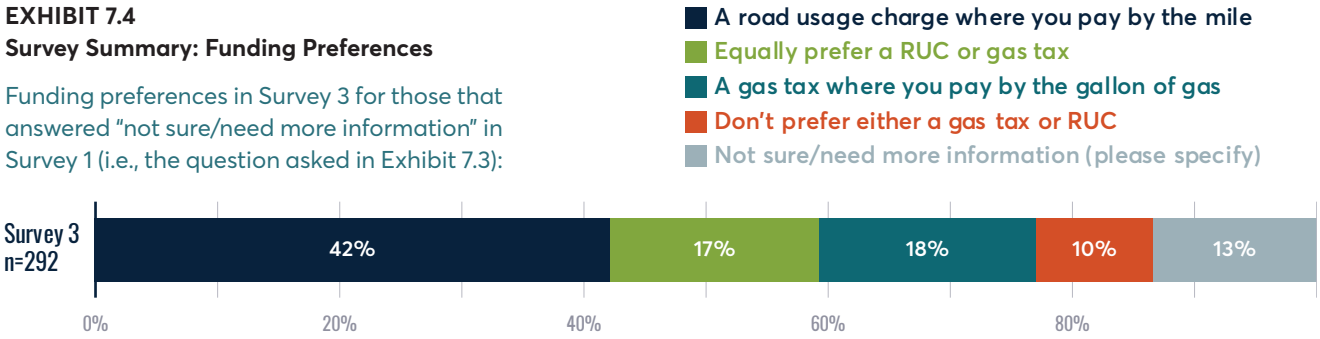
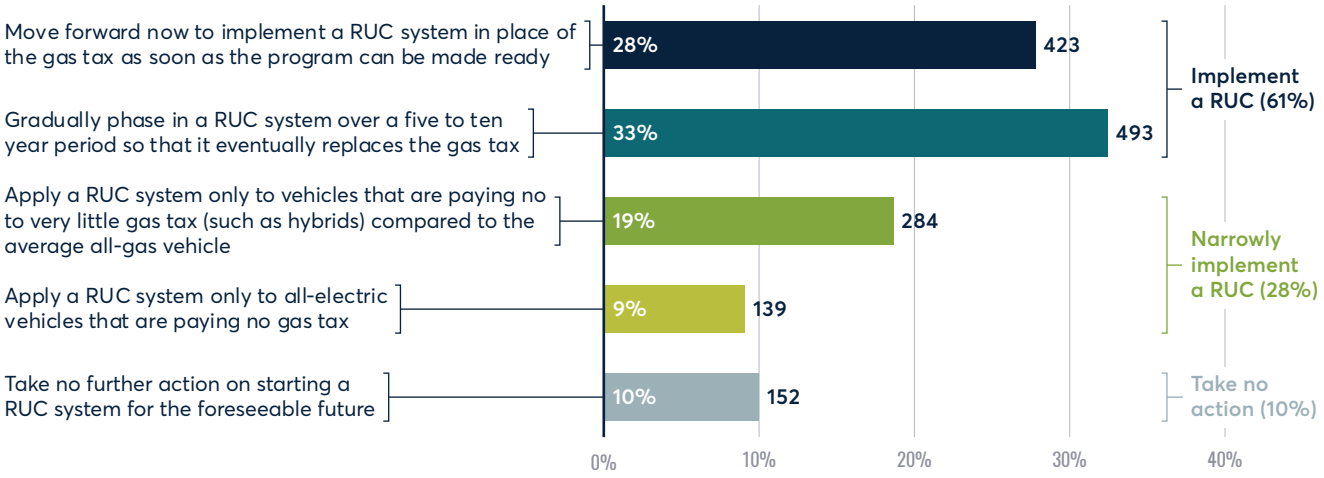


EXHIBIT 7.5
Survey Summary: Advice for Elected Officials

Which of the following best represents your advice to elected officials as they consider the next steps in implementing a road usage charge system statewide?



Most respondents support moving forward to implement a road usage charge or gradually phasing it in (Exhibit 7.5). One-third support a gradual phase-in and nearly 30% advise moving forward to implement a RUC as soon as it is ready. Only 10% of respondents recommended no action.

7.1.2 GUIDING PRINCIPLES & PARTICIPANTS' VIEWS

The RUC Steering Committee established thirteen guiding principles for the design of a potential RUC system with corresponding evaluation measures to answer key questions during the pilot. Participants were asked to assess and rank nine of the thirteen Guiding Principles.[2] The definitions for each principle was given to participants, and results of their rankings are shown in Exhibit 7.6, along with the number of survey respondents rating them as "very important" in each survey.

EXHIBIT 7.6
Survey Summary: Principles

How important to you are the following principles for a potential road usage charge system?

Principle	Definition	Survey 1	Survey 2	Survey 3	Change (1 to 3)
Privacy	My personal and driving information cannot be sold to any organization or shared with entities other than those directly administering a RUC system without my consent.	83%	90%	89%	6%
Simplicity	A RUC system is easy to participate in and not time-consuming to comply with.	70%	79%	78%	8%
Data Security	A RUC system provides the highest level of data security possible and drivers can obtain information that clearly outlines the security measures.	74%	77%	75%	1%
Transparency	Clear information is available on the rate and how it is set, as well as RUC system operations.	75%	74%	70%	-6%
Cost Effectiveness	A RUC system is efficient for the State of Washington to collect, administer, and enforce.	62%	67%	65%	3%
Equity	All drivers pay their fair share based on how much they use the roads regardless of vehicle type.	59%	60%	61%	2%
Enforcement	A RUC system is easy to enforce, and costly to evade.	51%	57%	58%	7%
User Options	A RUC system provides choices to drivers for how they report their miles.	43%	58%	52%	9%
Charging Out-of-State Drivers	Visitors to the state pay for their use of Washington roads.	32%	43%	39%	8%

Note: Principles were presented in random order when participants took the survey.

2 The four Guiding Principles not ranked in the participant surveys related to directives for enactment and administration by government—for example, harmonize RUC with other public policy objectives, and develop a transitionary period to phase in RUC.

definition

My personal and driving information cannot be sold to any organization or shared with entities other than those directly administering a RUC system without my consent.

evaluation measures

1. **Participant perception of privacy protection, including any changes in perception during the pilot.**
2. **Relative ability of mileage reporting methods to protect participant privacy.**

PRIVACY

Privacy was the most important guiding principle across all surveys; however; evaluating privacy protection was difficult.

When discussing privacy, comments typically noted concerns about location and movements being tracked and the amount of information collected under a RUC. Respondents frequently linked privacy to data security (wanting to ensure their private information cannot be breached).

The following information was collected under the pilot: name, address, self-reported demographic information, vehicle identification number, vehicle make/model and year, miles driven per month, mileage reporting method, and contact information. The majority (83%) felt they were asked to provide the just right amount of information, and 5% felt they were asked to provide too much.

"It would be nice to have a simple, non-intrusive way to deal with that issue, but I do NOT like location tracking (the obvious choice) as that has too much potential for future feature creep."

"Information collected by DriveSync (breaking, speed, cornering, etc.) should not be transmitted to law enforcement or insurance companies without the driver's express permission. So, if a RUC is passed, those privacy and legal protections should be written into the legislation."

SIMPLICITY

Most users found the account and device setup process simple and easily achievable.

A majority (77%) of respondents in Survey 1 agreed the account set up process was clear and easy to complete. Across each reporting method, median time to register upon enrollment was 20 minutes. However, some reporting methods were more difficult to comply with than others.

Most users of the automated reporting types strongly agreed with the statement "instructions for using the reporting method were clear and easy to follow." This was less true for those with the mileage permit, which was selected by fewer than 20 participants. Only 9% of mileage permit drivers strongly agreed that it was "a convenient way to participate in the pilot."

The biggest motivations for reporting device selection were simplicity, ease, and convenience, with almost 70% choosing their reporting methods for those reasons. While the account setup and device reporting were simple, many comments noted that paying at the pump was easier.

definition

A RUC system is easy to participate in and not time-consuming to comply with.

evaluation measures

1. **Time and indirect costs expended by participants to comply with pilot tasks.**
2. **Participant understanding of compliance requirements.**

"This pilot has shown me that it would be more work to report monthly odometer readings than to just pay gas tax at the pump."

"The beauty of the gas tax is how simple it is to administer—people don't even know they're paying it. The alternative should not require substantial effort, overhead, or enforcement, it should be "baked in" to an existing process."

definition

A RUC system provides the highest level of data security possible and drivers can obtain information that clearly outlines the security measures.

evaluation measures

1. **Participant perception of data security, including any changes in perception during the pilot.**
2. **Relative ability of mileage reporting methods to provide data security.**

DATA SECURITY

There was uncertainty about the RUC pilot account setup process and whether information collected during the pilot would be protected from unauthorized use.

Data security was the largest area of concern during the pilot setup process, with 14% of respondents feeling they did not receive enough assurances. Comments noted that data security is linked with privacy issues because private information may be compromised and assessing data security before a breach is difficult.

> *"I don't trust for one second you will keep my data safe—every vendor involved has to implement the highest level of security … Equifax and the feds have been hacked and made people's lives hell after promising to keep the information safe."*

> *"If there were some way I could drive through a place monthly were my odometer is read (perhaps use the emissions sites that are being decommissioned at the end of this year??) and not have to worry about what other information about me is being stolen and abused, I would feel a lot more comfortable."*

TRANSPARENCY

Participants' understanding of their 'fair share' of transportation taxes was higher under a RUC, compared to under a gas tax, and their understanding increased over the course of the pilot.

At the start of the pilot, about 65% of people were unable to accurately estimate the amount of gas tax they pay each year. To estimate annual gas taxes paid, people need to know vehicle miles driven, fuel economy, and the gas tax rate.

In contrast, the RUC pilot sent monthly invoices to participants who reported their vehicle miles driven, the charge per mile, and the amount of RUC for the invoice period.

At the mid-point of the survey, 75% said their understanding of taxes paid was the same or better with a RUC than the gas tax. By the end of the survey, 86% of respondents said their understanding was the same or better with a RUC than a gas tax. People who became more supportive of the RUC noted that transparency about prices, vehicle miles driven, and charges were informative. However, the per mile rate used for the pilot was confusing to some participants. Others had concerns about who will set the RUC rate, who will decide how much transportation funding is needed, and how funds will be distributed to projects or local jurisdictions.

definition

Clear information is available on the rate and how it is set, as well as RUC system operations.

evaluation measures

1. **Change in participant understanding of gas tax rate, collection method, and use.**
2. **Change in participant understanding of RUC rate, collection method, and use.**

"I love the reports that break down how much I'm driving and what I'm paying. I never really thought how part of my gas purchases goes towards the roads before."

"What is a problem is the lack of true accountability or an easy, reliable understanding of how any of the transportation charges I pay (regardless of it being a RUC or a gas tax) apply to the overall transportation infrastructure scheme. I'd like to see this info made more accessible and transparent so that I know the charges are being wisely spent."

definition

A RUC system is efficient for the State of Washington to collect, administer, and enforce.

evaluation measures

As a small-scale effort, the pilot project will not itself generate data that can be evaluated for cost-effectiveness.

COST-EFFECTIVENESS

Survey respondents who became less supportive of the RUC noted concerns about how difficult it would be for the program to scale up to statewide implementation.

Collecting the gas tax at the point of sale is a long-standing method of revenue collection that people are familiar with and has relatively low administrative overhead. Moving to a per-mile charge will require new reporting and payment systems, and participants had concerns about how this could be done efficiently.

"This is just way too cumbersome to implement on every single vehicle in Washington State. It will be bureaucracy at its absolute worst. Please, if the problem is that too many people are driving hybrid cars and not paying the gas tax, then add a hybrid car "gas" tax to their annual renewal. This is not rocket science! A simple fee structure that will affect only a portion of the state population. No new tracking systems, expensive software, monitoring, security breaches, etc."

"I have strong reservations that this proposed program would be feasible as a state-wide requirement—I think there would be huge problems with compliance that would eat up resources and create ill will."

EQUITY

Respondents discussed equity and fairness with many definitions relating to transportation funding.

Pilot materials described a RUC as a funding method that "ensure[s] everyone pays their fair share" for the same miles. When asked how they define fairness, many respondents quoted the RUC pilot materials.

In terms of fairness, many people defined fair as equitable, but the object of equity differed. Most often respondents discussed vehicle type and/or weight, and household income, location, and environmental impact were also noted.

At the end of the pilot, 61% felt that between the gas tax and a RUC, a RUC was more fair.

definition

All road users pay a fair share with a road usage charge.

evaluation measures

1. **Total and per-mile RUC vs. gas tax paid by urban, suburban, vs. rural status of participant.**
2. **Total and per-mile RUC vs. gas tax paid by participant income.**
3. **Total and per-mile RUC vs. gas tax paid by in-state vs. out-of-state participants.**
4. **Participant expectations and before-and-after perceptions of RUC equity relative to gas taxes.**

"My only concern is my community is very poor. Our citizens live far away from their jobs because the housing costs are lower. Adding more costs to them might be counterproductive. These people tend to drive vehicles with poor gas mileage. Adding more taxes to them seems to be almost cruel."

"My concern is that focusing on miles driven (which is appropriate for maintaining infrastructure) is at odds with fuel efficiency (which is appropriate for reducing impact on the environment). My preference would be to have significantly higher fuel usage charges, coupled with vehicle fees based on emissions tiers, to encourage less usage overall of the roads, perhaps more promotion to shared transportation."

definition

A road usage charge system is easy to enforce and costly to evade.

evaluation measures

1. **Participant perceptions of relative effectiveness of enforcement methods in maintaining compliance.**
2. **Reasons for non-compliance expressed by participants (e.g., confusion, negligence, fraud). Participant-stated locations of fuel purchases (potentially only for interoperability participants).**

ENFORCEMENT

Enforcement was a common concern among participants who became less supportive of a RUC.

Many open-ended comments noted concerns relating to people falsifying miles driven to pay less in taxes or not registering a vehicle when moving to the state. Enforcement concerns also related to the accuracy of mileage reporting devices.

Some people assumed that because their own device seemed to be mis-reporting miles, there was no verification component, meaning that evasion could occur even for those intending to comply. Others noted large differences in device miles driven versus personally tracked miles driven and/or trips that were not recorded by the automated system.

"Everyone likes to try to "Game the System." I think that people will try to cheat this system (and the possibilities are endless)."

"Until there is more information about how the system will be enforced, I can't support this system. Case in point: my app logged mileage versus the odometer picture. Apparently, there is nothing in the Pilot system to check on significant discrepancies. I was curious if the system would trigger a review, apparently not. It's really not much of a pilot if you aren't working this piece in my opinion. Enforcement will be one of the largest issues around this system and it's not clear what the pilot is doing with this process."

USER OPTIONS

Users were satisfied with the number of reporting options.

Pilot participants were asked whether five reporting methods was too much, too little, or just right. Only 2% felt they had "too few" choices. Of the over 2,000 vehicles that enrolled in the pilot, about 40 switched reporting devices during the pilot after receiving at least their first invoice.

Popular reasons for device selection included ease and convenience, privacy, accuracy, and technology (wanting to use technology or their vehicle/phone limiting the technology they could use). The distribution of device selection was consistent across urban, suburban, and rural geographic users.

definition

A RUC system provides choices to drivers for how they report their miles.

evaluation measures

1. **Participant overall satisfaction and relative satisfaction with choices available in the pilot project.**
2. **Reason for participant preferences of various mileage reporting methods.**

Why Users Selected Their Reporting Option

Automated plug-in device with GPS

"Plug in seemed the most simple for reporting (its automatically updated). Then the bonus features for me to learn more about my driving habits and impact are available through the app."

Automated plug-in device without GPS

"Ease of use, and my husband drives my car too, so my cell phone isn't always in it when it's being driven."

Smart Phone App

"Convenience (phone is always with me), privacy (data collection with GPS is not appealing), and flexibility (mileage permit may over/under charge)."

Odometer Reading

"Multiple drivers, some without smartphone."

Mileage Permit

"It was the only option that was available for me at the time that was compatible with my device and convenient."

definition

Visitors to the state pay for their use of Washington roads.

evaluation measures

1. **Description of assignment of responsibility and oversight for Washington agencies and other jurisdiction agencies involved in pilot.**
2. **Participant understanding of interoperable RUC.**
3. **Relative ease of compliance for interoperability test participants versus others.**

CHARGING OUT-OF-STATE DRIVERS

Most comments concerned with charging out-of-state drivers were about people in Washington long-term, not visitors or tourists.

Some respondents suggested that charging out-of-state drivers was a reason to keep some version of the gas tax after a potential RUC.

"I am still very unclear on how non-WA residents will be held accountable—I am thinking of military personal living in WA from other states, college students, and commute workers."

"…consider keeping the gas tax, so that visitors continue to pay something. But when people pay RUC, they get a rebate on the gas tax. That way they don't feel they are charged twice."

"[A RUC] has no practical way to be collected from non-residents. It encourages people to register cars out of state."

7.1.3 PILOT EXPERIENCE

Most people participated in the pilot to understand how a road usage charge may impact them personally (see Exhibit 7.7). At the end of the pilot, 91% said they were satisfied or very satisfied with their overall pilot experience. Participants seemed interested in a RUC policy, with many people noting they spent time during the pilot exploring the reporting device's features, discussing the pilot with others, and tracking their travel data and reporting errors.

Users of both DriveSync and emovis said they were satisfied with the overall customer service and account management (81% and 84% respectively). High levels of satisfaction for both providers were also reported for their responsiveness and ability to resolve issues (about 70–79%).

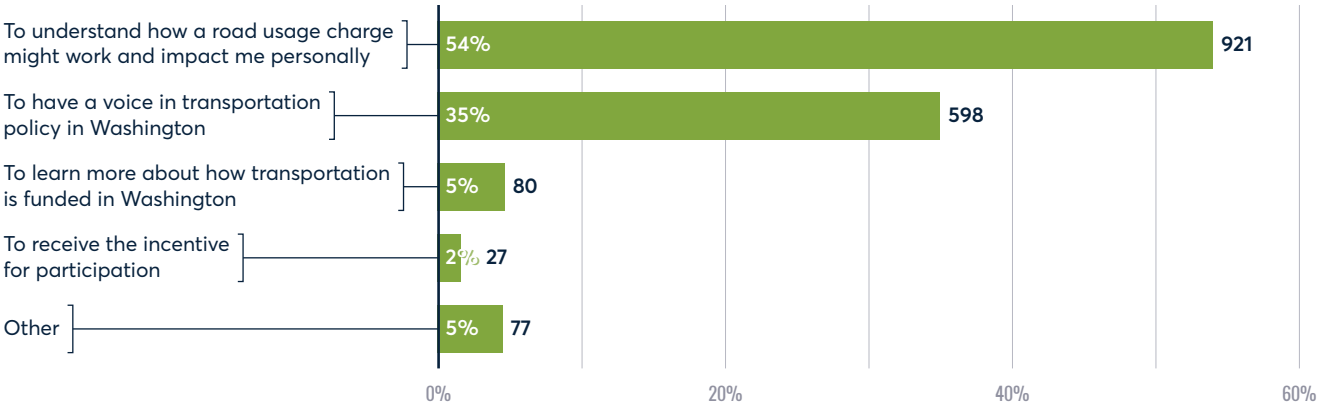
Participants enjoyed participating in the pilot. They felt the pilot was informative and convenient and were satisfied with the opportunity to contribute their perspectives before policy decisions were made. The most common challenges related to the use of reporting devices and reporting, with a minority of participants stating the pilot was poorly run or inadequate for assessing a potential RUC.

"It was great to participate in this program; it would be beneficial if more programs had a public beta or pilot program to gain meaningful public feedback before further legislative action is taken."

"I'm glad I got to participate. I was undecided about the RUC and understood what the thinking was behind it, so I had an open mind and really wanted to try it. Now that I know how invasive the reporting really is, I am definitely opposed to it."

EXHIBIT 7.7
Survey Summary: Motivation for Participating

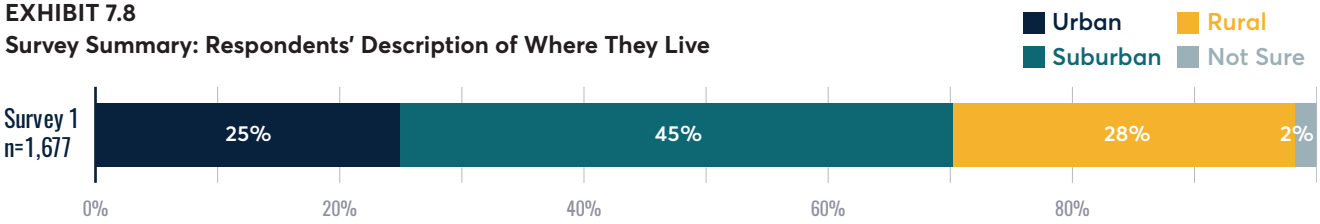
What is your primary motivation for participating in the WA RUC pilot?



7.1.4 ABOUT THE SURVEY RESPONDENTS

Geographic representation was consistent across surveys and is shown in Exhibit 7.8. Some analysis by geography was completed to see how respondent views may change based on where they live (see Appendix A-2).

EXHIBIT 7.8
Survey Summary: Respondents' Description of Where They Live



Most devices were represented by a large number of survey respondents and were consistent across surveys; however, mileage permits had a very low sample size in all surveys (between 11 and 16) as shown in Exhibit 7.9

EXHIBIT 7.9
Survey Summary: Respondents' Mileage Reporting Device

Mileage Reporting > Methods (MRMs)	Automated Plug-in Device (with GPS)	Odometer Reading	Automated Plug-in Device (without GPS)	Smartphone App (MileMapper)	Mileage Permit
Survey 1 (n=1,671)	34%	25%	21%	19%	1%
Survey 2 (n=1,591)	39%	26%	17%	17%	1%
Survey 3 (n=1,498)	38%	27%	17%	17%	1%

LOW-INCOME SURVEY RESULTS

The following exhibits include only RUC pilot participants who indicated their household income was $30,000 or less. Each exhibit also shows the percentage difference from all respondents, with blue indicating a higher share of low-income respondents selected that answer and red a lower share. All survey results are available in Appendix A-2.

Respondents with low-income had a high level of satisfaction with their RUC pilot experience, similar to all respondents.

Of respondents with low-income, 80% support implementing a RUC as a replacement to the gas tax, compared to 72% of all respondents.

EXHIBIT 7.10
Survey Summary: Satisfaction with Pilot Project of Individuals with Low-income

Thinking about your full experience with the WA RUC Pilot, how satisfied were you overall (n = 76)?

EXHIBIT 7.11
Survey Summary: Funding Preferences of Individuals with Low-income

Of the options listed below, which transportation funding approach do you think is more fair? (n = 76)?

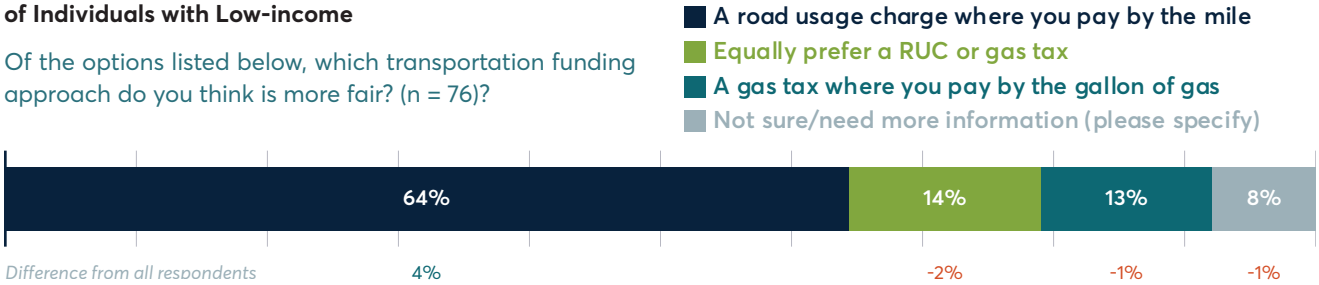
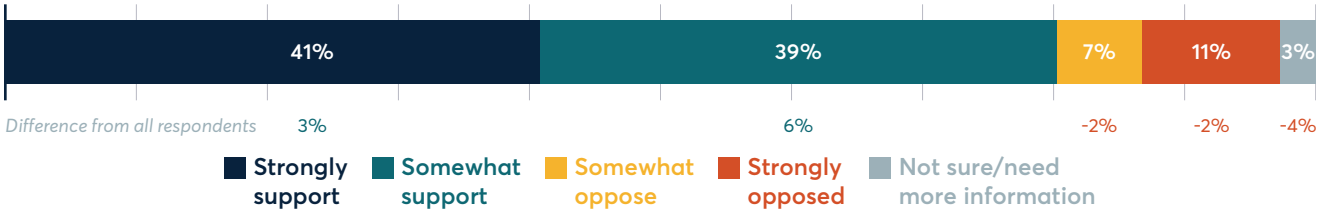


EXHIBIT 7.12
Survey Summary: RUC vs. Gas Tax Preference of Individuals with Low-income

At this point, how do you feel about implementing a road usage charge as a replacement to the gas tax in Washington to fund transportation infrastructure (n = 76)?



Note for Exhibit 7.10, Exhibit 7.11, and Exhibit 7.12: The percentage difference from all respondents is shown below each chart, with blue indicating a higher share of low-income respondents selected that answer and red a lower share.

7.2 PARTICIPANT FOCUS GROUPS: OBSERVATIONS & FINDINGS

Six separate focus group sessions enabled participants to more fully describe their beliefs, concerns, and preferences related to paying for the state's transportation system—and specifically, how they felt about a RUC as a future replacement to the gas tax.

7.2.1 OBSERVATIONS ABOUT MILEAGE REPORTING METHODS (MRMS)

Most focus group participants chose the recording method they felt would be simplest to use. Some considered privacy. Below are some participant observations:

- Plug-in device with GPS: Simple, don't have to think about it. More accurate information collected (particularly for those that drive outside of Washington state), added benefits such as driving scores and car location if car is stolen.
- Plug-in device without GPS: Simple, don't have to think about it. Location information is not collected and shared.
- Smartphone app: "My phone is always with me."
- Odometer reading (taking photos): Ability to control data and privacy, low-tech, but some found it cumbersome to take pictures every month.

7.2.2 OBSERVATIONS ABOUT MOTIVATIONS FOR PARTICIPATING IN THE WA RUC PILOT

Focus group participants volunteered for the pilot project for two main reasons: first, to understand how much they would pay under a RUC and whether this is higher than the gas tax; and second, to pursue a personal interest in transportation policy, equity issues, or infrastructure funding. Many felt participation was their civic duty.

"I wanted to join because I drive on unmaintained roads daily and want to be part of a way that will get these roads up to standards and that everyone should pay for the roads we use."

—Federal Way

"Want to understand how it will impact me."

—Yakima

"Always concerned with infrastructure funding and especially as it impacts declining gas tax revenues."

—Spokane

7.2.3 THEMES ACROSS ALL FOCUS GROUPS

- **Most participants were open to a RUC and thought it could work.** Many became more supportive through participating in the pilot. While most participants felt the pilot worked well at an individual level, some had questions about how a RUC would be implemented and administered statewide. Answers to these questions could change their support for a RUC.
- **Overall, participants were having a positive experience in the pilot.** Most participants felt their experience in the pilot project had gone well; they were happy with their chosen recording method and felt comfortable with the amount they would pay under a RUC based on their invoices. Any confusion was related to managing the recording method and understanding monthly invoices.
- **Many participants felt the RUC amount was comparable to the gas tax.** For some participants, the RUC amount was slightly higher than what they pay under the gas tax, and for others it was less. Many participants noted that the monthly invoices made the amount more visible than the gas tax, which is paid at the point of sale.
- **In general, participants had little knowledge of transportation funding.** Most did not know the current gas tax rate or understand how transportation is funded in Washington. Participants noted that this lack of awareness is a challenge; major educational and communication efforts statewide are needed to increase understanding about transportation funding and make the case for RUC.
- **Participants' top criteria for a RUC system were that it is simple, convenient, and takes little time or effort for the user.** Other criteria included fairness and transparency. Participants acknowledged that there are trade-offs between some of these characteristics and no easy answers.

7.2.4 TOP CONCERNS & QUESTIONS WITH A RUC

The following concerns and questions about a RUC surfaced in all focus group discussions, with the first three expressed most often. Additional detail on several of these is in Appendix A-3.

- **Privacy and data collection.** How will information remain secure? Who has access to the data? How much control will participants have in sharing their data and information?
- **Compliance and administration costs.** What are the costs of administration? How will out-of-state drivers be charged? How will out-of-state residents comply and pay?
- **Fairness and equity.** How will the system balance equity and simplicity? What does fairness mean under RUC? What factors should be considered? Will there be options for how the RUC is paid (monthly, yearly)?
- **Fairness in revenue allocation.** How will funds be allocated? Would they go to the roads they were collected on? Will it be equitable between the east and west sides of the state?
- **Replacement or additional tax.** Will it replace the gas tax? Some participants were skeptical that the State would stop collecting the gas tax if a RUC is implemented.
- **Long-term viability and sustainability.** How is the per mile charge determined? Will it generate enough revenue? What happens if the system breaks down and the money can't be collected?
- **Environmental impacts.** Would a RUC have an impact on vehicle choices that benefit the environment?

7.2.5 WHAT DOES SUCCESS LOOK LIKE?

Most participants described success as roads and bridges across the state that are well-maintained and safe for travel. They want both maintenance and improvements that make the transportation system work better. This issue is not just about financial fairness but also about whether traffic improvements exist to move people and freight where they need to go.

There were some concerns about how projects or roads would be prioritized under a RUC. Other participants wanted to ensure a RUC would generate sufficient revenue.

7.2.6 ADVICE TO STATE LEADERS

Participants offered advice to state leaders. A summary with select illustrative comments is below.

SUPPORT FOR RUC

Many felt a RUC is a good transportation funding option with certain caveats. A RUC should continue to offer different recording methods, focus on equity (both related to revenue collection as well as distribution of funds across jurisdictions), and ensure data privacy and security.

SUPPORT FOR GAS TAX

Those who did not support a RUC were skeptical it would work statewide or thought it was a regressive tax. Participants who support the gas tax appreciate its simplicity and familiarity. Preference for the gas tax in the first Federal Way group (see page 11 of Appendix A-3) stemmed from a feeling that many people would not pay a RUC due to various exemptions.

INVESTIGATE OTHER ALTERNATIVES OR HYBRID SYSTEMS

Some participants preferred neither a RUC nor a gas tax. One of the main reasons was that neither met their criteria for fair and equitable. A few participants suggested other alternatives, such as revenues tied to a driver's license, tolls, or an income tax.

> *"[The RUC is] going in the right direction but more focus on details is needed. I want to pay my fair share, but also have concern for local roads in Yakima. Also focus on data transparency, security and safety, so that information is not abused. Consider sliding scales that are sensitive to household income and poverty levels."*

> *"I like the gas tax, it's what I'm used to. Only problem is electric vehicles."*

> *"I would like to see some sort of combination because neither option seems fair to me."*

7.3 PARTICIPANT FEEDBACK TO THE WA RUC PROJECT HELP DESK

Throughout the course of the WA RUC Pilot Project, the Help Desk fielded calls, answered questions, and recorded any concerns from both pilot participants and the general public. This information was documented so the team could be aware of any trends.

7.3.1 HELP DESK BY THE NUMBERS

Over the course of the WA RUC Pilot Project, the project team built an interest list with, at its highest point, over 5,800 subscribers. Each of the nearly 2,000 enrolled drivers were subscribed, meaning that over 3,700 members of the public were interested in staying updated with the pilot project regardless of their ability to participate in the test-driving phase.

During the live pilot test-driving phase between February 2018 and January 2019, a total of 741 unique individuals contacted the help desk during the test-driving phase of the pilot project. Of those 741 individuals, 462 (62%) were pilot participants and 279 (38%) were members of the general public (Exhibit 7.13).

Collectively, the 2,000 test drivers reported over 15 million miles driven and shared feedback through over 1,300 written comments and phone calls during the live pilot test-drive. The project team could be reached through emails, phone calls, or website comments. Seventy-one percent (71%) of communications received were emails to the project inbox (929 emails); the remaining 29% of communications were phone calls to the help desk (381 phone calls; Exhibit 7.14).

While a majority of the communications received during these phases came from enrolled participants, a significant percentage of communications (38%) came from members of the public. This shows that the people of Washington have a growing interest in many of the topics associated with road usage charging.

EXHIBIT 7.13
Incoming Help Desk Communications by User Type

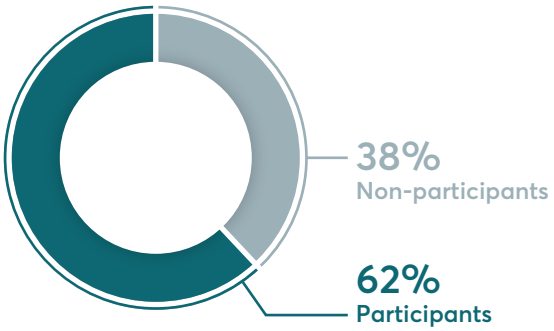
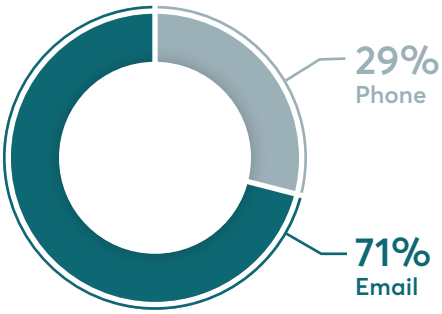


EXHIBIT 7.14
Communications Received From All Users by Communication Type



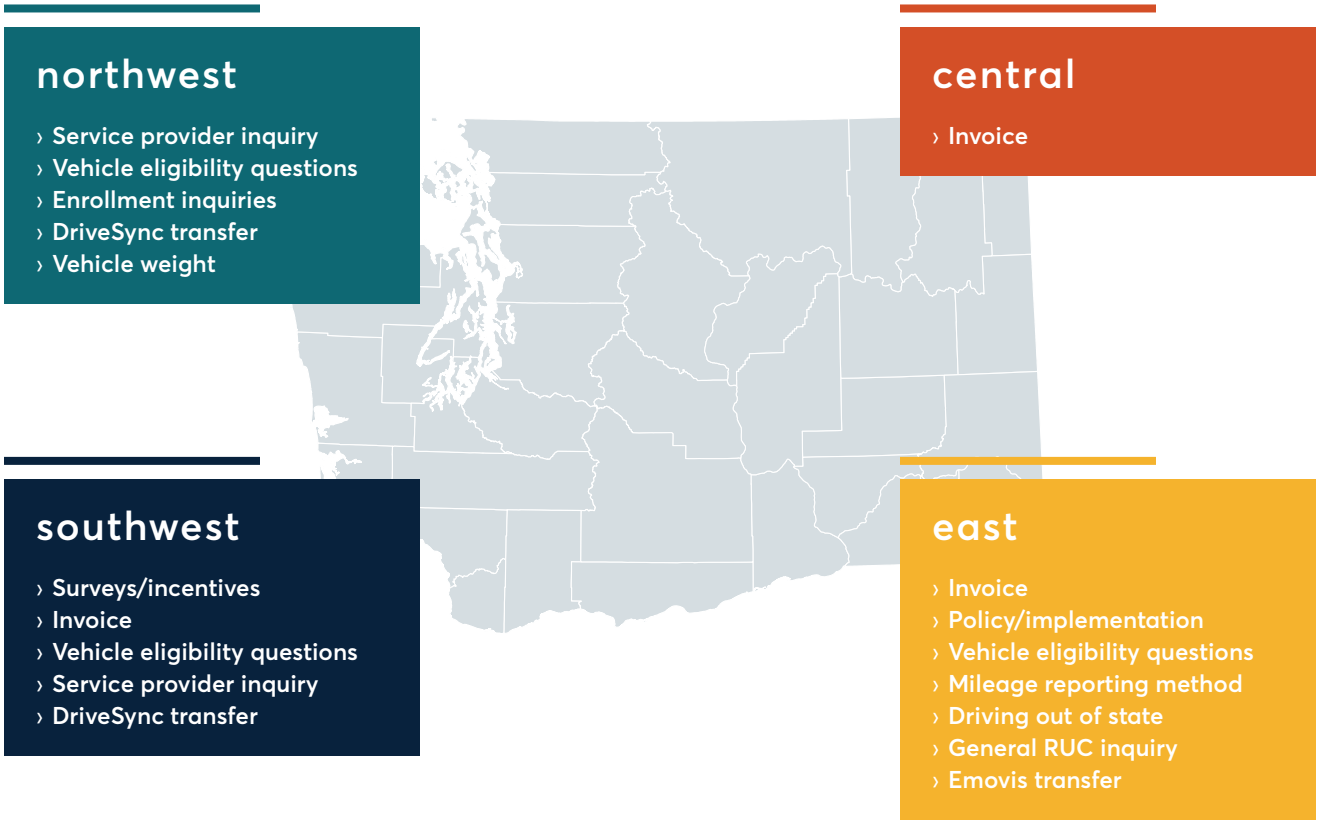
7.3.2 TRENDING TOPICS

The number of trending topics brought forth to the help desk varied greatly by each geographic region. A trending topic is defined as a topic that significantly exceeded the anticipated topic frequency based on participant distribution. The project team assumed that the distribution of communications received from a specific region would be roughly the same as the participant distribution for each region as a percent. For example, the East region had a 13% participant distribution—therefore, the project team assumed that roughly 13% of each communication topic would have been received from participants in the East region.

However, the East region of the state had the largest number of communication topics that exceeded the anticipated percentage based off the participant distribution. Many of the communications topics exceeded the anticipated 13% distribution. This could indicate that drivers in Eastern Washington were particularly engaged throughout the pilot project. Additionally, the Central and Puget Sound regions had the least number of trending topics amongst the regions (two and zero respectively). This could indicate that these regions were not as engaged with the help desk throughout the pilot project.

When accounting for participant distribution, the following communication categories emerged as trending topics in each of the regions (Exhibit 7.15).

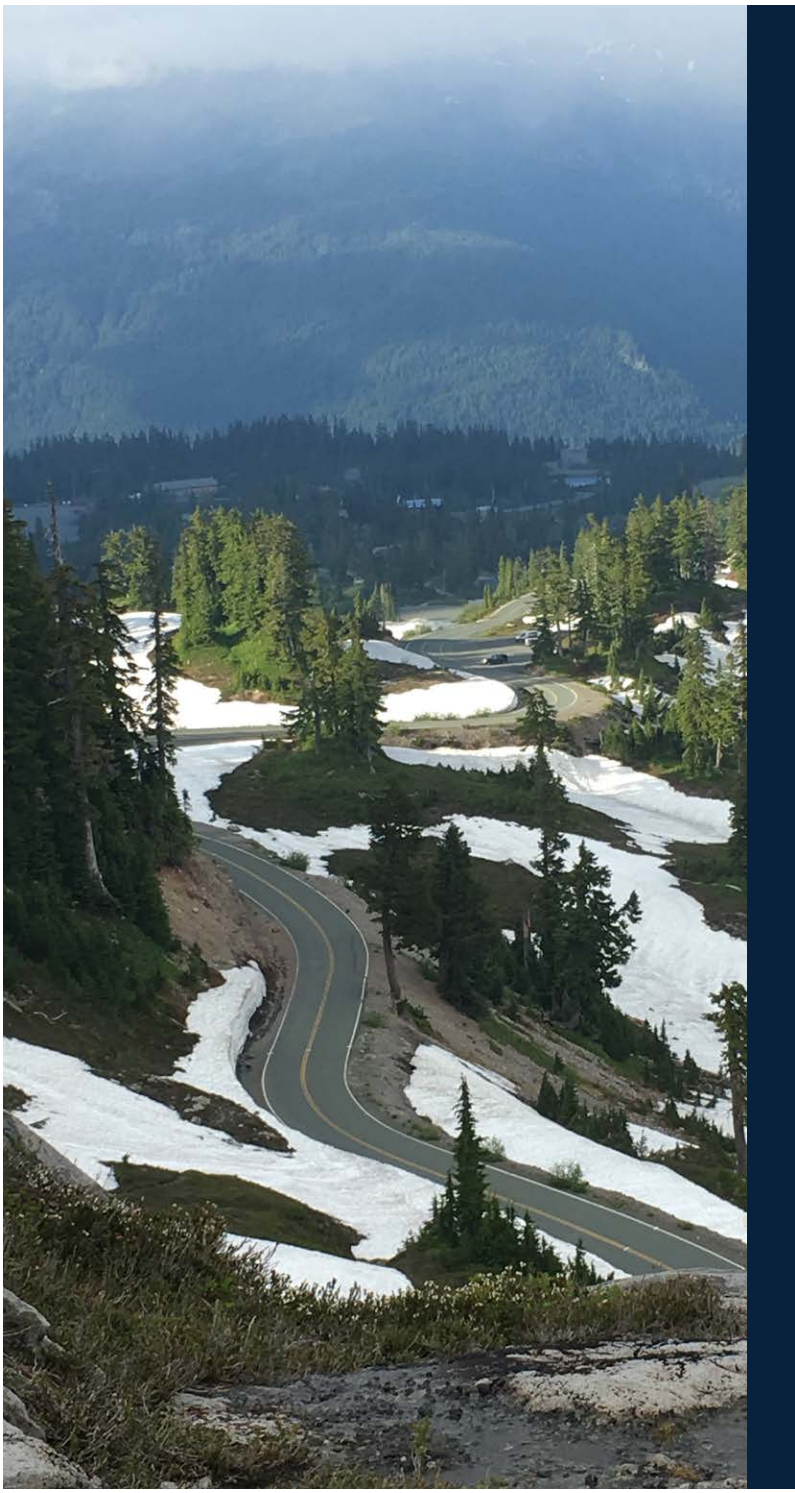
EXHIBIT 7.15
Breakdown of Trending Topics, by Region



In addition to geographic region, the project team evaluated the trending topics for each mileage reporting method. Participants using the odometer reading method contacted the help desk with the highest number of trending topics. Many of the topics regarded technical questions suited for service providers or logistical questions regarding a RUC. This could mean that these users had more questions or uncertainty about their MRM, indicating that a clearer explanation of this method needs to be shared with the public, in addition to more targeted information on a RUC policy. Additionally, the odometer reading mileage reporting method encouraged participants to be actively engaged with reporting their miles, as this method required participants to submit a photo of their odometer either electronically or in person.

Test-drivers were also able to choose three "high-tech" options which included plug-in devices with or without GPS, or the MileMapper™ smartphone app. These mileage reporting methods had the fewest number of trending topics amongst the five options. These high-tech options automatically reported participants' mileage and did not encourage the participants to be as actively engaged with reporting their miles compared to the "low-tech" options. This could indicate that passive mileage reporting could result in fewer inquiries to a help desk or service provider in a future road usage charge.

If a future RUC policy were to advance, special consideration is needed to ensure the needs of these groups are met, whether it is clarifying the purpose of a RUC or providing clear directions for mileage reporting. While age and income demographics were not analyzed in the communications summary report, those additional demographics could be analyzed in future reports to provide more information on how these demographics may influence drivers' communication needs.



chapter 8

PUBLIC ACCEPTANCE FACTORS: FINDINGS, CHALLENGES, & OPPORTUNITIES

WA RUC pilot participant feedback constitutes the principal source of data to inform road usage charge policy design. The project team recorded and attempted to address customer account and technology issues as quickly as possible, preserving the environment of the policy experience to simulate as closely as possible a real road usage charge system. Lessons from those issues inform future system design.

Most importantly, the pilot opportunity invited impressions about the ***essence*** of a road usage charge service. Participants offered their views on whether and how much they valued the ability to choose a mileage reporting method, what aspects of the pilot they regarded as simple and easy (and which the regarded as complex and difficult), and how they regarded the transparency of the road usage charge compared to the gas tax. They also offered requirements, impressions, and suggestions for protecting privacy and preserving or achieving equity.

From the feedback on these varied topics emerged acceptance factors, or choices for detailing a road usage charge policy that make it more or less acceptable to drivers. Acceptance factors help to explain the gap between views of the general public (as assessed through public opinion surveys) and the views of those who experienced the prototype system.

key takeaways

1. Participants validated the Guiding Principles of the Steering Committee, with over half rating eight of the nine principles included in the survey as "very important." Over 70% of participants consistently rated four principles as very important: privacy, simplicity, data security, and transparency.

2. **Privacy** remained the most important issue for participants in the pilot from start to finish. Although they found it difficult to assess the actual performance of the RUC pilot system in protecting privacy, participants generally agreed that the system as designed met their expectations. The Steering Committee identified gaps in the legal protections for personal privacy in a RUC system. For example, current state law does not exempt RUC mileage data from public disclosure laws. The Steering Committee considered a model privacy policy that could be used to craft appropriate privacy protections in any RUC enabling legislation. At minimum, RUC mileage data should be granted similar privacy protections that currently exist for the state's tolling program, where information related to roadway use and payments are exempt from public disclosure.

3. Participants regarded **simplicity** highly, and it was the second most important guiding principle by the conclusion of the pilot. Simplicity was the only guiding principle to achieve a higher ranking at the end of the pilot than at the beginning. Participants who chose automated mileage reporting methods generally regarded those methods as simpler than those who chose manual methods.

4. Participants regarded **choice** among mileage reporting as among the least important guiding principles, relatively speaking, but, slightly over half regarded it as "very important." Over two-thirds agreed that the number of choices offered in the pilot (five) was "the right number of choices." Interestingly, despite the stated top concern over privacy, the vast majority of participants made their mileage reporting choice based on "ease and convenience," with only 11% choosing a method based on privacy considerations.

5. Over 70% of participants rated **transparency** as a "very important" guiding principle in all three surveys, and nearly three-quarters indicated increased awareness of the amount of transportation taxes they pay. Over half agreed that they understood how they pay for transportation better with a RUC than with a gas tax.

6. The Steering Committee defined **equity** as drivers paying a fair share based on how much they use the roads. Although the Steering Committee recognizes numerous dimensions of equity and future work in this area remains, participants tended to view the "user-pay" dimension of equity as the most salient. Along this user-pay dimension, participants also viewed RUC as "more fair" than the gas tax, by large margins.

8.1 OVERVIEW OF PUBLIC ACCEPTANCE ISSUES & FACTORS

The WA RUC pilot allowed participants to directly experience a road usage charge, with features as imagined and deployed as close to a live system as possible. Based on that experience, participants shared their reactions and opinions, focusing on the impact of various policy and system design choices on their acceptance of RUC.

As described in Chapter 2, the primary purpose of conducting a live, statewide public demonstration of a road usage charge system is to gauge drivers' reactions and preferences about a per-mile charge as an alternative to the gas tax, based on their direct experience testing a small-scale RUC prototype.

Given this, the pilot project focused on drivers' actual experience. Based on their feedback, policymakers can learn what matters most to Washington drivers and what to change in a future RUC system to make it a more acceptable replacement for the gas tax. Secondarily, the pilot aimed to test how RUC performs under live operating conditions, enabling the State to identify technical, operational, and administrative issues for further development and improvement before implementing a RUC and relying upon it as a major source of transportation funding.

A public acceptance "factor" is a condition that must be met in order for drivers to find RUC an acceptable transportation revenue collection mechanism. This is ***not*** the same as polling the general public about the concept of per-mile charges. Rather, public acceptance factors aim to highlight the reasons for gaps between general public reaction to the notion of RUC and participant drivers' reactions to RUC after experiencing it for one year. What issues raised in general public opinion polls about RUC did the WA RUC pilot mitigate, through user-centered design, systems engineering, or policy approaches? What issues remain unresolved, and what options can address them? This is the focus of Chapter 8 through 11.

Section 8.2 describes the baseline public opinion polling conducted before the WA RUC Pilot Project launched. It reveals initial public reaction to the notion of per-mile charges in Washington. With this established as a baseline for public opinion of Washington residents, the remaining sections in Chapter 8 through 11 probe specific aspects of RUC that, from earlier research and from Steering Committee input, the public and stakeholders deem important: privacy, ease of use, transparency in taxes paid, fairness, and many other factors.

8.2 PRE-PILOT STATEWIDE PUBLIC ATTITUDES

A broad statewide public opinion poll was conducted before the pilot launched to measure general public understanding and inclinations toward a per-mile charge concept. This baseline opinion information helped the project team explore identified areas of concern during the 12-month pilot test.

In 2017, a statewide poll of Washingtonians gathered data and input on baseline public knowledge, impressions, and inclinations toward transportation funding and road usage charging. A statewide telephone survey and six statewide focus groups revealed the following key insights leading into the pilot test:

- Transportation is often a top priority for Washington residents, especially those in urban areas. However, they do not know the details of transportation funding.
- Residents are receptive to the notion that increasing fuel efficiency of the vehicle fleet will impair transportation funding. Most agreed that fairness is a critical feature of transportation tax policy, but residents define fairness differently.
- When surveyed, most residents oppose RUC, but many asked for additional information about how it would impact their lives and expressed a willingness to participate in research on the topic.

With regard to RUC, in a telephone survey, only 18% of Washingtonians indicated they were "very familiar" with the topic. The rest, presumably with little or no knowledge, responded to questions based on a brief description of the concept of RUC. In response, 41% judged RUC "less fair" than the gas tax, with 23% judging RUC "more fair," and 21% saying RUC and the gas tax are "about the same." When probed on several of the Steering Committee's Guiding Principles, a plurality of telephone survey respondents chose fairness as most important (28%), followed by avoiding double taxation (26%), and protecting privacy (20%). Only 8% thought ensuring out-of-state drivers pay their fair share was the most important issue, and 7% thought that providing mileage reporting choices was most important.

The pilot participant pool, although representative of the state geographically and along most demographic dimensions, did not match the views of the general population when comparing the results of the pre-pilot research to the survey data gathered from participants alone. Pilot participants, in general, indicated greater openness to RUC as a gas tax replacement than the general population. While this difference in opinion exists, the collective survey data tells us that when people get the chance to participate and experience RUC, they tend to have more positive views of it compared to those who merely hear a description. Survey data also provided useful information about the relative importance of various aspects of RUC operations, in particular, what characteristics make RUC more or less attractive as a policy option. The remainder of this section explores acceptance factors as revealed by the participant pilot experience.

8.3 CONSUMER CHOICE *

As expected, WA RUC Pilot participants valued the ability to choose their own mileage reporting method. However, when compared to other important design principles, having many mileage reporting options to choose from ranked 8th out of 9 possible design principles.

As a RUC Steering Committee Guiding Principle, consumer choice featured strongly in the pilot design and evaluation efforts. Participants appreciated the ability to choose among mileage reporting methods and also among two account managers. Within the context of a pilot, participants not only valued the concept of choice, they also demonstrated it.

Beyond choice, providing multiple mileage reporting options also helps address at least two other guiding principles: privacy and simplicity. That said, of the principles, choice ranked relatively low for pilot participants, with 43% ranking it as "very important" in the pre-pilot survey. Only "charging out-of-state drivers" ranked lower. By the final survey, 52% ranked choice as "very important," indicating that participants strongly value choice, but it still ranked eighth out of nine principles, ahead of charging out-of-state drivers.

Participants displayed a collective preference for choice in their selection of mileage reporting methods, with 37% opting for a plug-in device with GPS, 19% for a plug-in device without GPS, 14% for a smartphone app, 28% for a manual odometer reading, and 1% for a mileage permit. The numbers reflect, at least within the sample of pilot participants, a strong sorting of mileage reporting method preferences, with most (69%) indicating they chose their personal method primarily for ease and convenience, and 11% for privacy reasons. Moreover, 69% of respondents indicated that five mileage reporting methods was "the right number of choices," with 29% indicating five was "too many choices."

* Denotes one of the WA RUC Guiding Principles

8.4 SIMPLICITY *

Driver preference for simplicity in mileage reporting grew over the course of the 12-month pilot, ending as the second-most important acceptance factor after privacy protection.

The large pilot sample provided a unique opportunity to assess simplicity as a guiding principle. At the outset, 70% ranked simplicity as "very important," ranking it as the fourth most important guiding principle behind privacy, transparency, and data security. Among survey respondents, 69% identified simplicity as the primary reason they selected their mileage reporting method, by far the most important factor underscoring the importance of simplicity as a concept. By the second survey, 79% rated simplicity as "very important," ranking it the second most important principle, a place it held in the final survey.

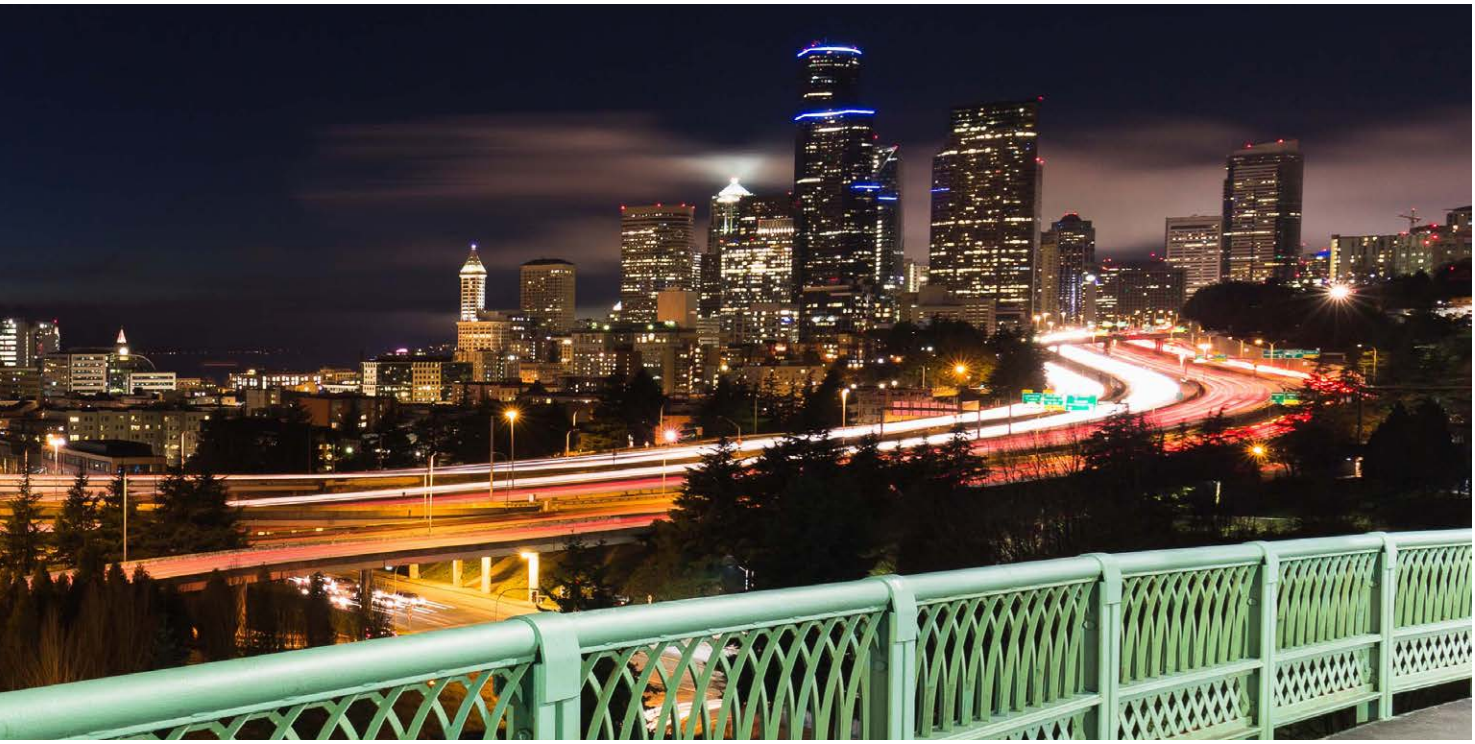
Although participants rated simplicity highly across all mileage reporting methods, those who chose a plug-in device tended to agree more strongly that it offered a "convenient" method for participating in the pilot (by the end of the pilot, over 80% "strongly agreed," and 98% "agreed" or "strongly agreed"), compared with other methods for which only about 50% "strongly agreed." Still, over 80% "agreed" or "strongly agreed" that non-plug-in device methods were convenient. Plug-in device users were similarly more likely to agree strongly with the ease of accessing account information, ease of reviewing mileage data, and amount of time devoted to the pilot.

8.5 TRANSPARENCY*

While baseline public opinion polling revealed that Washingtonians have limited knowledge of transportation funding, by the pilot conclusion, nearly three-quarters of participants said they had increased awareness of the roadway taxes they paid under the WA RUC system.

The RUC Steering Committee selected transparency as a guiding principle because of the inherent public value in increasing motorist awareness of the costs of driving. Statewide public opinion research conducted prior to the pilot revealed that few Washingtonians understand how transportation is funded, and pilot participant surveys reinforced that lack of awareness when fewer than 20% of participants could correctly estimate their gas tax due within 10% of the actual amount. At the outset, 75% of participants rated transparency "very important," ranking it as the second most important guiding principle. In the final survey, it fell to fourth most important, with 70% rating it as "very important." While a small change, transparency was the only guiding principle to lose intensity of support over the course of the three pilot surveys.

As for the impact of the pilot itself, at both the midpoint and end of the pilot, over half of participants agreed that the pilot made them more aware of how many miles they drive each month, and nearly three-quarters indicated increased awareness of the amount of transportation taxes they pay. Reflecting this increased understanding, 47% of participants stated that their understanding of what they pay in transportation taxes is "better with RUC than with a gas tax," while 9% indicated lower understanding "with RUC than with gas tax." This spread increased in the final survey with 53% indicating a better understanding with RUC and 6% a lower understanding.



8.6 PRIVACY *

Privacy remained the top concern among WA RUC pilot participants. Although the vast majority of drivers felt the WA RUC system protected their privacy, additional protections—including legal protections—may be required.

Privacy arose early in road usage charge investigations as the central issue. Those who would pay the per-mile charge showed strong privacy concerns related to information acquired and used to determine, invoice, receive payment, or enforce their obligation. In the first survey of WA RUC pilot participants, 83% of respondents ranked privacy as the top issue, characterizing it as "very important."

The use of personal data is necessary for collecting a distance-based RUC. A RUC system must acquire data directly related to distance measurement of individual vehicle travel during a specific time period. To obtain the distance-traveled data for an individual vehicle, the person responsible for the vehicle (owner, lessee, or operator) must report the required travel data to a billing entity. The billing entity applies the reported distance-traveled data to calculate a fee, tax, or charge and presents the amount to the responsible person as an obligation for payment. The RUC payer pays the charge in an approved manner. Often the payer will consider the information used in this process "sensitive."

The government can protect privacy in a RUC system technologically and legally. While technology-based protections can prove effective, RUC payers may not have confidence that the technology deployed cannot be hacked or otherwise unprotected by providers. Legal protections of sensitive information, combined with rights for RUC payers, can offer additional assurance that the privacy of RUC payers will be protected or that penalties would be imposed in the event of a breach.

General legal protections for privacy in the United States are uncommon. Few general privacy protections exist at the federal level, except as implied in the US Constitution and applied on a case-by-case basis, but never in the context of a RUC system. General privacy laws passed recently in California (2018) and Washington state (2019) but these laws have minimal application to information collected in a RUC system. The only specific statutory protection of information gathered in a RUC system was passed in Oregon for its ORe*GO* program (2013).

8.6.1 RUC PERSONAL INFORMATION AS A PUBLIC RECORD EXEMPT FROM DISCLOSURE

Many states have comprehensive public records laws to ensure transparency for government actions. Transparency of public information as a policy can conflict with expectations that certain personal information should remain private[1] even if it is collected or used for a public purpose (such as calculation of taxes owed). Washington state law (RCW 42.56.010) defines the types of documents, data, and information that constitutes a "public record." The definition of a public record is very

1 Washington state law specifically recognizes a right to personal privacy. See RCW 42.56.050. That law describes the threshold for when personal privacy rights are violated if certain information is released:

"A person's "right to privacy," "right of privacy," "privacy," or "personal privacy," as these terms are used in this chapter, is invaded or violated only if disclosure of information about the person: (1) Would be highly offensive to a reasonable person, and (2) is not of legitimate concern to the public. The provisions of this chapter dealing with the right to privacy in certain public records do not create any right of privacy beyond those rights that are specified in this chapter as express exemptions from the public's right to inspect, examine, or copy public records."

broad.[2] Information collected to administer a tax or assess a fee would fit within the definition of "public records," and unless exempt from disclosure under state law, such information is subject to being released upon request.

Washington state statutes contain numerous exemptions from public disclosure.[3] For example, within the transportation and public utilities realm, information required to obtain a drivers' license; individual information related to vanpool, carpools or other ride-sharing programs or services; information related to persons who acquire and use transit passes or fare payment cards; information collected and used for assessing tolls on roadways, tunnels or bridges; customer-specific public utility usage and billing information; and several other examples are all exempt from public disclosure.

To administer a road usage charge, the only new information that must be collected beyond what is already held by the Department of Licensing is the taxable mileage driven by a specific vehicle. Information such as specific location where the vehicle traveled, and date or time of travel are not mandatory elements of a RUC system. Nonetheless, because personal privacy is the top concern for the public (further confirmed through the WA RUC pilot), and because many individuals feel odometer mileage is sensitive information, the Steering Committee finds that RUC-related information should be added to the list of statutory exemptions from public disclosure, as has previously been done for toll-payer information in Washington.

8.6.2 MODEL PRIVACY POLICY FOR A RUC SYSTEM IN THE UNITED STATES

As part of the WA RUC pilot project, a Model Privacy Policy for Road Usage Charging[4] was developed through analysis of applicable legal approaches to privacy protection in the European Union's General Data Protection Regulation, the California Consumer Privacy Act of 2018, and the Oregon Road Usage Charge Program's statutory privacy protection provisions.

The model RUC privacy policy proposes establishment of a legal obligation to protect from disclosure any personal information used to collect a road usage charge. The model privacy policy defines ***personal information*** as information or data that identifies, relates to, or describes a person or entity that is obtained or developed in the course of reporting metered use by a vehicle subject to a road usage charge or for providing administrative services for collection of a road usage charge. Personal information is specifically not limited to location and metered use data. The manner of information or data reporting is not relevant; thus the data may be reported by automatic or manual means.

The model privacy policy directs an authorized agency to ensure protection of the confidentiality of personal information. This agency will be the agency assigned responsibility for implementing and operating a RUC program in the authorizing legislation.

The obligation to protect personal information from disclosure falls to whomever holds this information, whether a private or government entity or person. There are some recipients of personal information who may receive personal information to the limited extent that the information is necessary to the recipient's function in collecting road usage charges. Such persons include the road usage charge payer, a financial institution, employees

2 RCW 42.56.010(30) defines a public record as *"any writing containing information relating to the conduct of government or the performance of any governmental or proprietary function prepared, owned, used, or retained by any state or local agency regardless of physical form or characteristics. For the office of the secretary of the senate and the office of the chief clerk of the house of representatives, public records means legislative records as defined in RCW 40.14.100 and also means the following: All budget and financial records; personnel leave, travel, and payroll records; records of legislative sessions; reports submitted to the legislature; and any other record designated a public record by any official action of the senate or the house of representatives. This definition does not include records that are not otherwise required to be retained by the agency and are held by volunteers who:*

(a) Do not serve in an administrative capacity;

(b) Have not been appointed by the agency to an agency board, commission, or internship; and

(c) Do not have a supervisory role or delegated agency authority.

(4) "Writing" means handwriting, typewriting, printing, photostating, photographing, and every other means of recording any form of communication or representation including, but not limited to, letters, words, pictures, sounds, or symbols, or combination thereof, and all papers, maps, magnetic or paper tapes, photographic films and prints, motion picture, film and video recordings, magnetic or punched cards, discs, drums, diskettes, sound recordings, and other documents including existing data compilations from which information may be obtained or translated."

3 See RCW 42.56.230 et. seq. for a comprehensive listing of all statutory exceptions from public disclosure.

4 See Appendix A-6, section 5, page 33 for the full Model Privacy Policy for Road Usage Charging.

of the authorized agency, a service provider, a contractor for a service provider, an entity expressly approved to receive the information by the road usage charge payer, or a police officer pursuant to a valid court order based on probable cause. ***Express approval*** means active approval by a road usage charge payer that identifies the entity with which the personal information will be shared. ***Express approval*** once given, may be withdrawn.

The authorized agency or service provider that accesses or provides access to personal information shall maintain a record of that access. The access control log must state the date, time, and purpose of access, the data elements used to query the database, and the person accessing the personal information.

Most importantly, the model privacy policy sets forth extensive rights for the RUC payer, including the right to access personal information held by another, the right to inquire about personal information, the right to examine personal information, the right to rectify errors or inaccuracies within the personal information, and the right to erasure of location and metered use information that is no longer needed for the collection of a RUC. The right to erasure provides that deletion of records of location and daily metered use must occur within 30 days after completion of payment processing, dispute resolution or a noncompliance investigation, whichever is latest. The road usage charge payer may consent to longer retention and has the right to withdraw consent given at any time.

The policy confers upon the road usage charge payer the right to portability of the personal information to enable transfer from one service provider to another. Finally, the policy creates the right of nondiscrimination against a road usage charge payer for exercising these rights or refusing to grant express approval for transfer of personal information.

This model policy specifies that a service provider undertake several actions to facilitate compliance with it. A service provider must designate a personal information officer to enable contact by road usage charge payers and the authorized agency. The policy also requires that service providers adopt and publish an organizational usage and privacy policy and sets forth the subject-matter content.

This policy directs the authorized agency to take certain actions. The authorized agency must adopt and publish an organizational usage and privacy policy. The authorized agency shall also establish certification measures for service providers to demonstrate compliance with the requirements of the model RUC privacy policy.

This model policy requires service providers to implement appropriate technical and organizational measures to ensure a level of security appropriate to the risk of destruction, loss, alteration, or unauthorized disclosure of or access to personal information. The model policy prescribes issuance of notification in the event of a personal information breach and specifies the content for the notification.

To empower the provisions of the model RUC privacy policy, the policy contains several remedies against actions or inactions by the authorized agencies, service providers, or others holding personal information. Such remedies include the right to effective judicial remedy, the right to compensation and liability, administrative fines, and civil actions for violation of security provisions.

8.7 EQUITY*

Although the largest share of participants felt RUC was a more fair method of funding roadways than the gas tax, drivers frequently mentioned other aspects of equity that should be considered in a future transportation funding system, such as vehicle weight, emissions, and others. More work is needed on this topic.

When defined as a Guiding Principle, the concept of equity for RUC implementation focused on drivers paying a fair share for their road usage based on how much they use—in other words, preserving the "user-pay" principle.

In pre-pilot surveys, 59% of participants rated equity as "very important," placing it sixth among the nine principles. Its rating increased by two percentage points between the pre-pilot and post-pilot surveys, not enough to change its relative importance. When asked which approach they thought was more fair for funding roads between RUC and the gas tax, 44% chose RUC, 8% chose the gas tax, and 13% said both are equally fair. Rural participants were less likely to choose RUC and more likely to choose the gas tax. Urban and suburban participants were equally likely to choose RUC. These figures did not appreciably change over the course of the pilot.

Even before explicitly introducing socioeconomic equity concerns, the Steering Committee and participants alike recognized the challenge of assessing the equitability of a tax. The final survey offered participants an opportunity to share their thoughts on the meaning and value of equity.

The dimension of equity that stood out most in the open-ended comments was the notion of "paying for use," with 39% of respondents alluding to that definition of fairness, and over 80% citing similar concepts such as paying for road impact, damage, and upkeep; paying for distance traveled; paying your share; or paying for benefits received from the roads.

Other dimensions of fairness raised by participants included tax treatment by vehicle type, with most respondents preferring that all vehicles pay for road usage based on their impacts, regardless of fuel type. One impact specifically cited by over 100 survey respondents was vehicle weight. Smaller numbers of respondents (fewer than 100 each) raised concerns about income, geographic, and environmental equity.

Although they acknowledge numerous dimensions of equity and reveal wide variation in views across those dimensions, broad agreement among pilot participants exists around the user-pay dimension of equity and the superior performance of RUC along that dimension.

Despite the pilot evaluation's focus on the user-pay dimension, the RUC Steering Committee recognizes that equity encompasses other important dimensions, ranging from potential disparate impacts to lower-income populations, to whether all state drivers should be responsible for contributing to high-cost transportation facilities that primarily serve a single transportation corridor. The Legislature specifically directed the WSTC to recommend "necessary next steps to consider impacts [of RUC] to communities of color, low-income households, vulnerable populations, and displaced communities." Future RUC work, as directed by the Washington Legislature, will include deeper analysis of the impacts of RUC on vulnerable communities.[5]

Literature on infrastructure funding and service delivery identifies more than 25 definitions of equity.[6] Increasingly,

5 See Section 1(a) of ESHB 1160, Chapter 416, laws of 2019, which is a legislative proviso directing further research work by the WSTC on equity impacts.

6 Rosenbloom, S. 2009. The Equity Implications of Financing the Nation's Surface Transportation System. *TR News*, No. 261, March–April, pp. 3–9.

equity implies proportionality of impacts, often with a focus on communities of color, low-income households, and other vulnerable populations. The pilot yielded scarce information to examine dimensions of equity beyond the user-pay dimension. Data from the pilot allowed limited observation of vehicle characteristics and driving behavior by income level of participants, but with little confidence in the applicability of the results to a broader population.

National data sources provide better information on these characteristics. They indicate that average vehicle age decreases with income, while miles driven increases with income. For example, the lowest income households (less than $10,000 per year) own vehicles with an average age of 19.1 years and drive about 8,000 miles per year, while the highest income households (over $200,000 per year) own vehicles with an average age of 10.5 years and drive nearly 25,000 miles per year.[7] These data suggest a syllogism that lower-income households, although they drive less, tend to own older vehicles, and since fuel efficiency declines with vehicle age, lower-income households pay more per mile than higher-income households in gas tax.

WSTC's future work on this topic, as directed by the Legislature, will test the validity of the syllogism and explore dimensions of equity beyond income. The aim is to better understand the possible impacts of replacing the gas tax with a RUC on communities of concern.

7 Federal Highway Administration, 2017 National Household Travel Survey (NHTS); BERK, 2019.


LEGISLATIVE BUILDING

chapter 9

LEGAL & POLICY-RELATED ISSUES: FINDINGS, CHALLENGES, & OPPORTUNITIES

Many of the complications related to transitioning from the gas tax to a RUC system are legal and policy issues, which must be closely examined separate from the pilot project and are not affected by the results of the driving test. The Steering Committee has documented these issues since 2012 and has now completed its analysis.

Many issues examined by the Steering Committee strictly represent policy decisions: What are the roles of different governmental entities in a RUC system? Which vehicles (or drivers) should be entitled to a refund or be exempt from a RUC? Can a RUC system design account for other policies of public importance?

Some issues are financial and policy in nature but come with legal constraints or requirements. For example, whether RUC revenue should be restricted to highway purposes is a policy issue, but the available options are affected by the Constitution of the State of Washington, state statutes, bond resolutions, and contract law. Whether and how to collect RUC from out-of-state drivers represents a policy choice, but the available options are constrained by the Commerce Clause of the US Constitution. These and other complex policy issues are summarized in this chapter.

key takeaways

1. The Steering Committee strictly interprets their legislative direction: a RUC should be examined as a potential replacement for the gas tax. This is how the pilot system was designed, operated, and analyzed. The Steering Committee has carried forth this assumption in this report and takes no position on other potential uses of revenue.

2. To most closely replicate the characteristics of the gas tax it would eventually replace, a RUC should be designed, implemented, and the proceeds expended subject to Amendment 18 of the state Constitution. This requires the revenue to be intended for highway purpose expenditures only and placed into a special trust fund (the Motor Vehicle Fund), where it is segregated from other state revenue.

3. A RUC cannot fully replace the state's gas tax until all outstanding bonds that pledged the gas tax revenues have been paid off or restructured. The soonest this could happen would be in 10 years, provided the State Treasurer is able to refinance (or "call due") outstanding gas tax bonds at a cost that makes sense for the State. The longer time horizon is 25 years from the date the last gas tax-pledged bond is sold to investors. While the State's reliance on the gas tax can be reduced within the 25 years, a RUC (or other sources) must still provide sufficient revenues to meet transportation spending needs.

4. To offer similar financing advantages offered by the gas tax, a RUC could be implemented as a form of mileage-based license fee, which would make it eligible to be bonded in the future without impacting the State's debt limit.

5. One advantage to maintaining the state's gas tax during a transitionary period is that it provides a simple way to collect money from out-of-state drivers using Washington's roadways.

6. The policies that currently provide exemptions from gas taxes or refunds (either directly or indirectly) should remain in place for as long as the gas tax system is in place (i.e., at least 10 to 25 years).

7. Another advantage a RUC holds over the gas tax is the ability to more narrowly craft roadway tax policy so that it is compatible with other public policies. A RUC can be customized to apply different rates based on the characteristics of the owner, the vehicle, or how the vehicle is used. This level of customization is not feasible under the gas tax.

8. The WA RUC prototype system proved to be flexible enough to allow a range of consumer choice in how miles would be reported and among RUC service providers. It was also able to accommodate market competition and new technologies for RUC services.

9. A RUC system in Washington can be delivered and operated without creating a new agency. The Washington State Department of Licensing would likely take a lead role in implementation, while the Legislature may opt to direct the Washington State Transportation Commission to maintain policy oversight of the new system during a transitional period.

9.1 USE OF RUC REVENUE

The Steering Committee strictly interprets their legislative direction: a RUC should be examined as a potential replacement for the gas tax. To capture all legal and fiscal attributes of the gas tax, a RUC could be instituted as a mileage-based vehicle license fee, with expenditures limited to highway purposes.

One of the most important issues for policymakers to decide is how a RUC will be structured and how its revenue will be spent. If a RUC is intended to replace the existing state gas tax, will RUC revenue be used only for highway-related purposes, as is the case with the state gas tax today? Or, if implemented as a new revenue source, will expenditure of RUC revenue be expanded to include funding for other transportation-related projects, programs, and services? Because of the state's Constitution and existing transportation bond authorizations, the specific structure and implementation of the RUC need to be carefully considered, and the related impact, especially for the state's debt limit, fully understood. This section and Section 9.2 cover these issues.

In 2018 and 2019, the Steering Committee spent several meetings reviewing white papers,[1] receiving briefings, and discussing this topic. Committee members expressed diverse opinions. At their May 2, 2019 meeting, the Committee settled on the following conclusion: beginning with the original authorization for the RUC Assessment in 2012, the Legislature specifically directed the Steering Committee to examine a RUC's potential as a like-kind replacement for the state's gas tax. It did not direct the Steering Committee to consider broader uses of the revenue beyond how gas tax revenues are used today. Therefore, the Steering Committee's analysis and testing is limited to a RUC's potential to replicate the features of the current state gas tax. The Steering Committee takes no position on other potential uses of RUC revenue.

Using this as the basis for continued analysis, the Steering Committee specifically examined the important features of the state gas tax, and how a RUC could be designed to most closely mimic those characteristics. The most salient characteristics of the state gas tax are:

1. The state gas tax can only be expended for highway purposes, as that term is used in the Washington state Constitution Article II, Section 40;
2. Bonds supported by a pledge of the gas tax are not subject to the state's constitutional debt limit under Article VIII, Section 1 of the Washington state Constitution;
3. Gas tax refunds are provided to, or for the benefit of, persons using fuel off public highways; and
4. Certain drivers or motor fuel-burning activities are exempt from the gas tax.

The first two characteristics—restricting expenditures to highway purposes, and bonding revenue outside of the State's constitutional debt limit—are discussed below. The last two characteristics are discussed in Section 9.5.

If the Legislature decides to restrict expenditures of a RUC in the same manner as the current gas tax is restricted, the Steering Committee finds that a RUC should be made subject to the same constitutional provisions as the gas tax. Article II, Section 40 of the state Constitution (Amendment 18, enacted by the voters in 1944) requires three different types of revenue to be placed into a "special fund" (i.e., the Motor Vehicle Fund within the State Treasury) to be

1 *C.f.*, Use of RUC revenue white paper in Appendix A-7; Effects of 18th Amendment on RUC in Appendix A-8; and Bonding RUC Revenues in Appendix A-9.

used exclusively for highway purposes:[2] (1) License fees for motor vehicles collected by the state; (2) excise taxes collected on the sale, distribution, or use of motor vehicle fuel (commonly referred to as the "gas tax"); and (3) all other revenue intended to be used for highway purposes.

Vehicle license fees and gas taxes are specifically identified (enumerated) as being subject to the restrictions of Amendment 18. As such, making changes to the use of these two enumerated revenues would require an amendment to the state Constitution.[3] The third type of revenue restricted by Amendment 18 is categorical: "all other revenue intended to be used for highway purposes." The Steering Committee further examined the types of revenue that have been brought under the constitutional restrictions, and the specific legislative mechanisms required in order to accomplish it.[4]

The Steering Committee identified two primary ways that RUC revenue could be made subject to the provisions of Amendment 18, with expenditures restricted in the same manner as the state gas tax. **The first option is to structure a RUC in the form of a mileage-based vehicle license fee.** This is the approach assumed for the State's $5.3 billion Connecting Washington and $1.5 billion Puget Sound Gateway Project and I-405/SR 167 Express Toll Lane bond authorizations, which pledge motor vehicle fuel taxes and vehicle related fees to the repayment of debt.

A second option would be to enact a RUC as an "in lieu of" tax, to be imposed instead of the gas tax, with explicit legislative findings and intent that the revenue be placed into the Motor Vehicle Fund ("special fund") and be used exclusively for highway purposes. However, this approach would not align with the structure of the Connecting Washington and Puget Sound Gateway Project and I-405/SR 167 Express Toll Lane bond authorizations, and could potentially negatively impact the State's debt limit and ability to proceed with future transportation bond financings.

A third option is for a RUC to be added as an enumerated revenue by amending the state Constitution. However, the Steering Committee determined that given the difficulty of amending the Constitution and the availability of the first option, this approach is not mandatory. Further information about approaches to restricting RUC revenue similar to the current gas tax are in Appendix A-8.

Of the two primary options identified above, the Steering Committee concluded that Option 1 would be most effective at replicating the characteristics of the gas tax and preserving the State's future financing options. In addition to restricting expenditures similar to the gas tax, designing and implementing a RUC as a mileage-based license fee would enable the revenue to be pledged for the repayment of state highway bonds, as already contemplated by the Connecting Washington and Puget Sound Gateway Project and I-405/SR 167 Express Toll Lane bond authorizations.

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2 Article II, Section 40 of the Washington State Constitution provides: *"All fees collected by the State of Washington as license fees for motor vehicles and all excise taxes collected by the State of Washington on the sale, distribution or use of motor vehicle fuel and all other state revenue intended to be used for highway purposes, shall be paid into the state treasury and placed in a special fund to be used exclusively for highway purposes. Such highway purposes shall be construed to include the following: (a) The necessary operating, engineering and legal expenses connected with the administration of public highways, county roads and city streets; (b) The construction, reconstruction, maintenance, repair, and betterment of public highways, county roads, bridges and city streets; including the cost and expense of (1) acquisition of rights-of-way, (2) installing, maintaining and operating traffic signs and signal lights, (3) policing by the state of public highways, (4) operation of movable span bridges, (5) operation of ferries which are a part of any public highway, county road, or city street; (c) The payment or refunding of any obligation of the State of Washington, or any political subdivision thereof, for which any of the revenues described in section 1 may have been legally pledged prior to the effective date of this act; (d) Refunds authorized by law for taxes paid on motor vehicle fuels; (e) The cost of collection of any revenues described in this section: Provided, That this section shall not be construed to include revenue from general or special taxes or excises not levied primarily for highway purposes, or apply to vehicle operator's license fees or any excise tax imposed on motor vehicles or the use thereof in lieu of a property tax thereon, or fees for certificates of ownership of motor vehicles."*

3 Amending Art. II Sec 40 would require an affirmative supermajority (two-thirds) vote of both houses of the legislature, and majority approval by voters in a November general election.

4 C.f., *Effect of 18th Amendment on RUC Revenues*, presented at Washington Road Usage Charge Steering Committee meeting, November 29, 2018; and white paper *RUC and Amendment 18 of the Washington Constitution*, Appendix A-8.

9.2 RUC REVENUE TO SUPPORT BORROWING*

Shifting from today's transportation funding system that relies primarily on the gas tax to pay for public roadways to a RUC system will be neither easy nor quick. The State's legal obligations to repay outstanding bonds from gas tax revenue take precedence and constrain options for transitioning to a RUC.

In March 2019, the Steering Committee specifically considered how a RUC might replace the state gas tax given the gas tax has been pledged as the primary revenue source earmarked to repay the motor vehicle fuel tax bonds that have been (or will be) issued by the State. This issue was coupled with a related question: if a RUC is enacted in the future as a replacement for the state gas tax, how can it be structured to retain the gas tax's financing advantages? Both of these issues are thoroughly addressed in Appendix A-9 and summarized below.

The first question relates to whether, when, or how the current 49.4 cent per gallon state gas tax can be repealed and replaced with a RUC. The factor that most constrains the Legislature's ability to make this switch is that the gas tax has been pledged for the repayment of $7.3 billion of currently outstanding motor vehicle fuel tax (MVFT) bonds. In addition, it is expected that the MVFT will also be pledged to the repayment of, or to support repayment of an additional $9.0 billion of authorized but unissued bonds. Constitutional provisions prohibit the State from taking any action that would impair its contractual obligations to other parties, including private parties.[5]

State-issued MVFT bonds contain legally binding contractual covenants that make promises and grant certain rights to bondholders. When the Legislature authorizes the issuance of MVFT bonds, it pledges that repayment will come from specific revenue sources. The most significant source of repayment pledged for state MVFT bonds is the motor fuel tax. Below is language from a recent legislative bond authorization:

> "Proceeds of these excise taxes [motor fuel taxes] are hereby pledged to the payment of any bonds and the interest thereon issued under the authority of sections 1 through 6 of this act, and the legislature agrees to continue to impose these excise taxes on motor vehicle and special fuels in amounts sufficient to pay, when due, the principal and interest on all bonds issued under the authority of sections 1 through 6 of this act [Transportation Partnership Act]."[6]

The Steering Committee sought input from the Office of the State Treasurer (OST), which is responsible for issuing and managing state debt in accordance with law (both constitutional and statutory). In opinions originally offered in 2014 and bolstered with more in-depth analysis and insights in 2018, the OST conclusively determined that the current state gas tax could not be fully repealed without violating the Washington State Constitution, legislative bond authorizations (which are enacted laws), and specific bond covenants (which are legally binding contracts), because each require the gas tax to remain in place in sufficient amounts to pay debt service until all bonds that have pledged the gas tax have been repaid.

The Steering Committee explored a number of options that might enable the gas tax to be repealed in the short term. The only option that merited consideration was the possibility of a short-term refinancing of the existing gas tax bonds, replacing those bonds with new ones secured only by RUC revenue. However, the OST opined (and the Steering Committee concurred) that the transaction costs, likely higher interest rates, and potential legal complications—coupled with uncertainty around how much revenue RUC will provide in the early years—make a near-term refinancing of gas tax bond cost prohibitive.

*** Denotes one of the WA RUC Guiding Principles**

5 SHB 2394, 2007 Regular Session. See also Chapter 519, Laws of 2007.

6 Substitute Senate Bill No. 5989, Laws of 2015.

However, over a longer period of time, it is possible the gas tax could eventually be eliminated by refinancing existing MVFT supported debt with bonds supported solely by a RUC. As the State typically issues its debt as 25-year bonds with a 10-year call (meaning, the bonds could be paid off without penalty beginning 10 years from the original issuance) this approach would need to be implemented over a period of years. It would also be influenced by interest rates as well as the perceived credit quality of a RUC. Given the many variables related to this scenario, it is still an open question as to how long this strategy would take, but it is safe to assume it could take 10 to 25 years before the gas tax could be repealed in its entirety (with the clock starting on the date of the most recent bond issuance pledging the gas tax). Adding to the complexity of this approach, current transportation spending plans assume that new bonds at least partially supported by gas tax revenues will continue to be issued throughout the next ten years, and potentially beyond.

As an alternative to repealing the gas tax, a RUC could be phased in over time in a manner that compliments the existing gas tax (or mirrors the Connecting Washington authorization) by: a) seeking new legislation that amends the existing bond authorizations (including Transportation Partnership Act and Nickel Package bonds that have already been issued) to add in a RUC as an additional vehicle fee security pledge; or b) refund the existing (already issued) MVFT bonds with new bond issuances that pledge both MVFT and vehicle-related fees (RUC).

How to structure future RUC-supported new money bond authorizations also remains an important question. As of today, road usage charging is a new and relatively unproven revenue source, especially when it comes to a revenue stream pledged to the repayment of debt. Until it matures and develops a proven track record, borrowing against it will be costly, especially on a stand-alone basis, and potentially subject the State to increased credit risk.

However, through the phased in approached described above, a RUC could be combined with the more mature gas tax, which in total could provide a strong revenue base to support the State's future transportation projects. This is precisely what is anticipated in the Connecting Washington and Puget Sound Gateway Project and I-405/SR 167 Express Toll Lane bond authorizations, which are supported by a pledge of MVFT and vehicle-related fees. If a RUC is enacted in the future, it could be used in combination with other sources to repay bonds.

The key to this financing structure is that bonds secured by the State's gas tax and vehicle related fee revenues, such as the Connecting Washington bonds, are exempt from the state's constitutional debt limit. Sometimes referred to as the "GO" (general obligation) debt limit, this provision of the Washington Constitution limits the aggregate maximum annual debt service to 8.25% of a six-year rolling average of general state revenues. All state-issued bonds where repayment has been pledged without limitation (i.e., backed by the "full faith and credit of the state") are subject to this debt limit, except for narrow exceptions that exist for debt obligations that are payable from gas tax revenue, vehicle license fees collected by the State, and certain types of revenue generated from a project (such as tolls). As such, bonds secured by the MVFT and/or vehicle license fees are constitutionally excluded from the state debt limit. In order for a RUC to carry forward this same financing advantage, it must be structured in the form of a vehicle license fee, which is constitutionally required to be deposited into a special fund (i.e., the state's Motor Vehicle Fund). This issue is more fully examined in Appendix A-8.

In conclusion, the Steering Committee determined that for a RUC to most closely mimic the characteristics of the gas tax it would eventually replace, the most financially advantageous structure would be to design and implement it as a mileage-based vehicle license fee, in conformance with both Art. II, Section 40 (Amendment 18), and Art. VIII, Section 1 of the Washington state Constitution. This approach is consistent with the advice of the Office of the State Treasurer in 2014 and 2018. This approach is also compatible with the Connecting Washington and I-405/SR 167 Express Toll Lane bond authorizations, which pledge both the gas tax and vehicle license fees to repay debt service on the bonds.

9.3 COLLECTING RUC REVENUE FROM OUT-OF-STATE DRIVERS

The pilot demonstrated that multi-state road usage charging is feasible. However, there are limits to how a RUC can be collected from out-of-state vehicles. Until a RUC is more widely adopted throughout the Pacific Northwest region, the most cost-effective way to collect roadway taxes from out-of-state drivers is for them to continue to pay the gas tax.

Visitors to Washington can report and pay for miles driven under a RUC system just as Washington residents can. The WA RUC pilot demonstrated the technical viability of these approaches, including participants from Idaho, Oregon, and British Columbia. A time permit could also be made available to visitors. Beyond technical viability, if Washington applies a RUC to out-of-state vehicles, it must consider operational, enforcement, and constitutional constraints. Until Washington and neighboring jurisdictions address these constraints in a cost-effective way, continuing to collect the gas tax from visitors remains the most viable approach.

The first constraint is operational. The WA RUC pilot successfully assessed a RUC on out-of-state drivers. Drivers from Oregon and British Columbia used plug-in devices with GPS to report and pay for miles driven in Washington, while drivers from Idaho selected from among the odometer charge, mileage permit, and smartphone application reporting methods. Non-technology methods likely do not suit a live system, since the odometer charge method lends itself to overcharging out-of-state drivers, while the smartphone application, as tested, suffers from known gaps in accuracy. Mileage permits and time permits may be the most appropriate mechanisms for assessing a RUC on visitors, but these methods require additional compliance and enforcement activities that the pilot did not test. These additional activities would reduce the cost-effectiveness of assessing RUC on visitors.

The second constraint is enforcement. Washington may find limited ability to enforce payment for road usage charges by vehicles registered in other jurisdictions. Although Washington can impose penalties and enforcement actions on its own vehicles, such as registration holds, these tools may be less effective for out-of-state vehicles.

The third constraint is constitutional. The Steering Committee carefully examined the Commerce Clause of the US Constitution to identify policy and design considerations for a RUC on nonresident vehicles.[7] Eight scenarios for imposing a RUC on nonresident drivers pass the nexus, fair apportionment, and fair relationship tests for determining constitutionality of a state tax. The scenarios also pass the non-discrimination test, but only if designed carefully. These areas of design require specific legal advice or compliance with constitutional restraints protecting interstate commerce. Below are five policy or system features that the Washington Legislature and implementing agency should approach with caution:

1. Separating RUC rates from fuel tax rates (in a situation where a state completely switches to a RUC system instead of a fuel tax system and the nonresident drivers continue to pay the fuel tax);
2. Offsetting, crediting or rebating fuel tax paid within the state exclusively to resident drivers and not to nonresident drivers;
3. Requiring nonresident drivers to use an electronic reporting method or compliance technology that places an extraordinary cost on out-of-state businesses relative to local businesses;
4. Setting RUC and/or gas tax rates without a rational basis and declared public purpose; and
5. Imposing a RUC enforcement regime that discriminates against nonresident drivers.

7 "RUC and the Commerce Clause and other provisions of the United States Constitution." March 2019. Appendix A-10.

9.4 EXEMPTIONS & REFUNDS OF RUC

In order to most closely mirror the gas tax characteristics, a RUC should be applied to the same classes (and uses) of vehicles that are required to pay the gas tax.

Most taxes and fees contain exemptions and allow for refunds for a variety of reasons. These include constitutional or statutory requirements, lack of nexus between the tax or fee purpose and the entity or activity being taxes, and other policy considerations. For example, Washington's fuel tax exemption and refund provisions cover all three reasons.

For a RUC system, exemptions and refunds fall into two broad categories: vehicles and miles. There are two ways to avoid taxing certain vehicles or certain miles. One way is to define vehicles and miles subject to road usage charging in a way that includes only those of interest and excludes all others. For example, subjecting all light-duty vehicles to a RUC would necessarily exclude heavy-duty vehicles without requiring an explicit exemption. The second way is to define a set of exemptions or refund allowances to exclude specific vehicles or miles from a RUC, from among the universe of subject vehicles and miles.

To determine appropriate RUC exemptions or refunds, the Steering Committee examined fuel tax statutes, other RUC programs, and its Guiding Principles for RUC in Washington. The only vehicle exemption the Steering Committee identified is foreign diplomatic and consular mission vehicles from a RUC. The Legislature may avoid other classes of vehicles without exemptions or refunds, but rather by defining the group of vehicles subject to a RUC carefully.

As for miles, the Steering Committee identified one narrow exemption to consider for a RUC to maintain consistency with fuel tax exemptions. Fuel tax does not apply to fuel consumed off road by farm vehicles, vehicles operated exclusively in natural recreation areas, and vehicles operated exclusively in state parks by the Parks and Recreation Commission. Therefore, miles driven in these circumstances may also need to remain exempt from a RUC. Out-of-state miles could be exempt by defining subject miles only as those driven in state.

EXHIBIT 9.1
Vehicle Exemption Recommendations

Class of Vehicle	Recommendation	Reason
Foreign diplomatic and consular mission vehicles	Exempt	Align with fuel tax statute 82.38.080(2)(b)
Out of state (<45 days in state)	Do not subject	No clear precedent; can include or exempt later (will pay fuel tax in the meantime)
Diesel transit vehicles	Do not subject	Align with fuel tax statute 82.38.080(1)(g)
Publicly owned diesel construction, firefighting vehicles	Do not subject	Align with fuel tax statute 82.38.080(1)(a)–(b)

EXHIBIT 9.2
Mileage Exemption Recommendations

Class of Mileage	Recommendation	Reason
Off road miles driven by farm vehicles, vehicle operated exclusively in natural recreation areas, and vehicles operated exclusively in state parks by the Parks and Recreation c\ Commission	Exempt	Align with fuel tax statute 82.38.180(1)(a)
Out of state	Do not subject	No nexus

9.5 COMPLEMENTARY POLICY OBJECTIVES *

A clear advantage offered by a RUC is the ability for government to customize transportation tax policy across three different dimensions: characteristics of the vehicle owner; characteristics of the vehicle; and vehicle use. This allows a RUC to align with other public policy objectives.

Early on in the Steering Committee's RUC Assessment work, the Committee discussed how best to thoroughly assess a new method of funding transportation—a road usage charge—that would provide better financial sustainability for the public roadway network, while at the same time recognizing the challenges and changes underway in society that will shape how people move around in the future. Myriad issues related to the transportation system were mentioned: stormwater runoff, air quality, greenhouse gas emissions, petroleum dependence, economic inequality, divergent transportation needs between urban and rural residents, travel time reliability, effects on small businesses, and many others. The main question became, how can a RUC be assessed against each of these concerns or policy objectives, when there is lack of consensus among policymakers about what the issues are, their relative importance, and their potential impact?

Given the Steering Committee's strict interpretation of their legislative charge, rather than developing an extensive work plan to analyze how a RUC might impact a wide range of policy concerns, the Committee decided on a single measure. Road usage charging should be evaluated, tested, and analyzed to determine whether it is a more robust and flexible revenue mechanism than the gas tax which serves (or is at least compatible with) many other transportation-related policies or issues.

For example, if the issue is how a per-mile charge system might support or be compatible with state policy goals to reduce greenhouse gas emissions,[8] the primary question is whether a RUC is more capable of accounting for public policies related to GHG emissions than the current gas tax, rather than specifically how RUC might impact that issue.

Because the WA RUC system creates a direct linkage between the vehicle owner, the vehicle's characteristics, and payment in direct proportion to actual use, a RUC is much more capable of being tailored to reflect other public policies or priorities than the gas tax. Although the Steering Committee takes no position on whether a RUC should reflect other public policies beyond providing sustainable roadway funding, the Committee finds that a RUC system is flexible enough to be tailored across three dimensions:

- Characteristics of the vehicle owner. Example: RUC could apply a different per-mile rate based on where the owner resides, perhaps to reflect the higher or lower cost of roadway infrastructure in certain parts of the state.
- Characteristics of the vehicle. Example: a small surcharge could be applied to "gas guzzlers," similar to federal policy regarding low-MPG passenger vehicles.
- How the vehicle is used. Example: different rates could be applied to ride-share vehicles.

Based on the 12-month live pilot test results, participants often commented that a future WA RUC system should account for other factors besides vehicle distance traveled. Similar feedback was documented from people not participating in the pilot who nonetheless shared their comments through email or phone calls. One of the most frequent comments heard was that a future RUC system should account for vehicle weight—either because larger, heavier vehicles tend to have higher emissions, or because heavier vehicles impact the roads more than lighter vehicles.[9]

8 See RCW 70.235.020.

9 Within the class of vehicles that were tested (light duty vehicles, those under 10,000 lbs.), the relative differences in emissions and the measurable impact to roadways between a vehicle weighing 4,000 lbs. compared to 6,000 lbs. is negligible or non-existent. However, there was a prevalent belief among Washington residents that vehicles weighing more should pay more. The Steering Committee makes no finding on this issue, other than to note how important Washingtonians feel this is.

clearing things up: road usage charges & urban congestion pricing initiatives

In the Puget Sound region, there has been recent news of the City of Seattle's interest in exploring vehicle pricing initiatives for the downtown core. This has led to some misunderstanding about how a RUC system might be extended to apply different rates within congested urban centers. "Congestion pricing" initiatives are being considered in several large US cities and abroad. As envisioned, vehicles that travel between (or within) a designated zone would be charged a significantly higher price for that travel. The primary goals of these policies are to discourage driving in congested urban areas, and to collect revenue from the charges to help expand other mobility options for non-personal auto travel to the zone (for example, improved transit service to the area). While it may be tempting to think of a future transportation system where travel pricing is so exact that all factors can be accounted for—time of day, level of roadway congestion, use of high-cost transportation facilities such as tunnels or bridges, etc.—for the foreseeable future, this vision of combining congestion pricing with the WA RUC system is not feasible. Washington drivers' top priority for any future RUC system is that it protects personal privacy, especially with respect to location. This was a persistent view held throughout the entire WA RUC pilot project, with 89% saying this was their top concern.

The WA RUC system as designed, tested, and evaluated by the Steering Committee reflected the fundamental design principles of privacy protection and consumer (or user) choice in mileage reporting.[10] Requiring the WA RUC system to delineate when a vehicle is traveling within a congestion priced zone would violate the principle of consumer choice in mileage reporting, because such a system would need to require GPS-enabled mileage reporting mechanisms for all vehicle owners—not just those who choose this method. The Steering Committee found that policies requiring use of GPS-enabled devices for all drivers are incompatible with the purpose and design of a RUC system for Washington.

10 See Chapter 2, Section 2.1.2, "User Options: Consumer choice should be considered wherever possible."

9.6 SYSTEM FLEXIBILITY *

The pilot test demonstrated that a RUC system can retain a wide degree of flexibility. It offered numerous mileage reporting options, choice of service providers, and the ability to collect a RUC with only one new piece of information from vehicle owners—their odometer mileage.

The RUC Steering Committee defined the guiding principle of system flexibility as follows: "A RUC system should be adaptive, open to competing vendors, and able to evolve over time." Flexibility supports several other guiding principles, including user options and cost-effectiveness. As stated before, although pilot participants agreed with user options as a "very important" principle, it ranked low relative to other priorities. Participants also expressed interest in efficient administration, but with limited ability to gauge administrative costs. Nonetheless, the WA RUC pilot demonstrated system flexibility and allowed the Steering Committee to observe several approaches for building a flexible system in the future.

The WA RUC pilot demonstrated flexibility in several ways. First, it featured two competing vendors who enrolled customers in the pilot. Second, it featured numerous reporting methods, each of which can be continuously improved and adapted for future use either by the vendors who deployed them or by the State. Third, the pilot demonstrated for the first time a commercial-off-the-shelf reporting device. This particular feature proved the concept that customers can select their own mileage reporting technology at retail and use it with a RUC account manager to report miles.

Perhaps the most important aspect of flexibility that the pilot demonstrated is the ability to deploy multiple account managers and several mileage reporting methods across a common set of RUC reporting standards and specifications. This illustrated how the State could link in to receive mileage data from a universe of providers in a future RUC program, satisfying drivers' tax reporting requirements with minimal disruption to the innovation of private sector firms in the automotive and consumer technology industries.

The flexibility demonstrated in the WA RUC pilot makes available to the State numerous approaches for deploying a live RUC system in a way that preserves future flexibility. One interesting example is the idea of starting a RUC program with odometer charging. This approach could encompass reporting odometer readings periodically to a licensing agent and/or self-reporting (through a mobile application), as the pilot did. This approach leaves open the possibility of adding automated approaches in the future. It could even allow motorists to choose other technology approaches to mileage reporting if they wish, at their own cost, while providing guidelines for the eventual formal integration of such methods into the system.

Building off the principle of system flexibility, the Steering Committee observed in the pilot three system design features integral to its achievement:

- Direct the State to collect only the minimal information necessary to accurately calculate and process RUC payments due from motorists;
- Specify the format of such information exchange, and the requirements of any mileage measurement technique, in an open manner so that future providers of technology or systems on behalf of motorists can openly compete to furnish the service; and
- Leave motorists free to choose technology or services to assist them in the provision of required mileage reports to the State, so long as the service complies with the open information exchange formats and technology requirements.

the steering committee's principles for institutional design

Administration of a RUC system should be cost-effective and cost-efficient.

- Reflect the identified functional areas, specific functions, and tasks needed to carry out the program (i.e., "form follows function").
- Identify incremental resources required to successfully execute a RUC system.
- Leverage existing agencies, systems, and expertise as much as possible, to contain marginal costs and avoid enlarging bureaucracy.
- Build from existing state agency relationships and processes in policy, revenue forecasting, revenue collection, and customer interaction to minimize impacts on existing agency workforce.
- Build on lean principles when adding functions and processes to minimize addition of new resources and impacts on existing agency workforce.

A RUC system should have a clear assignment of responsibility and oversight, and provide accurate reporting of usage and distribution of revenue collected.

- Consider all organizational and functional aspects needed for a RUC system, including those not covered in the WA RUC pilot.
- Group customer-facing functions logically to minimize interdependencies between agencies and to deliver a cohesive end-user experience.
- Indicate the essential information sharing, coordination, and interactions among or between agencies and vendors for maximum operational effectiveness and minimal disruption to the end user experience.
- Provide mechanisms for transparency and accountability, including ongoing opportunities for information sharing with the public and for public input and feedback.

A RUC system should respect an individual's right to privacy; a RUC system should meet applicable standards for data security and access to data should be restricted to authorized people.

- Consider the privacy and data security implications of handling drivers' road usage charge data.

9.7 INSTITUTIONAL ROLES IN A FUTURE RUC SYSTEM*

A RUC system can be delivered and operated without creating a new agency. The Washington State Department of Licensing would likely take lead role in implementation, while the Legislature may opt to direct the Washington State Transportation Commission to maintain policy oversight of the new system during a transitional period.

When a RUC system requires institutional clarity, the Legislature must direct an agency or agencies to implement, operate, and oversee it. The Steering Committee identified several overarching features for institutional design of a RUC system, along with principles for their execution, and finally several alternatives for achieving accountability.

The Steering Committee determined that a RUC program can be delivered by existing state agencies. Specifically, the Department of Licensing (DOL) offers the broadest set of appropriate existing functions and capabilities to undertake RUC operations (customer-facing and vendor-facing activities). WSTC, WSDOT, and Office of State Treasurer can each provide supporting functions:

- WSTC conducts independent evaluation of road usage charging in support of its policy and performance advice to the Legislature and support for system design (including knowledge transfer to DOL).
- WSDOT supports revenue forecasting and technical support for operations.
- The Office of State Treasurer receives revenue forecasts and supports funds handling.

The Steering Committee created three scenarios for achieving accountability in the structuring of a RUC program. In the first scenario, each of the involved agencies (DOL, WSTC, WSDOT, and Office of State Treasurer) reports individually to the Legislature. In the second scenario, DOL reports to the Legislature on operations, while the WSTC reports independent policy and other recommendations based on its ongoing RUC evaluation. In the third scenario, the Legislature designates an agency as the RUC Authority, which has sole responsibility for reporting on RUC. Regardless of the approach taken, the Legislature enjoys clear lines of reporting on RUC functions and obligations, accountability ultimately to lawmakers, and confidence in agency capabilities and resources to deliver the program.


ENTERING
Washington

chapter 10

FINANCIAL ISSUES: FINDINGS, CHALLENGES, & OPPORTUNITIES

The WA RUC Pilot project drew out drivers' reactions to a potential RUC system and what must change in the future. However, the pilot did not yield insights about the costs and revenues of a RUC system. Instead, detailed financial analysis provided information about the comparative costs and revenues of various RUC scenarios. The functions and associated costs of a RUC system depend on many policy variables such as the number of vehicles required to pay a RUC and the number and type of mileage reporting options available. Revenues likewise depend on factors such as the per-mile rate and number of vehicles enrolled. The financial analysis concluded that, generally, while holding the per-mile and per-gallon tax rates constant, a RUC costs more to collect than the gas tax, but yields more revenue in the long-term. The fundamental question for the Legislature is whether switching from the gas tax to a RUC will be worth the higher cost of collections if RUC yields more revenue for the same tax rate.

key takeaways

1. For practical and legal reasons related to motor vehicle fuel tax bonds, the State should continue to collect the gas tax for at least 10 to 25 years, regardless of a transition approach to introducing RUC. Meanwhile, the Legislature can introduce a RUC on a portion of vehicles, using the gas tax as a pre-payment mechanism to reduce collection costs and evasion risks.
2. A wide range of scenarios for introducing RUC exist, with increasing revenue to fill the expected gap in per-mile revenue from a "gas tax only" revenue policy as the number of subject vehicles increases.
3. The cost to collect a RUC will exceed the cost of collecting gas tax under all scenarios examined, but unit costs of collection for a RUC will decline with increasing numbers of subject vehicles. In the near term, with smaller volumes of subject vehicles, higher-technology approaches to reporting mileage will cost more than lower-technology approaches. A purely or largely manual approach to mileage reporting with self-reporting or odometer photo reporting of mileage can achieve operational costs on par with the cost of collecting vehicle registration fees.
4. The Legislature likely prefers to retain the authority to specify the per-mile rates and time permit rates under a RUC program. Should the Legislature prefer to delegate rate-setting authority, it can only do so if road usage charging is designed as a fee or charge, and not a tax.
5. Depending on the design requirements, the Legislature may face legal constraints if out-of-state vehicles are required to pay a RUC on a per-mile basis. To avoid running afoul of the Commerce Clause, the basis of rates and the relationship between fuel tax rates and RUC rates must be considered carefully. Specifically, as discussed in greater detail in Appendix A-10,[1] RUC and gas tax rates must have a rational basis; RUC rates and fuel tax rates must not feature an unreasonable separation (in a way that could be deemed discriminatory to out-of-state drivers); and any credits, rebates, or offsets must be designed in a way that does not unreasonably restrict them to residents over out-of-state drivers.
6. A RUC system can be implemented in a manner that provides a high degree of accountability from both an operational and a governance (or policy) perspective.

1 See WA RUC Steering Committee white paper, *RUC and The Commerce Clause and other provisions of the United States Constitution*, Appendix A-10.

10.1 OVERVIEW OF FINANCIAL ISSUES

While a large public demonstration of a RUC system is an unmatched tool for gaining insight into how drivers react to a per-mile system and identifying what must change in the future, a demonstration is not useful for determining the likely range of costs and revenues of a fully-deployed RUC system. Detailed financial analysis is required to begin addressing this issue.

Most of the issues covered in this chapter relied on research and analysis, including using financial modeling to forecast a range of potential outcomes. The result of this work necessarily depends on the starting assumptions: How many vehicles would pay a RUC, and when? What would the per-mile rate be? Over what time period should costs and revenues be considered? These are just a few of the basic assumptions—all subject to future legislative decisions—about a RUC system to conduct a financial analysis.

The pilot test revealed what drivers thought about the WA RUC system after testing it for a year. Participants generally valued cost effectiveness, with between 62% and 67% rating it as "very important," placing it fifth among the nine guiding principles. However, since most of the cost impacts of a RUC system depend on fiscal and policy decisions made by the Legislature, reactions from pilot test drivers cannot be extrapolated to conclude that Washingtonians are accepting of the cost and revenue impacts of a RUC. Neither the test drivers nor the general public have enough information at this stage to draw such conclusions.

There are two perspectives to consider related to RUC financial issues: needs and expectations of the driving public; and needs and expectations of the State of Washington. The driving public may be most concerned about personal cost impacts of RUC compared to the gas tax, how the revenue will be spent, and whether the taxes will be transparent and fully accounted for. State government may be most concerned about whether the revenue will be sufficient for its intended purpose, stable with low volatility in revenue collection, and predictable so that the State can count on the revenue stream to fund future transportation system needs.

How rates would be set and how the RUC system would be accountable to the public are addressed in Section 10.3 and Section 10.4. The overall cost effectiveness of a RUC system is covered in Section 10.2.

10.2 COST EFFECTIVENESS *

Cost-effectiveness considers both the ability of a RUC to generate revenue and the cost to collect it. Under all scenarios examined, when holding RUC and gas tax rates constant, RUC generates more revenue, but is costlier to collect than the gas tax. RUC revenue depends on the number of vehicles subject to it, the per-mile rate, and the number of miles driven, while cost to collect depends primarily on the number of subject vehicles and the methods drivers use to report mileage. The precise cost will depend on a range of policy choices but, in general, the unit cost of collecting a RUC declines as the number of subject vehicles increases.

The first factor to consider in assessing RUC cost-effectiveness is ability to generate revenue. This factor faces one key constraint: the Steering Committee recognizes that RUC cannot replace gas taxes all at once. The gas tax must remain in place to service outstanding motor vehicle fuel tax bonds. Moreover, as a practical matter, a large portion of the Washington vehicle fleet contributes substantial revenue through the gas tax and will do so for years to come as the vehicle fleet gradually turns over. This reliance on an existing, understood revenue mechanism, makes the prospect of switching entirely to a RUC system too risky while some system design and operational aspects remain untested.

Given this constraint, the Steering Committee examined a range of scenarios in which only a portion of the vehicle fleet transitions from paying gas taxes to paying a RUC, rather than transitioning the entire fleet at once. Three scenarios illustrated below include: (1) introducing a RUC only for electric vehicles (in lieu of the electric vehicle registration surcharge) in 2023, (2) introducing a RUC gradually by MPG rating over the course of a decade, to include all vehicles over 20 MPG,[2] and (3) introducing a RUC for all new vehicles in 2025.

Under all scenarios, the gas tax would remain in place. Subject vehicles would pre-pay a portion of their RUC through the gas tax mechanism, then pay the remainder through the RUC mechanism. In addition to allowing gas tax collections to continue servicing outstanding bonds, this approach reduces the cost of collection (since subject vehicles pay only a portion through the RUC mechanism) and reduces the risk and cost of revenue loss through evasion, since subject vehicles would continue to pay most RUC through the gas tax mechanism.

The results of the revenue analysis are presented on a per-mile-driven basis. For example, at 49.4 cents per gallon and a fleet average of 20 MPG, the gas tax currently generates 2.4 cents per mile driven across all vehicles. By 2040, with a fleet MPG approaching 30, the gas tax will generate about 1.6 cents per mile driven. If VMT increases over time, both gas tax and RUC will increase; likewise, if VMT declines, both gas tax and RUC will decline by a similar amount. Considering revenue on a per-mile basis removes the inherent uncertainty of total VMT forecasts from the analysis of revenue effectiveness, whether gas tax or a RUC.

The following three exhibits illustrate revenue per mile driven from three sources: gas tax, electric vehicle surcharge (labeled "flat fee"), and RUC. Note that the

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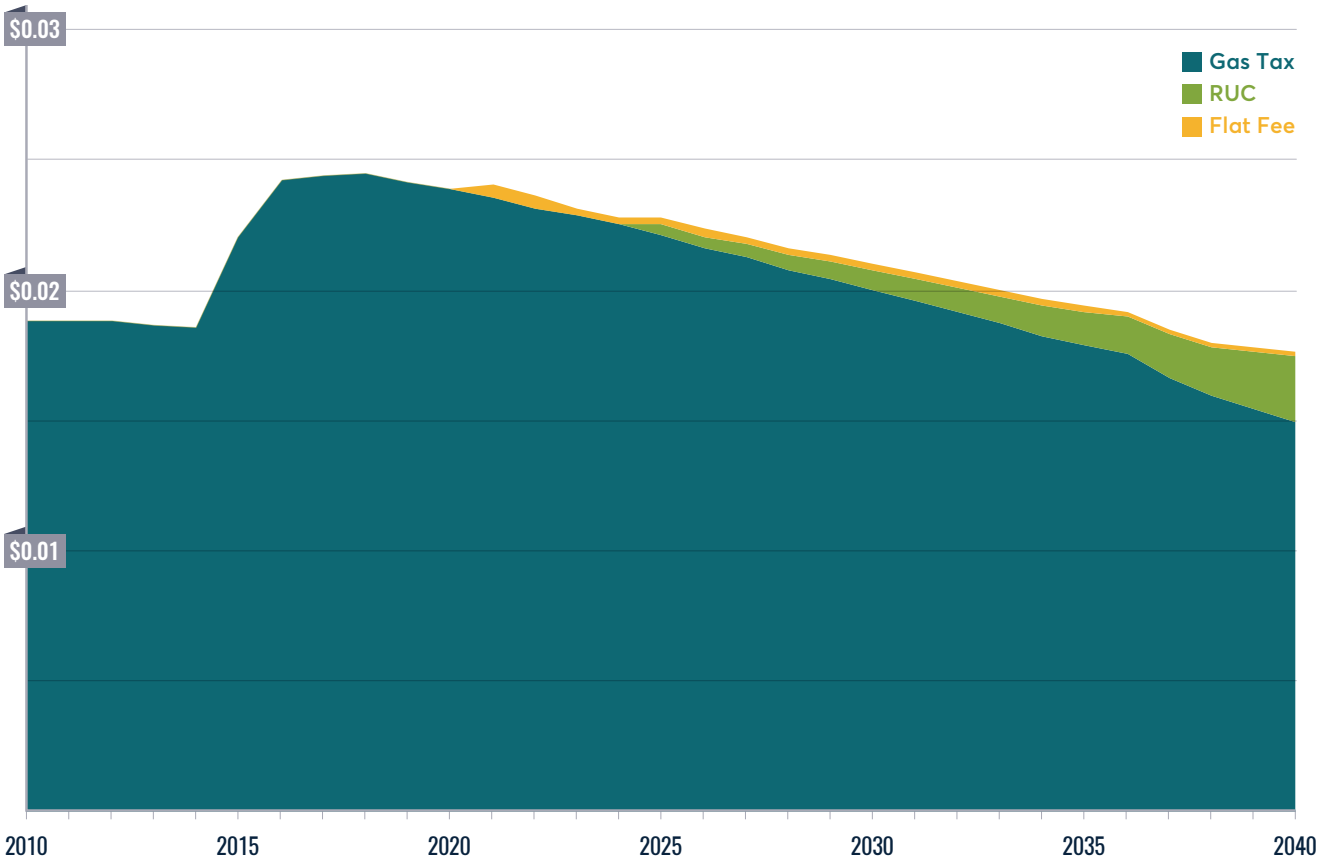
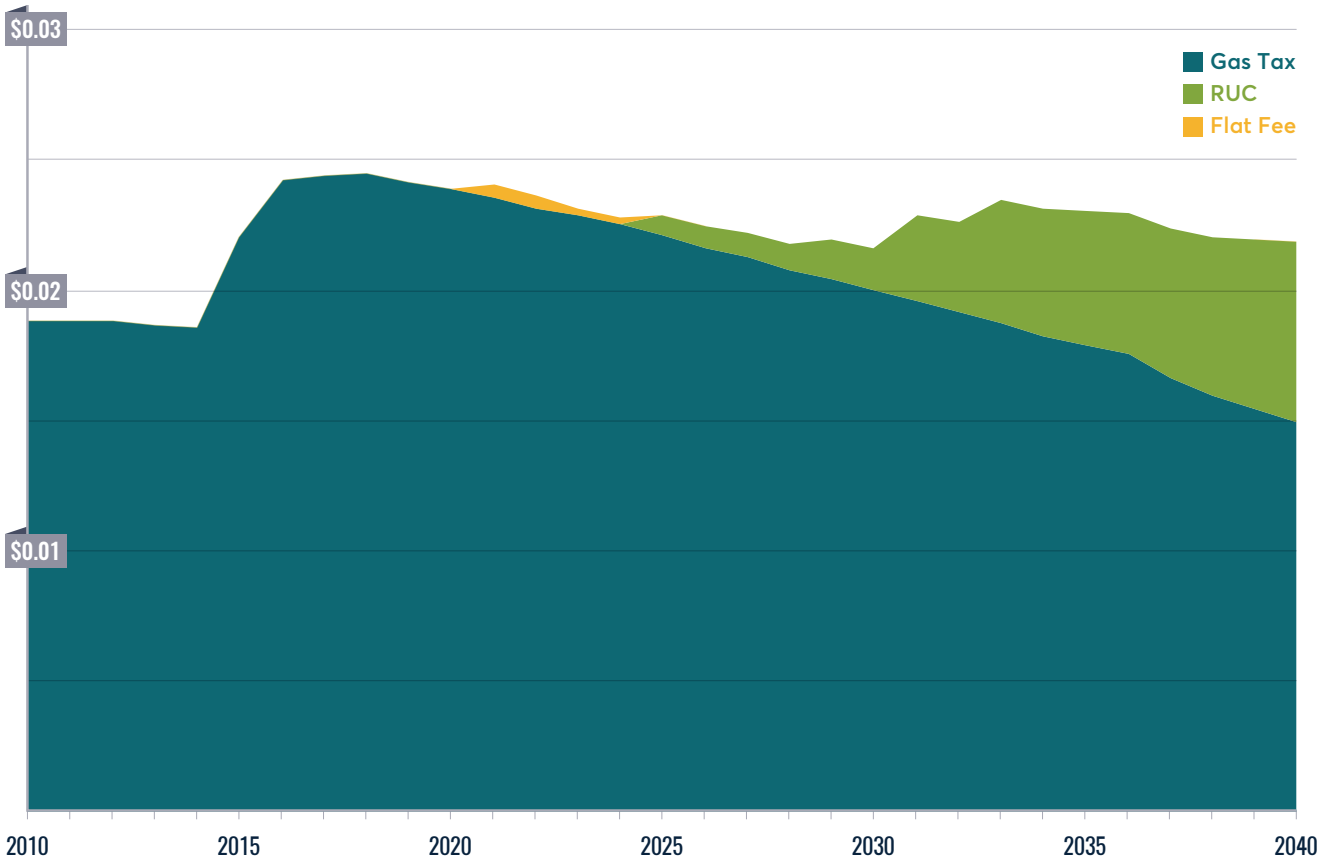
2 Scenario two anticipates that in the next decade the vast majority of new vehicles will receive an MPG rating above 20, making it impractical to plan for introduction of RUC on vehicles below that threshold after 2030.

EXHIBIT 10.1
Revenue Per Mile Driven, Scenario 1



gas tax component does not change across the three scenarios, since we assume it continues to be collected in all scenarios. Under scenario one (Exhibit 10.1), the State introduces a RUC on electric vehicles in 2023 to replace the flat fee. The RUC portion of the chart signifies the revenue from RUC paid by electric cars, which rise under the set of assumptions in this analysis to represent 10% of the total fleet by 2040. Should EVs comprise a larger portion of the fleet by 2040, then the gas tax per mile driven across the fleet as a whole would decline further, and the RUC per mile driven would increase (i.e., the blue portion would be smaller and the green portion would be larger). Under this scenario, the "flat fee" continues to be collected on hybrid vehicles after 2025, which explains the sliver corresponding to the flat fee in Exhibit 10.1.

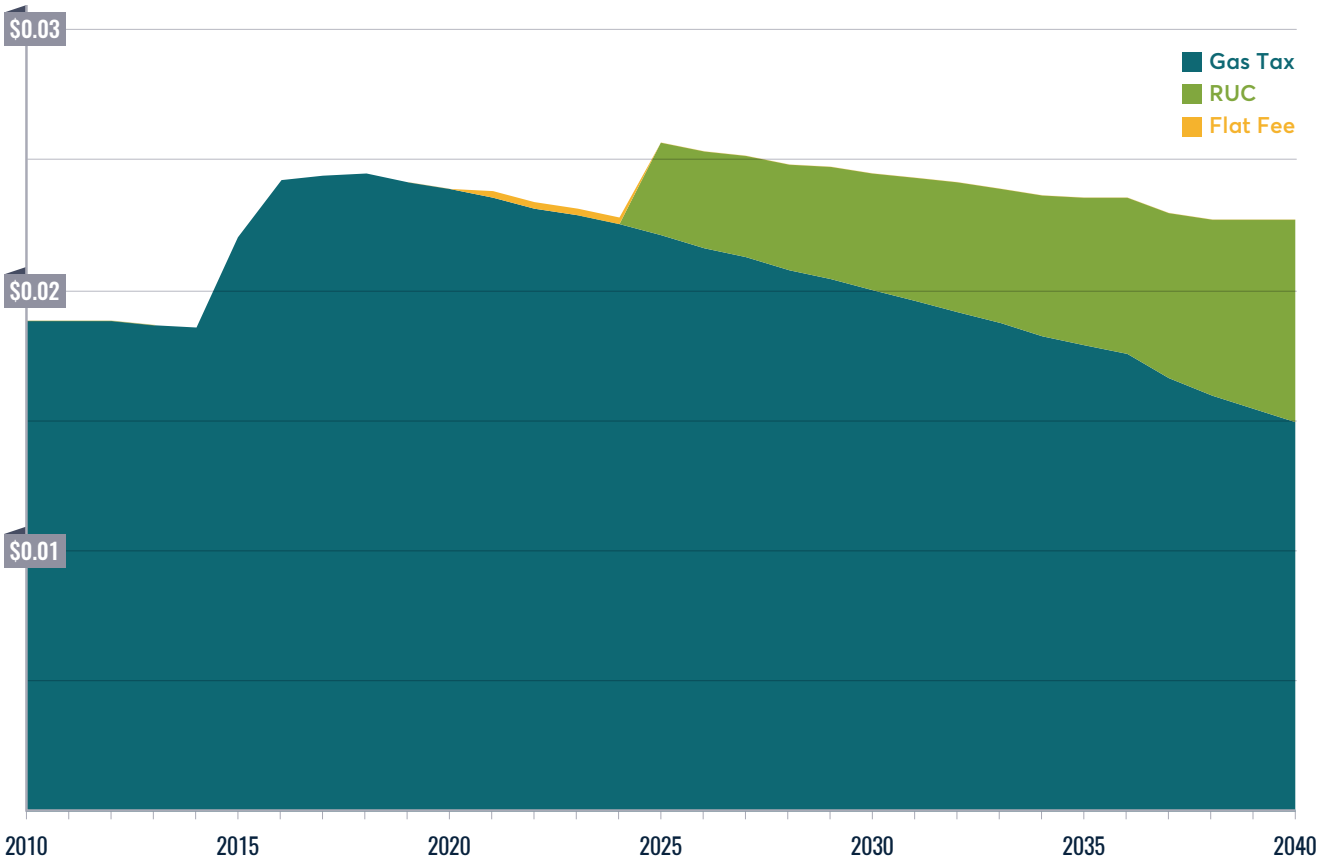
EXHIBIT 10.2
Revenue Per Mile Driven, Scenario 2



Scenario two contemplates a similar transition pathway, by starting with a RUC on electric vehicles in lieu of the registration surcharge beginning in 2023 (Exhibit 10.2). But, every two years subsequent to that, the State applies RUC to a new group of vehicles, gradually introducing it on hybrids in 2025, vehicles above 50 MPG in 2027, above 40 MPG in 2029, above 30 MPG in 2031, and above 20 MPG in 2033. As a result of this approach to introducing RUC, the gap in revenue from a "gas tax only" policy is largely filled, such that by 2040 the total revenue across the entire fleet stands at around 2.2 cents per mile driven.

The third scenario introduces RUC on all new vehicles in 2025, which results in filling the largest portion of the gap from "gas tax only" policy (Exhibit 10.3). Under this scenario, by 2040, total revenue stands at 2.3 cents per mile driven. Again, the State continues to collect gas tax, crediting the gas taxes paid against RUC owed to all subject vehicles

EXHIBIT 10.3
Revenue Per Mile Driven, Scenario 3



after 2025. This scenario assumes very few new vehicles after 2025 would receive refunds under RUC since very few new vehicles sold after 2025 would have an MPG rating below the revenue break-even point of 20.

All three scenarios assume a cost of collection of 10% of RUC revenue generated. The actual range of RUC costs could be as low as 5% under a high volume of enrolled vehicles and a single, manual method of mileage reporting. Under very small volumes and a relatively high-cost method of mileage reporting (e.g., plug-in devices only), RUC could cost as much as 50% of revenue to collect. This was the case under Oregon's voluntary system, where low volumes dictated a relatively high unit cost for operating a RUC system.

The Steering Committee recognizes two key factors: (1) number of subject vehicles, with an increasing number of vehicles reducing the unit cost of collecting RUC, and (2) methods of mileage reporting, with high-technology methods of reporting costing more to collect in the short term and less in the long term. A purely or largely manual method of reporting mileage, with self-reporting or odometer photo-based reporting, could be operated for a relatively low cost of collection in the near term, with costs in the same range as registration fees.

Given the wide range of possible costs and the numerous policy variables that influence cost, the WSTC will seek to conduct further exploration of this topic with other states exploring or enacting RUC systems as part of future federally-funded research.

10.3 SETTING RUC RATES

Should the Legislature move forward with a RUC, it must decide how to set per-mile rates. Rate setting can be as straightforward as a political negotiation or as complex as an analytical process driven by revenue targets and forecasting of miles traveled. Regardless of the process, some principles and constraints are of value in the Legislature's consideration of this issue.

An essential ingredient of RUC enabling legislation is the per-mile rate or rates to charge vehicles. The Steering Committee addressed rate setting for the WA RUC pilot examining the legal context for RUC rate setting and considering approaches the Legislature could take to develop rates for a live system.

The Steering Committee considered as a starting point its charge to explore RUC as a replacement for the state fuel tax. This meant assuming a per-mile RUC rate that replaced the state fuel tax. For analytical purposes, and also for testing RUC as a revenue mechanism in the pilot, the Steering Committee adopted an equation for determining a per-mile RUC rate for light-duty vehicles: divide the state fuel tax rate by the statewide average light-duty fuel economy. For the pilot, the math worked as follows: 49.4 cents per gallon ÷ 20.5 miles per gallon = 2.4 cents per mile.

For a live RUC system, the Legislature has ultimate authority and discretion for rates and rate setting. As a practical matter, this means RUC rates ultimately are subject to political negotiation like any other tax or fee. Nevertheless, a model approach to rate setting can inform the Legislature's deliberations, and/or constitute the approach the Legislature defines for a delegated entity to follow. The Steering Committee identified the following model approach:

1. Determine the ways to allow motorists to report and pay for RUC (e.g., pre-pay versus post-pay, and based on time or distance);
2. Determine the per-mile rate(s);
3. Determine the time permit rate(s); and
4. Determine any exceptions (as noted in Section 9.4 on refunds)

The WA RUC pilot tested both pre-pay and post-pay distance charges, and the Steering Committee has long suggested including a time-based charge as a user option in any RUC system.

The recommended method for determining per-mile rates follows three basic steps:

1. Gather inputs;
2. Build a revenue model to test scenarios and determine revenue targets; and
3. Determine rate structure, per-mile rates, and time-based rates.

The State can follow these steps under any approach to rate setting, whether done through political negotiation, or using revenue neutrality as a basis, or done purely as an analytical exercise.

Setting rates for time permits differs methodologically from per-mile rate setting, since a time permit offers an alternative for certain customers based on time instead of distance. A logical method for setting time permit rate(s) is to determine the mileage equivalent it should represent, then multiply that by the mileage rate. However, setting the mileage too low (e.g., at the median mileage driven) opens the overall system to substantial unrealized revenue, since high-mileage drivers can elect time permits to save cost relative to their cost responsibility based on mileage driven.

The Steering Committee offers two constraints for the consideration by the Legislature in rate-setting:

- The Legislature likely prefers to retain the authority to specify the per-mile rates and time permit rates under a RUC program. Should the Legislature prefer to delegate rate-setting authority, it can only do so if RUC is designated as a fee or charge, and not a tax.
- The Legislature may face legal constraints if the RUC program applies to out-of-state vehicles. To avoid running afoul of the Commerce Clause, the basis of rates and the relationship between fuel tax rates and RUC rates must be considered carefully. Specifically, as discussed in greater detail in Appendix A-10,[3] RUC and gas tax rates must have rational basis and declared public purpose; RUC rates and fuel tax rates must not feature an unreasonable separation (in a way that could be deemed discriminatory to out-of-state drivers); and any credits, rebates, or offsets must be designed in a way that does not unreasonably restrict them to residents over out-of-state drivers.

Aside from these constraints, the Legislature enjoys broad discretion to develop a per-mile rate or rates to suit revenue and other policy objectives.

3 See WA RUC Steering Committee white paper, *RUC and The Commerce Clause and other provisions of the United States Constitution,* Appendix A-10, and *Effects of the Commerce Clause on State-Level RUC Collections,* presented at March 14, 2019 Washington State Road Usage Charge Steering Committee meeting.

10.4 ACCOUNTABILITY *

The public expects a RUC system to operate with mileage charges accurate and clear, and their RUC payments properly processed. If glitches or errors are discovered, drivers want to know who will take prompt corrective action to address these issues.

There are two ways to consider accountability. The first is at the operational level, where drivers want confidence in how mileage is reported, the resulting charges, and accurate processing of payments. The second is from a governance perspective, where policymakers and, by extension, the public, desire assurance that the implementation of a RUC remains consistent with the policy direction given to the implementing agency.

At the operational level, 81% of pilot project participants agreed that the prototype accurately reported mileage and the resulting (simulated) RUC charges.[4] In post-pilot analysis conducted by the project team, the reporting of mileage between participating US states and Canada was successful, and the collection and processing of "real money" payments between volunteer drivers in Washington and Oregon was accurate.

While the WA RUC prototype system performed well on these measures, there were instances of error or inaccuracy. The WA RUC system prototype provided sufficient information for drivers to easily see their reported mileage, the associated RUC charges and gas tax credits, and reach their RUC service provider with questions or to seek corrections.[5] Detected glitches and shortcomings reported by some pilot participants resulted in corrective action where possible, or important learnings about how to modify the prototype system before deploying it for wide-scale revenue collection.

The second way to view accountability is in the governance of the RUC system. As a research test, the authorization, design, development, and implementation of the prototype system differed from how a legislatively enacted system would be overseen and governed in a real revenue collection system. Thus, the live pilot test does not offer a useful basis for measuring whether (or how) a RUC system would be accountable from a policy perspective.

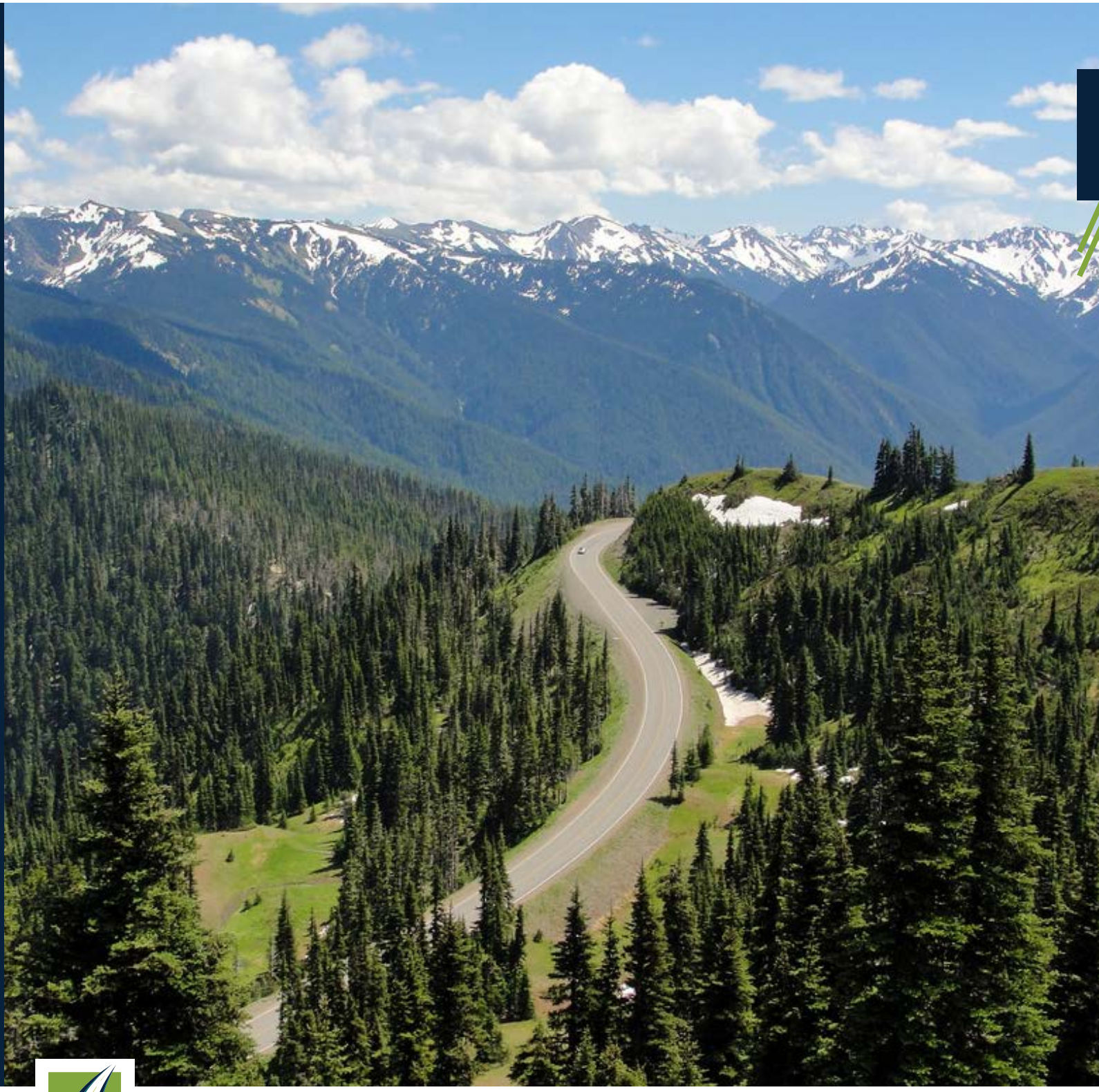
In lieu of testing policy governance of a WA RUC system, the Steering Committee reviewed a wide range of administrative and oversight configurations. These options are reflected in the Organizational Design work, described in more detail in Appendix A-11. The WA RUC governance issues most salient to the Steering Committee included:

- Who will determine the scope and pace of implementing RUC?
- Which agency will be responsible for implementation, and who will oversee the implementation?
- Who is responsible for setting and adjusting per-mile rates, and establishing other policies such as refunds or credits?
- Who will measure how the system is performing from both an operational and a policy perspective?

Assuming the Legislature enacts a future RUC system, the Steering Committee finds that a WA RUC system can be implemented in a manner that provides a high degree of accountability from both an operational and a governance (or policy) perspective.

4 See Appendix A-2, Survey 2 Results, Question 20.

5 See Appendix A-2, Survey 2 Results, Question 23.



chapter 11

OPERATIONAL ISSUES: FINDINGS, CHALLENGES, & OPPORTUNITIES

The pilot provided insights on a range of operational issues that need to be resolved for implementation of a wide-scale RUC system, including coordinating customer service responses with other agencies, enhancing data security measures, developing effective RUC compliance and enforcement policies, and upgrading the State's information technology system.

key takeaways

1. Interoperability with other jurisdictions worked efficiently and effectively when utilizing the WA RUC HUB form developed for the pilot, but it is important to resolve a range of issues, including the legal authority for collection and remittance of other states' RUC, ownership and governance of the HUB itself, and the structure of the HUB entity, so that other states also agree to use the HUB for interoperability.
2. Some coordination with the tolling system is desirable from the start of a RUC program, and coordination can increase as the program expands. Full integration, where users would receive a single service, is too complex and expensive for the start of a RUC program but is a desirable long-term goal when the program expands.
3. Strong data security measures, expanding upon those used in the pilot, should be used in any potential future RUC program.
4. A range of policy, operational, and technology measures should be taken to prevent RUC avoidance and implement enforcement in any potential future RUC program.
5. State IT systems can be upgraded to oversee service providers and possibly implement manual methods, but not administer plug-in devices. Further research should be conducted to determine whether the state should implement manual methods directly or hire a service provider to do so.
6. An open market for private sector service providers is highly desirable when a RUC system is operating at scale, but a small RUC system may start with a single service provider.

11.1 INTEROPERABILITY WITH OTHER STATES *

The WA RUC Pilot demonstrated interoperability with neighboring jurisdictions through a RUC HUB. The pilot experience demonstrated the advantages of this approach to providing interoperable RUC payment and accounting in a multi-state situation.

Under a gas tax system, states avoid the challenge of reconciling revenue from out-of-state visitors for use of their roads among light-duty vehicles. States could likewise choose to ignore the issue under a RUC program, particularly western states where cross-state travel represents a small fraction of total miles traveled, and there is likely a reasonable balance of total VMT between states.[1] But as other states enact RUC programs, and as RUC payers see their transportation taxes more explicitly, Washington could find value in working with other states to address miles driven across state borders in a seamless, interoperable fashion. An earlier section described how the WA RUC pilot demonstrated a HUB for precisely this situation.

Interoperability between states for RUC encompasses several possible components. The design of mileage reporting methods can include the ability for motorists to report and pay for miles to multiple jurisdictions in an interoperable manner. The WA RUC Pilot demonstrated the feasibility of accomplishing this using one reporting method (plug-in device with GPS). Short of self-reporting, other reporting methods (especially manual reporting) do not allow for multi-jurisdictional interoperability easily.

Interoperability also encompasses seamless interaction between jurisdictions. The HUB demonstrated a multi-lateral approach to interoperability, requiring each jurisdiction to interact only with the HUB, rather than bilaterally with each other jurisdiction connected to it. Once the business rules for RUC reporting and reconciliation in a HUB approach are determined, transferring funds among jurisdictions becomes a straightforward and ongoing matter, similar to the process already used for heavy truck fuel tax and registration reconciliation among jurisdictions through the International Fuel Tax Agreement and International Registration Plan clearinghouses.

Experience in the WA RUC Pilot confirmed the expected benefits of a RUC HUB:

- **It does not require numerous bilateral agreements between jurisdictions—**the RUC HUB operated with one set of rules that would apply to all states using it to exchange interoperability information, yet it did not mandate that states have identical RUC policies, as Oregon's RUC program differed in several ways from Washington's.
- **It is independent of RUC account managers/service providers—**RUC data was sent by the states to the RUC HUB, thus allowing states to implement interoperability independently of their private sector account managers.
- **It has the capability to perform selected data management functions potentially reducing participating states' RUC administration costs—**the RUC Hub avoids the State having to administer RUC for a set of out-of-state drivers, potentially reducing costs. In addition, potentially, the RUC HUB could serve as a single point of summary RUC data collection and accounting, for those states that wished to use the HUB in this manner. This approach would relieve each state from implementing a separate RUC data collection and accounting system, significantly reducing a state's RUC administration costs.

*** Denotes one of the WA RUC Guiding Principles**

1 RUC West estimates out-of-state VMT in Washington at between 5 and 9%, according to the 2016 study, "Assessing Out-of-State Drivers in a Road Usage Charge System: Phase 2 Final Report."

Other approaches to interstate interoperability, such as bilateral approaches, where all RUC states have direct agreements with one another, are certain to cost more and to be more complex, because each state-to-state interface would require a separate agreement and a separate implementation. Tolling interoperability began with such bilateral approaches, but has moved to using regional interoperability HUBs. RUC systems can start with HUBs, bypassing the step of implementing bilateral interoperability.

It is important that a RUC HUB be set up that other states buy into—that does not cost too much and that does not impinge on states' RUC policies. Interjurisdictional issues that the pilot HUB design did not address include the legal authority for collection and remittance of other states' RUC, ownership and governance of the HUB itself, and the structure of the HUB entity, should one evolve. These issues would need to be resolved before a fully operational interoperability HUB could be established. Washington may wish to work with states implementing road usage charging, such as Oregon and Utah, on these issues.

In the near term, the simplest approach for Washington is to keep the gas tax in place for out-of-state motorists. Washington could also allow out-of-state drivers from states with a RUC system to opt in to multi-state reporting. The benefit of allowing motorists to opt in is that it provides Washington and neighboring states (Oregon, and potentially Utah, in the near term) the opportunity to build a live, multi-jurisdictional reconciliation HUB with little downside risk, given the low volumes of vehicles and low revenue stakes. The HUB could serve eventually as a regional or national clearinghouse. In the longer term, Washington, in collaboration with other states, could begin requiring vehicles subject to road usage charging from neighboring states to participate.

11.2 COORDINATION WITH TOLLING SYSTEM

There are five ways in which a RUC system could be coordinated with a tolling system, ranging from having no coordination to offering a single unified service. At the start of a RUC program, some coordination is desirable, and this coordination can eventually be expanded as the RUC program grows and matures.

The Steering Committee examined the benefits, challenges, and several approaches to achieving or pursuing compatibility between a RUC program and Washington's tolling program. Washington can achieve compatibility between road usage charging and tolling at various levels of integration, depending on the appetite for such integration and the willingness to invest in it from the start. Even with minimal compatibility, Washington can improve the user experience by reducing confusion, reducing steps, increasing understanding of user requirements to comply, and clearly communicating the purposes of road usage charging and tolling. Options for compatibility range from simple collaboration to combining tolling and RUC billings to combining accounts to providing a single comprehensive mobility service.

There are five ways in which a RUC system can be coordinated with a tolling system, described as follows:

- **Do nothing—**RUC and tolling would remain completely separate, with separate billing and web portals.
- **Collaborate—**RUC and tolling systems meet regularly to share information, developments, and approaches; customer service is mutually informed, and new developments are rolled out together
- **One bill—**Collaboration plus provision of RUC and tolling on a single bill. Drivers receive a single bill for RUC and tolling, but accounts remain separate
- **One account—**One bill, plus drivers have a single account that supports both RUC and tolling. RUC and tolling payments may be made separately, and RUC entity and tolling entity exist separately, each responsible for user support and for retrieving funds paid.
- **One service—**Fully unified service. Drivers receive a single bill, make a single payment, and have a single customer service center to contact for all questions.

The five ways in which a RUC system can be coordinated with a tolling system are illustrated in Exhibit 11.1.

EXHIBIT 11.1
Range of Options to Achieve Compatibility with Toll System

Do Nothing	Collaborate	One Bill	One Account	One Service
› Low risk, easy to implement › Little benefit to users › Could postpone compatibility and raise long-term costs	› Open standards and procedures › Information sharing › Compatible objectives › Consistent information and mutually-informed customer support	› One bill but separate accounts and payments › Risk of customer confusion and errors › Could be combined with elements of collaboration	› Slight variation on one bill › Single account and registration › Same customer details for RUC and tolling	› Payments deducted from same account › Requires back office reconciliation between RUC and tolling › More complex › Integrated service for customers

Findings on the five ways a RUC system can be coordinated with a tolling system are as follows:

- **Do nothing—**requires no effort, but inconvenient for users.
- **Collaborate—**requires minimal effort, improves user experience, and paves the way for greater collaboration.
- **One bill—**Requires some effort. Could lead to confusion as users still pay for RUC and tolling separately, but potentially a worthwhile step toward greater collaboration.
- **One account—**Requires more effort than one bill. Lower risk of customer confusion than one bill. May be challenging to start RUC service with this level of integration. May be challenging to achieve with multiple CAMs, as each CAM would need to integrate separately.
- **One service—**Requires greatest effort, but provides greatest user convenience. Challenging to start RUC service with this level of integration. Challenging to achieve with multiple CAMs, as each CAM would need to integrate separately.

The Steering Committee concluded that at least minimal compatibility be established between road usage charging and tolling from the start of a RUC, rather than introducing it at a later stage. This includes ensuring customer service of RUC and tolling systems remain mutually aware of one another and adopt protocols for transferring customers, to reduce confusion. It also includes forward planning to identify plausible future steps toward greater compatibility that do not disrupt the independent purpose and operations of each system. Coordination among operating agencies, as suggested by the approach to RUC institutional design, can help to accomplish this initial compatibility.

11.3 DATA SECURITY

The WA RUC Pilot included a range of data security measures conforming to modern IT standards for IT systems used in the pilot. Vendors provided strong security measures on all plug-in devices used in the program. Odometer image analysis also included strong security measures.

Data security is a vital element in all modern IT systems, and it is especially important in RUC systems, as they utilize a range of important personally identifiable information, including personal vehicle location information. Thus, the pilot team included strong industry standard levels of data security into all back-end systems employed in the pilot.

For purposes of the pilot and due to limited budget, a highly prescriptive set of requirements for mileage reporting device security was not pursued as the associated costs could have limited the ability of vendors to respond to the procurement. Vendors are highly motivated to be secure, because they support the provision of tolling, usage-based insurance, and other consumer services—all businesses where any indication of insufficient security could do significant harm. Therefore, for the RUC pilot, basic security requirements were met utilizing existing equipment and systems, and this coupled with the fact that the vendors are highly motivated to be secure, provided strong device security in the pilot.

11.3.1 GENERAL SYSTEM SECURITY REQUIREMENTS

The pilot required the following general IT security best practices for the service provider's servers and pilot IT system:

- Encryption in transit and at rest (128-bit AES or better),
- Authentication (strict username/password),
- Authorization (defined user roles with appropriately limited data access),
- Anti-malware,
- Firewalls,
- Intrusion detection,
- Data masking (of credit card data), and
- Physical security.

In addition, in conformance with best practices of RUC systems, the WA RUC pilot system required data destruction of detailed mileage and charging data no later than 30 days after the completion of invoicing, payment processing, or dispute resolution—unless the participant opted out of data destruction.

The plug-in devices for the pilot (Onboard Diagnostics II, or OBD-II devices, which plug into a car's electronic data port, standardized as the OBD-II port for all US vehicles built since 1996) were required to have sturdy physical structure to resist tampering, detect unplugs from vehicles, verify consistency of data sources (e.g., OBD-II vs. GPS), detect unauthorized firmware changes or software resets, and have some basic anti-tamper measures (which were not specified).

11.3.2 VENDOR DEVICE SECURITY PRACTICES

Vendors selected for the WA RUC pilot employed the following security measures:

- Having read-only functionality on the OBD-II port (CAN bus)—vendor device hardware was not capable of sending information to the CAN bus, only of listening to data. Thus, it was physically impossible for a malicious attack to use these devices to hack into a vehicle. Such an attack is extremely unlikely and would have to make it through all the vendors layers of security, but this measure made over-the-air vehicle hacking physically impossible.
- Encryption at rest (e.g., 128-bit AES), and in transit (e.g., TLS 1.2)
- Having unique security certificates / keys for each device
- Employing on-device data destruction at some point after transmission

Vendor devices also used the following anti-tampering (anti-jamming, anti-spoofing) measures:

- For all devices, checking for consistency between the OBDII distance data and another internal sensor (typically an accelerometer)
- For devices with GPS, also checking for consistency between the GPS signal and OBDII distance data and the other internal sensor.

11.3.3 ODOMETER IMAGE SECURITY REQUIREMENTS

Several measures were used to ensure security of odometer images that were submitted by drivers testing the odometer read and time permit RUC methods:

- The smartphone image capture systems required images to be captured in real-time, to ensure that old or manipulated images could not be utilized. In limited instances when some participants had poor cell phone coverage, participants were allowed to submit images via email; this practice would not be supported in an operational system for security reasons.
- The smartphone image capture systems verified that the vehicle dashboard layout in each submitted image corresponded to the layout of the dashboard of the make and model of vehicle corresponding to the participant's VIN.
- The smartphone image capture systems used state-of-the art image analysis software and required that images of uncertain quality be re-sent.

11.3.4 SECURITY IN A POTENTIAL FUTURE RUC SYSTEM

In a potential future RUC system, all of the security practices used in this pilot should be continued, and in addition:

- Device security practices should be specified in device requirements documents (which may be referenced in regulation). Specifically, such devices should be specified to be read-only on the OBD-II port, use encryption, use unique security certificates, use consistency checks with an additional data source like an accelerometer, and include destruction measures for old data.
- Security measures should be standardized across states with RUC programs, so that there is an accepted level of security for all RUC devices, and new entrants know how to build devices that will be compliant with this higher level of security.

The MileMapper smartphone app was presented as a "Lab" or "beta" mileage reporting method, and while it included a range of security measures, it did not to have two vital security measures that would be to need be added:

- Verification that the phone is in the correct vehicle
- Sophisticated GPS spoofing detection

11.4 ENFORCEMENT*

The RUC avoidance tabletop exercise generated three categories of approaches to combating RUC avoidance, including policy/legal approaches, operational approaches, and technology approaches, that should eliminate most RUC avoidance attempts in a potential future RUC system.

As described in Chapter 6, the WA RUC pilot did not include enforcement, since a voluntary activity offers little value for assessing the effectiveness of enforcement measures. Instead, the pilot detected instances of noncompliance, attempted to diagnose the reasons, and encouraged voluntary compliance, for example by reminding participants via text, email, and phone to submit an odometer image or plug in a device. Despite the limited ability to test enforcement measures in a pilot, the Steering Committee recognized the importance of deterring evasion and other forms of noncompliance in a RUC system. Similarly, when given the opportunity to provide feedback, some pilot participants expressed concern that enforcement was non-existent in the pilot, and emphasized that it must be resolved in a real system.

To supplement pilot noncompliance detection and voluntary compliance encouragement, a RUC avoidance tabletop exercise was conducted to determine all the ways motorists could avoid a RUC, including intentional evasion and unintentional negligence.

The RUC avoidance tabletop exercise determined a range of approaches to combating RUC avoidance. These approaches fell into three categories:

- Policy/Legal Approaches
- Operational Approaches
- Technology Approaches

Highlights of the main policy/legal approaches to combat RUC avoidance were the following:

- Make the RUC pre-pay, i.e., it must always be paid in advance of travel.
- Adopt the principle that a RUC follows the vehicle. In other words, the person purchasing a vehicle becomes responsible for paying all outstanding road usage charges for the vehicle.
- Allow no net refunds for fuel taxes. In other words, the fuel tax rebate cannot be greater than the road usage charge due. This measure is needed because drivers could purchase fuel out-of-state, and thus not pay the Washington fuel tax, but then claim a RUC credit for fuel taxes as if they had been purchased in-state.
- Limit mileage exemptions on manual methods—either do not offer credits for out-of-state or off-road miles, or require significant proof of travel to claim such exemptions.
- In case a vehicle is not registered for a RUC or an initial odometer reading reported or device plugged in promptly, the vehicle owes the amount of a time permit for a given period.

Highlights of the main operational approaches to combat RUC avoidance were the following:

- Have an education campaign that explains to motorists the primary aspects of their involvement with the program.
- Create special payment options for drivers with financial limitations (e.g., budgeting options).
- Encourage Service Providers to automate as many aspects of payment as possible. Autopay solves the problem of forgetfulness or procrastination.
- Flag certain behaviors for audit. Audit, for the purposes of RUC, means looking up a vehicle via its VIN with a service like CarFAX, to the see the history of odometer readings. Audit-worthy behaviors are:
  - Frequent/long unplugs of plug-in devices;
  - Dramatic decreases in miles traveled; and
  - Recurring suspicious odometer images.
- Implement penalties for noncompliance, and have an adjudication process for motorists who feel penalties assigned to them are unjust or invalid.

- Ensure service providers have a clear, concise terms and conditions list to encourage drivers to accept device as valid.
- Ensure service providers use rigorous IT standards in all their work, to prevent hacking.

Highlights of the main technology approaches to combat RUC avoidance are the following:

- Validate the vehicle's VIN and license plate at signup using a real-time connection to the vehicle registration database.
- Always store the most recent odometer record with in a DOL database for all mileage reporting options.
- Require an annual odometer photo for all mileage reporting options, even the plug-in device.
- Require quarterly odometer reading submissions for manual methods, instead of annual.
- Require the app to capture images in near real time, i.e., not use stored images
- Require the app to detect suspect images, especially pictures of pictures.
- Require the service provider to detect correct vehicle and simple GPS jamming

Two avoidance scenarios remain challenging to detect and prevent even with effective countermeasures in place. The first is digital odometer rollback on vehicles never served by a licensed mechanic. Although significant penalties for odometer rollback exist in state and federal law, it still occurs, primarily for the benefit of higher vehicle resale values (which likely exceeds the benefit of avoided RUC). Licensed mechanics report odometers, which the state can access through services such as CarFAX, to determine whether an odometer has been rolled back, but if a car is never taken to a licensed mechanic, no such records will be available. The frequency of this scenario occurring is likely low, but worthy of monitoring. At least in the near term, it is addressed by continuing to collect the gas tax, which minimizes the financial losses to the state in instances of such fraud. The second scenario involves a user having two identical vehicles (same year, make, and model) submitting odometer images from one another. Although difficult to detect, this scenario may be able to be discovered through targeted audits and, in any, case, is likely to occur seldom.

11.5 STATE INFORMATION TECHNOLOGY NEEDS

A State Information Technology Needs Assessment concluded that while private service providers should be used to support automated mileage reporting methods that require the use of plug-in devices, the State, in particular the DOL, may be able to support the manual mileage reporting methods (time permit, odometer reading, and mileage permit) effectively, though further exploration is needed.

The operational elements of a RUC program—RUC mileage data collection and enforcement mechanisms—will depend on, need to interact with, and thus have an impact on the State's Information Technology (IT) systems. The design of a RUC system must account for the impacts of a RUC on the IT systems of the agency selected to implement the RUC program, starting with the capital costs (hardware and software upgrades) of the one-time change orders to update the existing state IT systems.

The Washington Department of Licensing (DOL) is the natural home to the operational elements of a RUC program for two primary reasons. First, DOL operates the vehicle registry database, which will be an important tool in any potential future RUC program, as it may be needed to determine the eligibility of vehicles for the program and check that all vehicles required to pay RUC have registered for the program. Second, DOL already supports and has experience with direct customer interaction (e.g., for registration renewals). Thus, the project team engaged with the DOL to estimate the state IT system enhancements needed in order to launch a RUC system. This topic is more fully detailed in an assessment conducted in conjunction with DOL (see Appendix A-12).

11.5.1 INFORMATION TECHNOLOGY NEEDS ASSESSMENT ASSUMPTIONS

The WA RUC Steering Committee was interested in understanding how DOL's new DRIVES system (the agency's new IT system that supports driver and vehicle licensing-related activities and transactions) might be able to accommodate a future RUC system. In particular, the Steering Committee wanted a rough estimate of the degree of difficulty and the one-time capital costs (i.e., development costs) of enhancing the DRIVES system to allow for a RUC program. The one-time startup cost estimates reflected in the assessment (and in this report) represent rough orders of magnitude, with a 50% margin of error. The estimates do not include any operational costs of a RUC program, nor do they include other IT system change management activities such as documenting system requirement specifications, testing, or other pre-launch costs.

If a RUC system is authorized in the future, even basic parameters for a program—which type of vehicles might be subject to RUC, how miles are reported, how frequently billings occur, just for starters—will greatly affect the one-time capital costs in a start-up RUC system However, an IT needs assessment cannot be made in the abstract—it can only be made with specific RUC program designs in mind. To undertake the assessment, the following was assumed:

Four Mileage Reporting Methods (MRMs) were assumed to be included:

- **Plug-in devices with location** are included, because they offer the best and easiest way to support non-charging of driving out-of-state, off-road, and on private roads.
- **Plug-in devices without location** are also included, because there is no additional cost or complexity to supporting such devices.
- **Annual time permits** are included, because they offer a simple method that appeals to those who do not want to report any information at all and are a good back up in case of missing odometer information.
- **Odometer readings** are included as a straightforward manual method.

Three business scenarios were included, each receiving its own forecast:

- **Scenario A:** Fully State Operated RUC system—State operates all mileage reporting methods
- **Scenario B:** Service Provider / State Hybrid RUC system—State operates Time Permits and Odometer Readings; Service Provider operates Plug-in Devices
- **Scenario C:** Service Provider Operated RUC system with State Oversight—Service Provider(s) operate all mileage reporting methods

RUC program phase-in: The following phase-in path was assumed as a feasible timeline to ramp up operations in a robust way and make RUC acceptable to Washingtonians:

- **Phase 1, July 2021–July 2025:** RUC applies to battery-electric and plug-in hybrid electric vehicles only, in place of the portion of the electric vehicle fee that goes to the highway fund.
- **Phase 2, July 2025–TBD:** RUC applies to all light vehicles with fuel economy over 40 MPG.

Additional assumptions were also made; the whitepaper in Appendix A-12 includes full details on the assumptions made.

DOL considered seven categories of IT Needs:

1. Financial
2. Vehicle Record
3. E-Services
4. Letters and Notices
5. Reports
6. Interfaces
7. Security

11.5.2 RESULTS OF STATE IT NEEDS ASSESSMENT

The State IT System Capabilities and Needs Assessment for the three scenarios demonstrated the following:

Scenario A: Fully State Operated RUC system

- Total cost for DOL: $ Indeterminate
- Duration of development at DOL: Indeterminate
- Because no plug-in device provider offers an system of devices without providing full accounting services, it is not feasible for DOL to support this business scenario.

Scenario B: Service Provider / State Hybrid RUC system

- Estimated hardware and software upgrade cost for DOL: $1,015,300 (+/- 50% margin of error)
- Estimated duration of development at DOL: approximately 25 months
- This is a feasible and desirable scenario, but would require DOL to develop a system to offer time permits and odometer readings, so could not be implemented as quickly, and costs more, than Scenario C.

Scenario C: Service Provider Operated RUC system with State Oversight

- Estimated hardware and software upgrade cost for DOL: $ 365,300 (+/- 50% margin of error)
- Estimated duration of development at DOL: approximately 10 months
- This is a feasible and desirable scenario. Since it requires DOL only to oversee operations of a service provider, it is substantially faster to implement and at a lower cost. However, the numbers provided here are direct costs at DOL only, i.e., they do not include any fees paid to service providers. The fees paid to service providers under this scenario will be higher than those paid under Scenario B, and the development timeline for the service provider will be longer.

In addition to these high-level results, there are two main conclusions:

1. A fully state-run system, in which the State provides and manages vehicle plug-in technology, is not desirable, because it would involve the state agency selected to implement a RUC to purchase OBD-II devices, develop a full accounting system to integrate the data that they provide, and develop a customer service system to support these devices. The development of such systems is well outside the range of activities that state IT systems currently support and is almost certain to be more expensive than using a private sector service provider in the short and long run.
2. The State should use or more private service providers to provide plug-in device technology. At least one non-plug-in device option (time permit, odometer reading, and mileage permit) should be offered, and ideally, both the time permit and either the odometer reading or mileage permit should be offered. Whether the State or a private company should provide these manual mileage reporting methods is not yet clear—both options offer compelling reasons to support them. Manual reporting seems to be a natural fit for the State for several reasons, explained below.

The annual time permit is very similar to vehicle registration, and it does not require any mileage information. In essence, drivers who choose this option would simply pay the additional RUC amount at the same time as they renew their vehicle license. The odometer reading method would only add one new data point—the odometer reading. Second, it may not make sense to have competing manual method providers. That is because there is little room for service providers to differentiate their services, and multiple providers of the identical service to motorists could confuse them. Third, due to the need to engage with the vehicle licensing offices, DOL may be better positioned to operate manual methods. Finally, some citizens will prefer a state-operated method.

The main reason for choosing to have a service provider run manual method system would be to save costs. However, it is not certain that significant cost savings would be achieved in the long run. Possibly, engaging the potential service provider market could help inform this choice by providing more information on the precise cost differences between a state-run manual method system and one that is run by service providers. Due to the existing connection with VLOs, and because the changes to DOL's systems to operate manual methods are feasible and not exorbitantly expensive, it is not clear that there would be significant cost savings achieved by outsourcing the manual method operations to a service provider, although it is possible. Again, market outreach to potential service providers could help answer this question.

11.6 USE OF PRIVATE SECTOR FIRMS TO DELIVER RUC SERVICES

When operating at scale, a state should use an open market of private sector service providers, possibly with government agency delivery of manual methods. However, for a small, beginning RUC system, having a single private sector provider is best. In the WA RUC pilot, VLOs provided a private option for collection of odometer data.

The government can deliver a per-mile road usage charge system in several ways. While it will always be necessary for a government agency to oversee a RUC program, either a government agency or the private sector or a combination of both have the ability to actually deliver the system's functions.

The high-level operational functions of a RUC system are:

- Customer service and account management
- Charge identification and processing
- Compliance, enforcement, and audit
- Maintenance and operation of the vehicle registry
- Oversight of the system activities, including monitoring and reporting.

11.6.1 CUSTOMER SERVICE DELIVERY CONFIGURATIONS

There are five configurations for delivery of customer service, account management, charge identification, and data processing functions in a RUC system in its fully mature, final end state.

All of the five configurations can deliver a RUC system but some have advantages over the others. Assessing each configuration, in its final end state, for administrative effectiveness, participant experience, operational experience, practical availability, flexibility and policy alignment indicates that the most viable delivery configurations are either through a government agency, an open market of private-sector service providers or a combination of the two. Whether to favor one of these three configurations over the others depends upon the nature of the preferred reporting method. A government agency can best deliver manual reporting. An open market of private-sector providers can best deliver automated reporting. For both manual and automated reporting, a combination of government agency and an open market of private-sector providers can well deliver such a RUC system.

The use of a single private-sector service provider in any of the configurations should not be an aspiration for a RUC system in its final end state. The gains of competition—administrative cost savings, technology and system evolution—are unlikely to occur with a single provider running the system (except as a transitional strategy).

While it may be possible to deliver a RUC system in its final end state from the beginning, it may not be practical to do so. The complexity and cost of delivering a fully mature RUC program may make a simpler approach more appealing at the start.

EXHIBIT 11.2
Customer Service Delivery Configurations

Configuration	RUC System Delivery Description
Configuration 1	Government agency-only delivery.
Configuration 2	Single private-sector services provider delivery.
Configuration 3	Open market private-sector services provider delivery.
Configuration 4	Combination of government agency-only delivery and open market for private-sector provider delivery.
Configuration 5a	Combination of government agency delivery and single private-sector provider delivery under a closed system.
Configuration 5b	Combination of government agency delivery and single private-sector provider delivery under an open system.

EXHIBIT 11.3
Transition Pathways

Preferred Mileage Reporting Mechanism	Preferred Final End State Configuration	Optimal Transition Pathway
Manual reporting	Government-only delivery.	Single, private-sector service provider operating under an open system adopted by government.
Automated reporting	Open commercial market for multiple private-sector providers.	Single entrant into open commercial market with an open system adopted at the beginning.
Both manual & automated reporting	Combination of government and open market for multiple private-sector providers.	Combination of government agency and single, private provider as first entrant into an open commercial market for multiple private-sector providers.

11.6.2 TRANSITION PATHWAYS

Assessment of the transition pathways to a final end state for a RUC program reveals that the best transition pathway depends upon the preferred RUC delivery configuration. The transition pathway question for each preferred delivery configuration yields a different answer.

For government-only delivery, the best transition pathway is procurement of a single, private-sector service provider, for a limited duration, operating under an open system adopted by the government. Although not foundational to the final end state of government operations, a single private-sector service provider offers the greatest certainty and simplicity, and allows transferability to the ultimate government-operated RUC system.

To achieve an open commercial market for multiple service providers, the best transition pathway is procurement of a single, private-sector service provider as the first entrant into an open commercial market with open system performance standards adopted at the beginning of the program. This leads to a simple foundational transition to an open commercial market. As the first entrant into an open market, a single provider could simplify the work of a single state government by removing or reducing the procurement and oversight responsibilities of regulating an open market and managing multiple private-sector providers.

For a combination of government agency and private-sector open market delivery, the best transition pathway is a combination of government agency and procurement of a single, private-sector service provider as the first entrant into an open commercial market with open system performance standards adopted at the beginning of the program. This transition pathway is foundational to the preferred combination of the RUC system in its fully mature, final end state.

In summary, the RUC system will likely start with a transition pathway that leads to one of the three preferred delivery configurations. There are other transition pathways but they prove cumbersome by adding unnecessary complexities and risk. The entire analysis can be reviewed in Appendix A-13.

11.6.3 USE OF PRIVATE SECTOR ENTITIES TO COLLECT MANUALLY REPORTED DATA

While most states typically use a government agency to collect registration fees during vehicle re-registration and licensing fees, some states, such as Washington, license private entities to do this work, in addition to the state agency. In Washington, these entities are VLOs. For a RUC program, VLOs could facilitate manual reporting of miles traveled through manual or electronic means. This was demonstrated in the WA RUC pilot, at eight selected VLOs throughout the state. In the pilot, participants could drive to a participating VLO station and use VLO-provided photographic equipment (an iPhone equipped with special software) to capture and send an authenticated image of their vehicle's odometer on that day. In a potential future road usage charge system, this process could involve the motorist paying a small fee paid to the VLO for this service. This process could also, in a potential future mandated RUC program, provide a way to institute enforcement of RUC payment during vehicle re-registration.

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