RUC AMERICA

New paths to road funding

Summary of RUC Exploration in RUC America States

October 2024

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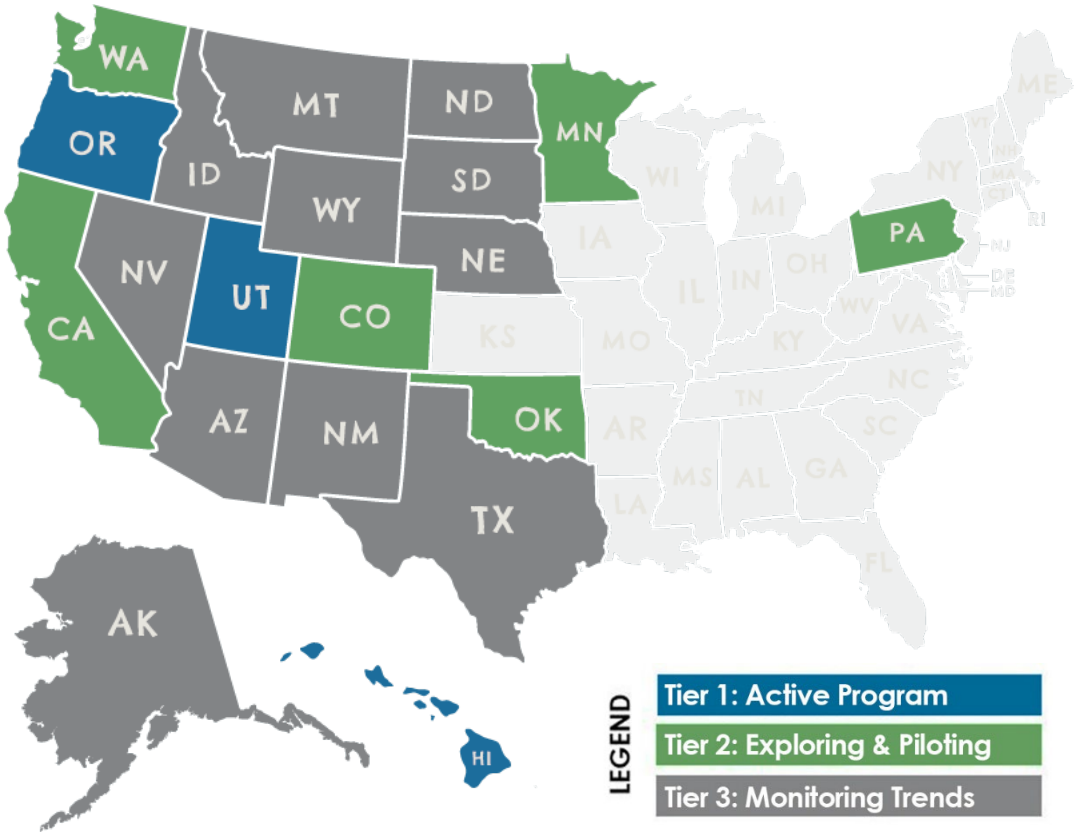
RUC America

RUC America is a leading authority on road usage charging (RUC) in the United States. The membership includes 20 state transportation organizations that share resources to investigate road usage charging as an appropriate revenue collection method for their respective state (Figure 1).

Tier 1 members actively promote road usage charging as an equitable road-funding solution by implementing a program in their state. Tier 2 members conduct research pilot projects for a RUC. Finally, Tier 3 members monitor transportation trends, evaluating the road usage charge environment.

Figure 1: RUC America Members



The group was formed to grow agency expertise, increase preparedness, and collaborate on projects of mutual interest. RUC America offers participating agencies the opportunity to achieve economies of scale in their RUC projects or research by offering joint testing and evaluation over wide territories. With a wealth of cooperative research, case studies, and best practices, RUC America serves as a central host for the latest information on road usage charging.

Areas of work include technical research and development, legal and policy issues, research of fiscal and economic issues, standards and certifications, and administrative and operational

issues. Additionally, RUC America works on inter-jurisdictional concerns, stakeholder outreach and communications, and platforms and operations for state and regional pilots.

RUC America allows state departments of transportation to pool resources to study outcomes and share best practices. To date, 24 projects related to the feasibility and evaluation of road usage charging have been funded, with more on the way. Some of these efforts have been supported by Surface Transportation System Funding Alternative (STSFA) federal grant funds, with five grants awarded to RUC America date.

Examples of some of the RUC America projects include:

- Addressing out-of-state drivers in a RUC system (Phase I & II),
- Impacts of a changing vehicle fleet fuel economy on state transportation funding
- Evasion, enforcement, and prevention for a RUC System
- 10-year strategic plan for implementing RUC on light-duty vehicles
- Web-based RUC calculator
- Effects of RUC on rural residents (2017; updated 2022)
- RUC Communications: an inventory of devices
- Regional Pilot system definition and pilot planning
- Protection of Privacy in a RUC System
- Automated vehicles and RUC Policy Toolkit
- Road map for state consideration of a RUC system
- RUC vendor certification (Phase I and II)
- Parameters for a RUC Rate
- Regional RUC interoperability pilot
- Automated Vehicles and a RUC Demonstration
- Study of interjurisdictional issues
- Financial impacts of RUC on super-commuters
- Taxation payment structures for RUC
- Critical examination of Oregon RUC System
- RUC Summit – June 2022

This document provides a summary of the RUC programs and pilots conducted in RUC America member states.

Oregon

In 2001, the Oregon legislature took a pioneering step by enacting HB 3946, to explore alternative transportation funding methods, to reduce dependence on traditional fuel taxes. This law created the Road User Fee Task Force (RUFTF), to lead policy formulation. The establishment of RUFTF led to two RUC pilot programs, carried out by the Oregon Department

of Transportation (ODOT). The first pilot, which was conducted from April 2006 to April 2007, had a total of 299 participants. The second pilot, carried out from November 2012 to February 2013, had 93 participants.

In 2013, Senate Bill (SB) 810 was enacted, directing ODOT to establish a fully operational RUC program by July 2015. This law included rigorous privacy safeguards to protect the collection and use of data from participating drivers and created the path for an open market in RUC mileage processing and account management services, in which companies compete to provide RUC services to customers. As a result, the nation's first fully operational RUC program, named OReGO, went live on July 1, 2015. During this initial phase, the number of participants was capped at 5,000 drivers.

In 2019, HB 2881 modified OReGO to prepare the state for a future large-scale program. These modifications included:

- Lifting the registration cap to allow an unlimited number of volunteer participants.
- Indexing the RUC rate to the fuel tax rate.
- Eliminating eligibility for vehicles that are rated at 20 miles per gallon (mpg) or less.
- Exempting program participants with vehicles rated at 40 MPG or higher (including EVs) from paying enhanced registration surcharge fees if enrolled in OReGO.
- Converting refunds of excess fuel taxes paid to non-refundable credits against RUC charges (although credits earned cannot exceed RUC paid, i.e., low-mpg vehicles do not get net refunds for joining the program).

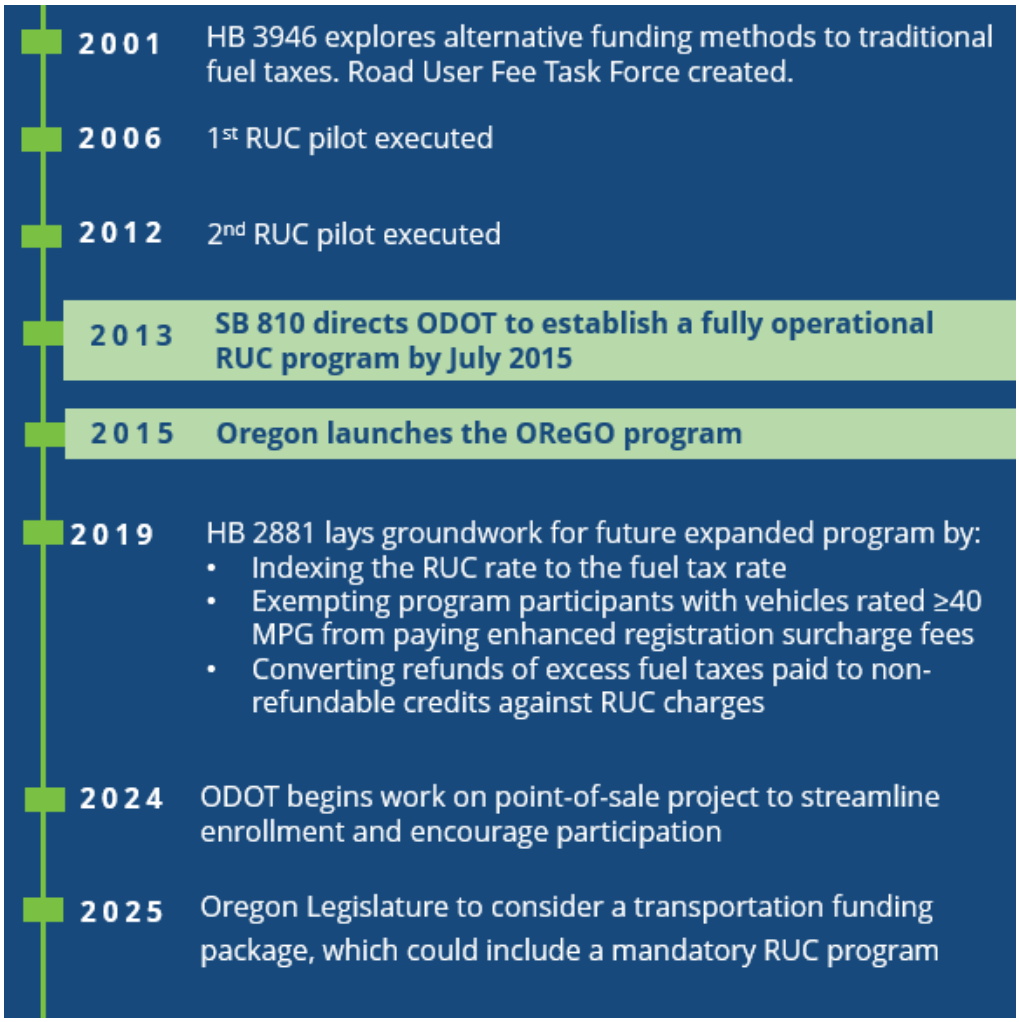
Oregon's RUC program is voluntary for drivers of vehicles rated at 20 MPG or better. Participants are charged per mile driven, and they receive a non-refundable credit for fuel taxes paid at the pump. Drivers of electric vehicles or highly efficient vehicles (40 MPG or better) are exempt from supplemental registration fees, paying instead a base registration fee of $43 per year plus a RUC at the current rate of 2.0 cents per mile (effective January 1, 2024).. Heavy-duty vehicles are not included in the OReGO program. As of August 2024, the OReGO program had 728 participants. All revenue is deposited into the State Highway Fund. Oregon is the only state that does not cap their RUC at a flat fee amount.

OReGO is administered by ODOT. ODOT contracts with private, third-party RUC service providers ("commercial account managers", also known as CAMs) to carry out mileage collection, accounting, payment processing, and customer service. The current CAMs are emovis and NextMove by Cintra. Participants can report their mileage using a variety of methods. Currently, two primary options are offered – an electronic device that connects to the vehicle's onboard diagnostic (OBD-II) port, which is typically located beneath the steering wheel (both GPS and non-GPS options available); and OEM-connected vehicle telematics, which collects odometer readings (non-GPS). A manual self-reporting option has been available in the past and may be available again. GPS options allow RUC service providers to compute non-taxable miles, such as those driven out of state, and adjust participant billing accordingly. If participants choose a non-GPS-equipped option, the service does not calculate or credit out-of-state mileage. ODOT has a Request for Qualifications (RFQ) for CAMs, with intent to keep the RFQ open, to allow additional CAMs to be certified to provide OReGO services, encouraging an open market.

Lessons learned as a result of the pilots and OReGO program include the following:

- Public, private sector, and political education matters.
- The public expects seamless delivery.
- Enrollees should be provided with multiple technology choices to report mileage.
- Emerging technologies are disruptors.
- Standards are being developed that enable road usage charging.

Figure 2: Oregon RUC Timeline



Utah

Utah is the second state to enact a RUC program, which launched January 1, 2020, after being authorized by the legislature in 2018. Utah's program is voluntary for owners of electric vehicles (EVs), allowing participants to pay the current 1.06 cent-per-mile RUC (originally 1.5 cents/mile) in place of the state's special registration surcharge for alternative fuel vehicles which currently stands at $130.25 annually. The change in per mile rate was to help encourage program participation. As of August 2024, there were 4,755 vehicles in the program, which includes

approximately 1,200 new-to-the-program enrollments since April 2024. The eligibility criteria for eligible vehicles have been changed to only include Electric Vehicles (EVs) instead of Plug-in Hybrid Electric Vehicles (PHEVs) and hybrids. Heavy-duty vehicles are not included in the program. By enrolling in Utah's RUC program, per-mile charges are capped at $130.25 per year, ensuring that EV owners will not be financially harmed by the RUC program.

The Utah legislature enacted SB 150 in 2020, directing the Utah Department of Transportation (UDOT) to submit a plan for expanding its RUC program to all vehicles registered in the state, with a target implementation date of no later than December 31, 2031.

As of May 2024, the Utah RUC Program offers two mileage reporting options – in-vehicle telematics or an odometer photo capture option via mobile phone or tablet. Utah's RUC scheme does not currently exempt any form of mileage from a driver's RUC invoice. Out-of-state, private roads, and other forms of mileage may become tax-free in the future when technology makes it more practicable.

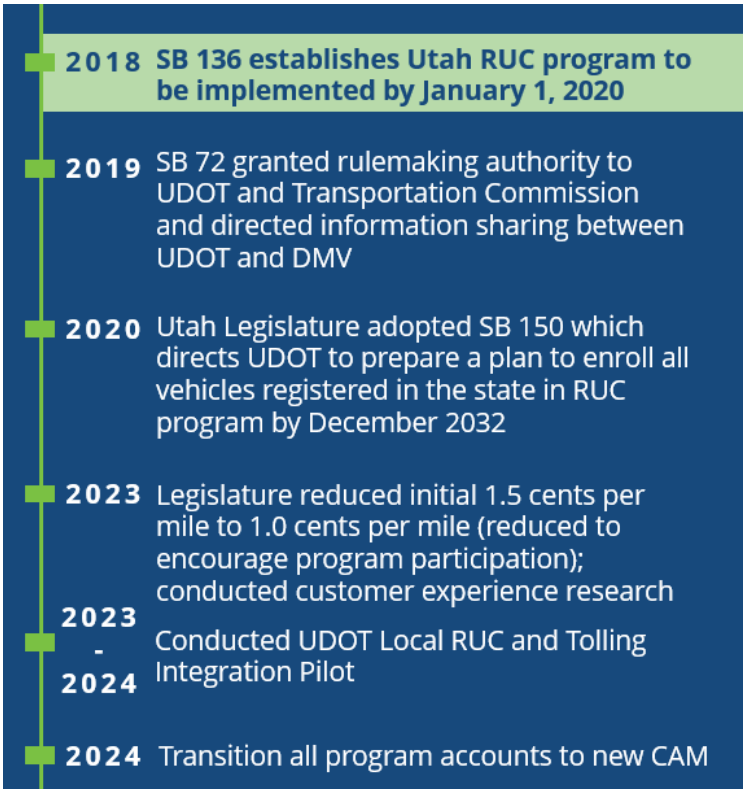
Utah’s RUC program relies on a private third-party vendor, ETAN, to collect mileage data and handle all processing, invoicing, and payment collection. UDOT oversees the program and its CAM, making policy recommendations to the government, and devising a longer-term transition plan to eventually include all registered vehicles in their RUC program as money from state gasoline taxes declines.

Lessons learned from Utah’s RUC program include the following:

- The program must be administered at an appropriate pace.
- Technology should be affordable, user-friendly, and easy to integrate.
- Charging RUC in lieu of a registration surcharge, as well as capping the RUC at the surcharge amount, can help encourage participation. This requires synchronizing registration and RUC payment.

In 2023, Utah began the Utah Local RUC / Tolling Integration Pilot to test approaches for local governments collecting a per-mile charge for miles driven in their jurisdictions. The pilot also tested integration of RUC and tolling systems The pilot was open to passenger vehicles and light trucks and had a total of 100 participants. The pilot ran from October 2023 to March 2024.

Figure 3: Utah RUC Timeline



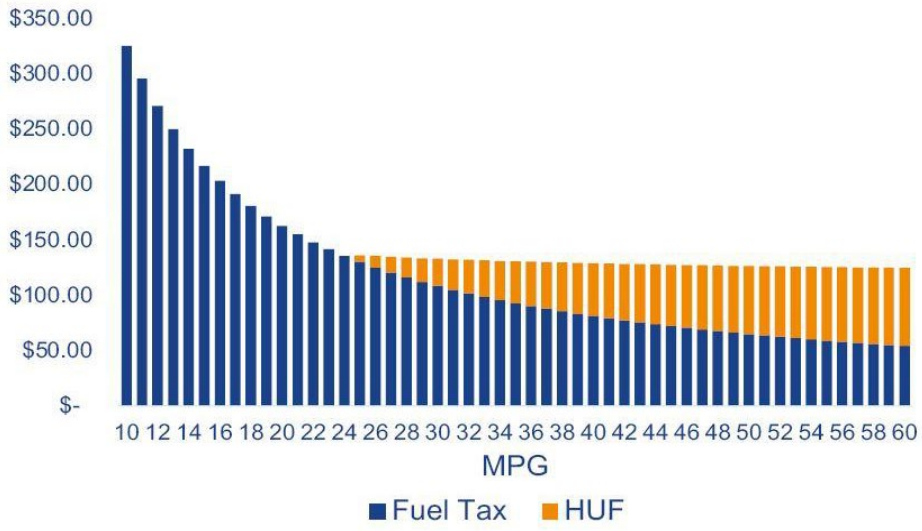
Virginia

While Virginia is not a RUC America member state, it is one of four states in the United States with a RUC Program. Therefore, a summary of this operational program is included in this document.

In 2020, the Virginia General Assembly passed legislation introducing a voluntary MBUF program, presently known as the Mileage Choice program, which went into effect on July 1, 2022. A new Highway Use Fee (HUF) was also included in the 2020 law, which levies an extra registration surcharge on all light-duty alternative fuel, electric, and fuel-efficient vehicles with MPG ratings of 25 or higher. Vehicles manufactured in a year where the average combined MPG rating for all vehicles manufactured in that year is 25 MPG or higher are also subject to HUF. The annual Highway Use Fee ranges from $6.06 (for a 25 MPG vehicle) to approximately $116.49 (for vehicles completely electric). The purpose of this HUF was to equalize the roadway contribution for owners of vehicles that get 25 MPG or more.

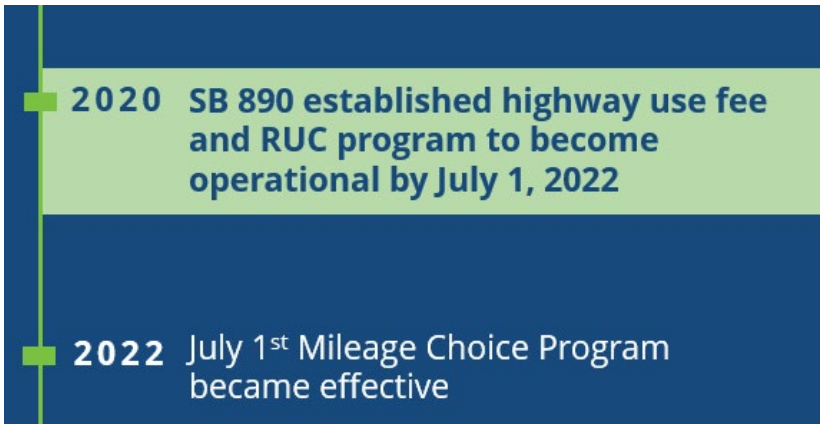
Figure 4 compares funding contributions for car mileages (10-60) MPG: Fuel Tax vs HUF. Drivers can enroll in the Mileage Choice program to pay by the mile instead of the yearly HUF. Drivers who choose to pay per mile are assured that the total amount owed depending on the miles driven will be capped at the amount they would have paid under the annual flat rate. Due to the maximum yearly mileage fee cap, drivers who engage in the Mileage Choice program can pay less than the fee, should they drive less than average, and will never pay more.

Figure 4: Total Annual Roadway Funding Contribution (at 11,600 miles traveled)



The Virginia Department of Motor Vehicles administers the Mileage Choice program. Because the Mileage Choice program is online and digital, users need internet connectivity to enroll in it, either through a computer or a smartphone/tablet. Mileage is tracked via telematics or OBD-II devices provided by a third-party CAM, emovis. Participants must submit an odometer photo using the app once a year to "true up" miles driven as recorded by the device to the miles driven recorded by the odometer. Currently, the Mileage Choice program does not offer credit for miles driven on private or out-of-state roadways. The program had 22,000 participants as of December 2023. Commercial vehicles are not included in the program.

Figure 5: Virginia RUC Timeline



Hawaii

Hawaii launched the Hawaii Road Usage Charge (HiRUC) Demonstration Project in 2016, the country's largest public demonstration and awareness initiative of its kind, eventually reaching nearly 300,000 state residents. The HiRUC pilot part 1 aimed to assess the public

understanding and preferences regarding RUC. Surveys were deployed from November 2019 to August 2020, and over 40,000 survey responses were obtained. The HiRUC pilot part 2 took place from July 2020 to June 2021 and tested technology approaches. The pilot involved 1,887 volunteers in testing automated mileage reporting, including a fleet demonstration with 242 vehicles. The project was completed in 2022 and resulted in a set of findings and recommendations on how to implement a small-scale per-mile tax scheme in Hawaii. Some of the lessons learned from this pilot project include:

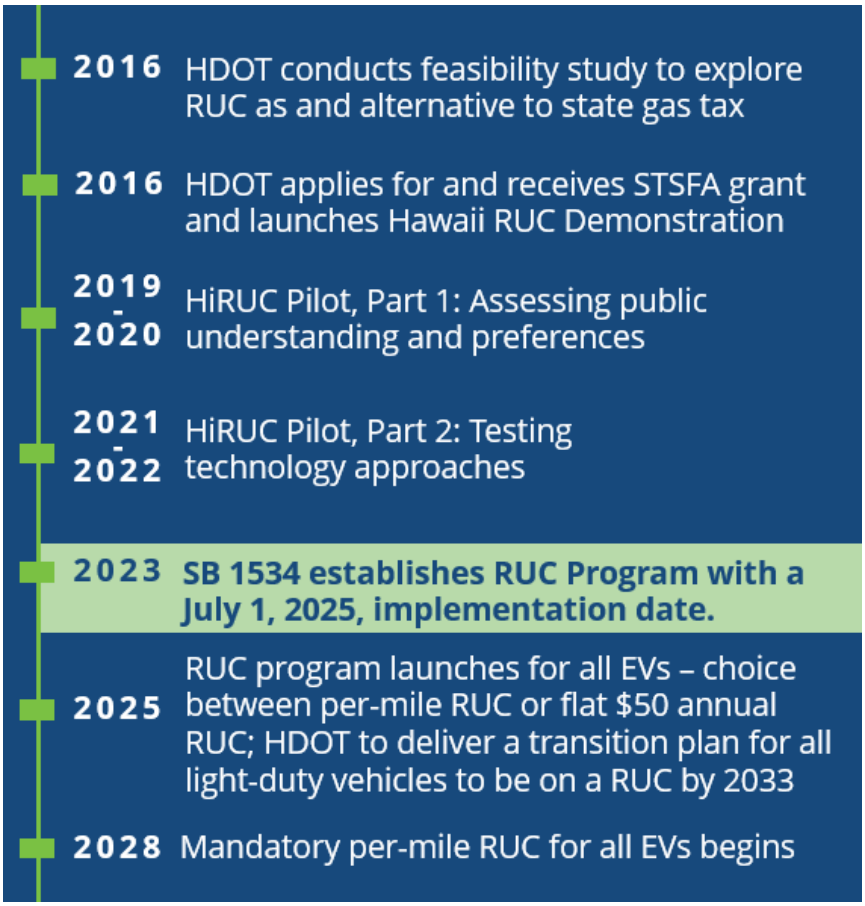
- The public generally regards vehicle inspection as a convenient and legitimate basis for mileage reporting for a RUC program.
- Residents have mixed feelings about the need for paying RUC in installments.
- Comfort with and support for RUC grows with exposure.

In response to the final report's recommendations, the Hawaii legislature passed SB 1534 in 2023, establishing a small-scale RUC program for EVs beginning July 1, 2025. The legislature also asked the Hawaii Department of Transportation (HDOT) to establish a transition plan that would include all light-duty vehicles in the RUC program by 2033 in the same measure. By December 31, 2025, the transition plan must be submitted to the legislature.

The program is currently for EVs only. EV owners will be offered the option of paying a per-mile RUC or a $50 flat annual RUC during a 36-month transition period starting July 1, 2025 until June 30, 2028. If an EV owner chooses to pay the per-mile RUC, the RUC will be capped at $50. After June 30, 2028, all EVs will be subject to the per-mile RUC, making Hawaii the first state to introduce a mandatory per-mile RUC program. The program is expected to have about 50,000 vehicles once the mandate goes into effect in 2028.

HDOT will use the state's annual motor vehicle inspection program as the foundation for mileage reporting. With a few exceptions, every vehicle in Hawaii must have an annual motor vehicle inspection. Private inspection stations exist throughout the state. An inspector uploads a digital report as proof of a completed vehicle inspection, including the vehicle’s odometer mileage, into a database linked to vehicle registration records. Only vehicles that have passed their required inspection are eligible to renew their annual vehicle registration. In Hawaii, vehicle registrations are handled by each of the four counties’ Departments of Finance and Divisions of Motor Vehicles. The Department of Information Technology (DIT) will operate the motor vehicle registry system to perform mileage processing and RUC calculations. The counties will be in charge of payment processing and customer service.

Figure 6: Hawaii RUC Timeline



Washington

In 2012, the Washington State Transportation Commission (WSTC) was directed to research RUC as a potential alternative to declining revenue from fuel taxes. Over the years, the WSTC conducted research, convened committees, and ran statewide RUC pilots. The first pilot involved 2,000 vehicles from January 2018 to January 2019 and focused on different approaches to RUC for light-duty vehicles (LDV). Heavy-duty vehicles (HDVs) were excluded from the pilot. This pilot included jurisdictional interoperability with Oregon, Idaho, and the City of Surrey, British Columbia.

This pilot assessed various mileage reporting methods, including pre-paid permits, smartphone-based odometer reporting, and plug-in devices. Based on participant feedback, a series of recommendations from the Washington State Transportation Commission and WA RUC Steering Committee set the foundation for a Road Usage Charge (RUC) transition in Washington. In response, the Washington State Transportation Commission initiated the Forward Drive research program in October 2020 to explore the feasibility and desirability of implementing a RUC system as an alternative to the gas tax. Research in 2021 focused on self-reporting of odometer readings and utilizing in-vehicle telematics. In 2022, WSTC conducted

workshops to find ways to reduce RUC collection costs through collaborations, such as pay-at-the-pump partnerships with gas stations or EV charging points.

In 2022, the WSTC introduced an online RUC simulation allowing drivers to experience enrolling in a RUC program. The simulation, which began in November 2022, emphasized privacy protection, cost-effectiveness, and voluntary compliance. Participants could choose different methods to report miles and payment options. A total of 1,145 participants completed the Washington RUC simulation by the end of 2022. Follow-on experiences in early 2023 included FlexPay (installment payments), Autopilot (telematics-based reporting), and MilesExempt (out-of-state mileage exemptions) which concluded in May 2023. Heavy-duty vehicles (HDVs) were excluded from the pilot.

In 2023, the WSTC also explored RUC standards development, facilitating a short-term mock RUC standards committee with stakeholders from other states studying RUC (Oregon, Hawaii, Utah, Washington, TETC) as well as AAMVA, FHWA, and two RUC vendors.

Lessons learned from Washington's RUC pilots include the following:

- Steeper gas revenue losses exacerbate transportation funding challenges and equity concerns.
- RUC performs strongest amongst transportation revenue choices for user equity and social equity.
- Public acceptance of RUC in WA has grown with exposure to the concept.
- Enrollment and odometer declaration is viable today: a simple, low-cost, popular approach for implementing RUC.
- Telematics is currently feasible on an opt-in basis for some vehicles, but work remains to expand eligibility and improve the user experience.

Beyond 2023, identified next steps include additional work focusing on further standards development in collaboration with other jurisdictions; user experience analysis and concept development for fleet vehicles; business case analysis for OEM telematics; and multi-state research cooperation in development and testing of policy concepts and system approaches.

Figure 7: Washington RUC Timeline

California

In 2014, California passed SB 1077 which directed the California Transportation Commission to create a Road Charge Technical Advisory Committee to design a road charge pilot program to then be implemented by Caltrans.

California's Road Charge Pilot Program launched in July 2016 and continued through March 2017 with approximately 5,000 participants statewide, and was the largest mileage-based fee pilot of passenger vehicles to date. The participating vehicles included 87% privately owned, 7% agency vehicles, 5% light commercial vehicles, and 1% heavy commercial vehicles. Participants reported their vehicle miles traveled using various mileage collection mechanisms offered by third-party account managers. Along with this, in 2017 SB 1 was passed in California which increased fuel taxes and provided added funds to continue the research based on the 2017 pilot report.

In 2018, SB1328 was passed extending the exploration of a road charge as an alternative to the gas tax in California through January 1, 2023. Based on that bill, in July 2019, a four-phase demonstration was launched aimed at evaluating the feasibility of four business models and emerging technologies in assessing a road charge, with the goal of identifying principles of easy user experience. Phase 1 was divided into Phase 1A (Pay-at-the-Pump) and Phase 1B (Pay-at-the-Chargepoint), with services provided by GasBuddy and ChargePoint. Phase 2 (Usage-

Based Insurance) covered how usage-based insurance companies could use existing systems for managing usage-based insurance policies to manage road charge activities, with services offered by MileAuto. Phase 3 (Ridesharing) was operated by a third party called Via. They collected data for trips taken by participating riders through existing vehicle and Ridesharing technologies, processes, and systems. Participants who scheduled and took rides with Via received trip receipts with a simulated road charge line item. Phase 4 (Autonomous Vehicles) evaluated the potential to integrate road charge with AV technologies, with EasyMile offering the autonomous vehicle and Via providing account management services. Live operations were executed from January 2021 to June 2021 with a total of 83 participants.

From April to September of 2023, California completed a public/private road charge pilot which tested the ability of GPS technology to differentiate mileage driven on public and private roads, including tribal lands, to help determine if mileage driven on private roads could be exempt from road charges under a road charge system. The pilot had 289 participants. This pilot focused on engaging rural and tribal communities to provide perspectives on the road charge concept and its potential impacts on their communities, as well as to participate in the pilot, as these communities were underrepresented in previous pilots. This pilot also included a 50-vehicle sub-pilot with the Transportation Corridors Agency (TCA) to evaluate the potential for a tolling agency to act as a CAM.

Lessons learned from the pilots in California include the following:

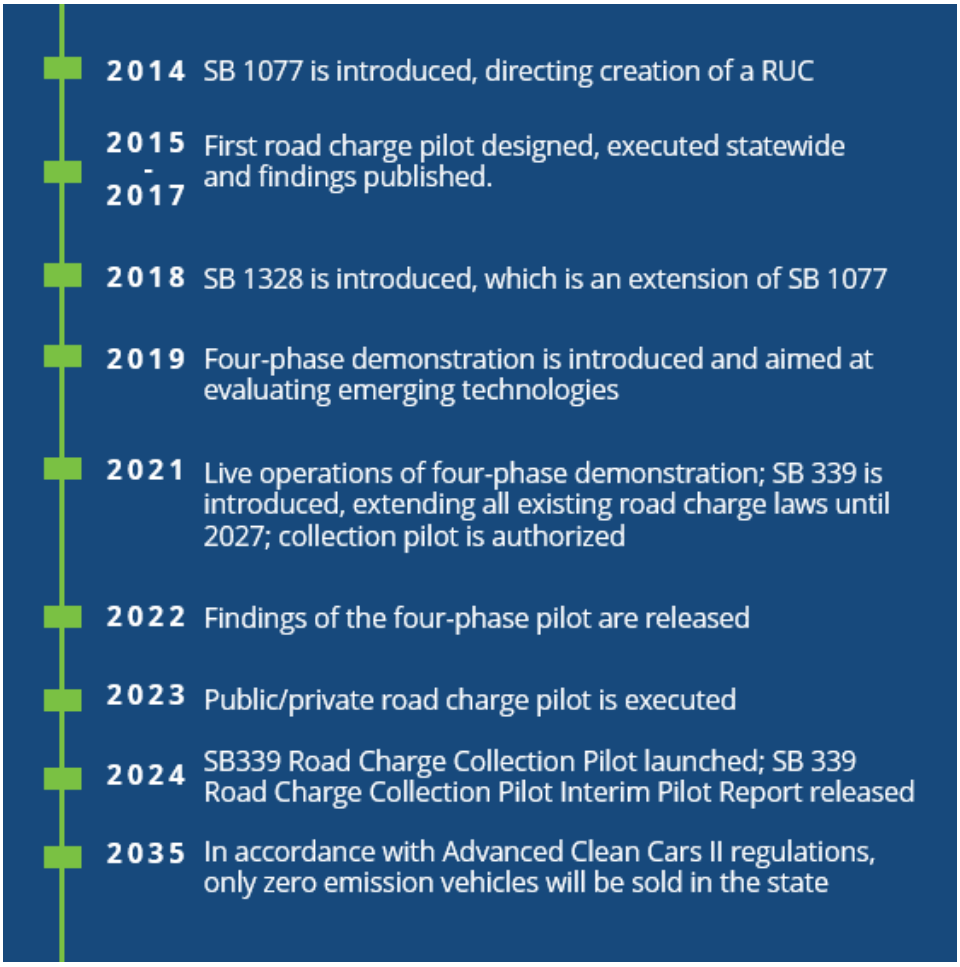
- In future demonstrations or a live program additional education is needed to help drivers new to the road charge concept differentiate between mileage reporting options.
- The use of verified odometer readings as the basis for periodic billings, in lieu of self-reported values, will help reduce errors and simplify the participant experience.
- In-vehicle electronic logging devices are well-suited for supporting road charges in heavy trucks.
- Continual and clear coordination and communication are needed to maintain compliance.
- Multiple customer support and outreach mediums are critical to participant satisfaction.
- Instructional materials help promote a positive enrollment experience while reducing customer service inquiries.

In 2021, SB 339 was introduced, which extended the operation of the existing laws regarding road charge in the state until January 1, 2027. It also directed the Transportation Agency, in consultation with California Transportation Commission, to conduct a pilot program to identify and analyze challenges relating to revenue collection for a road charge program. The bill mandated that pilot participants be charged the mileage-based fee and receive a credit or refund for fuel taxes or electric car fees paid. The pilot, authorized by the Transportation Agency to be administered through the California Department of Transportation, will collect actual money and will explore two different per-mile rate approaches. One group will be charged a single per-mile rate that is the same for all vehicles and the other group will be charged a per-mile rate based on the fuel economy rating of their individual vehicles.

The Road Charge Collection Pilot will be executed from August 2024 to January 2025. This pilot is being conducted to collect road charge fees from pilot program participants and to identify and evaluate issues related to the collection of revenue for a road charge program. Additionally, it aims to implement a pilot project that offers two different mileage rate options and to assess the impacts of these rates on ensuring sustainable funding for transportation and their alignment with the state's climate, air quality, zero-emissions vehicle, and equity goals. In July 2024, the SB339 Road Charge Collection Pilot Interim Report was released which states that California envisions their DMV running a passenger vehicle RUC system and the Department of Tax and Fee Administration, which administers the International Fuel Tax Agreement (IFTA) process, running a commercial vehicle system.

In 2022, the California Air Resources Board approved the Advance Clean Cars II rule. Under this rule, California plans to sell only zero-emission vehicles which includes cars, light trucks and also plug-in hybrid vehicles by 2035.

Figure 8: California RUC Timeline



Minnesota

The Minnesota Department of Transportation (MnDOT) has been actively exploring the concept of RUC for several years, employing a range of research methods to gather public opinion and test the technical feasibility. In 2006, MnDOT and FHWA co-sponsored a pay-as-you-drive (PAYD) demonstration and public opinion study to explore the impacts of PAYD insurance and a distance-based fee and changes in driving behavior. 130 households participated in the demonstration, and over 500 respondents participated in a survey.From 2007 to 2009 MnDOT conducted public opinion research through surveys, interviews, and focus groups to assess public understanding of transportation funding and awareness of RUC as an alternative to the motor fuel tax.

Upon gaining a comprehensive understanding of public opinion, MnDOT initiated technical research to test technology that could collect RUC data. From 2011 to 2013, MnDOT conducted a RUC test with 500 volunteers who used location-based data with GPS-equipped smartphones to collect travel data and assess the reliability of a road use fee. The multi-phase study also examined the effectiveness of other applications, such as real-time traffic alerts, accident notifications, and road hazards to enhance driver safety. The pilot testing was conducted from September 2011 to October 2012 and excluded commercial vehicles. Lessons learned from this pilot include the following:

- Efficient communication about a program to the public and stakeholders is needed for successful implementation
- Development and implementation of a RUC program will be challenging without involvement from neighboring states

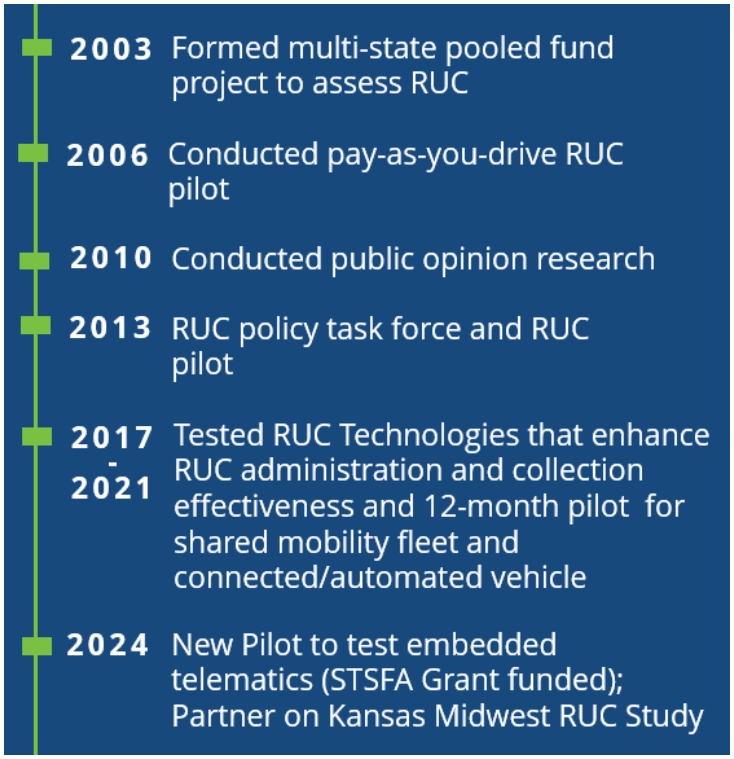
Following the RUC test, MnDOT commissioned a study to test more innovative mileage reporting mechanisms. Through a grant awarded in 2016 from the STSFA program, MnDOT designed an approach to test vehicle onboard technology, or telematics, to improve RUC administration and collection effectiveness. The STSFA grant enabled MnDOT to design a small-scale pilot that leveraged fleet-based shared mobility services from two providers in Minnesota. MnDOT designed, tested, and ran all systems and reporting processes for three months without interruption. A subsequent STSFA grant awarded in 2018 allowed MnDOT to carry out the demonstration pilot program. The 12-month pilot included 64 shared mobility fleet vehicles in total, as well as one connected/automated vehicle. The project proved that fleet services using telematics for assessment and reporting RUC fees may lower administrative costs due to lower accounts to administer and audit. Lessons learned from Minnesota's ongoing RUC studies include:

- Efficient communication about a program to the public and stakeholders is needed for successful implementation
- Development and implementation of a RUC program will be challenging without involvement from neighboring states
- Fleet-based approaches to shared mobility RUC may reduce administrative costs and improve compliance while reducing enforcement costs

- A RUC on shared mobility providers' vehicle fleet is a cost-effective model that would likely have lower administrative costs than a traditional DBF reliant on aftermarket devices

MnDOT is on the verge of launching a new pilot program in 2024 to test the scalability of using embedded telematics systems directly sourced from automobile manufacturers for the purposes of computing distance-based fees. The goal is to do this at the individual vehicle level.

Figure 9: Minnesota RUC Timeline



Colorado

From December 2016 to April 2017, the Colorado Road Usage Charge Pilot Program evaluated the feasibility of implementing a pay-by-mile system as an alternative to traditional gas tax. The program assessed the viability of a RUC system that would charge drivers based on the number of miles they traveled on the state's roads. This was a four-month pilot with nearly 150 participants across 27 counties. Heavy-duty vehicles were not included in the pilot. A key aspect of the pilot study was the assessment of various mileage reporting options. Participants could submit mileage using either manual odometer readings or technology-based techniques, notably OBD-II devices. Colorado's RUC program, like many others, relied on private third-party vendors to collect mileage data, process the data, and distribute monthly statements summarizing RUC charges and fuel tax credits. Notably, participants were more satisfied with technology-based reporting solutions, with 93% satisfied compared to 55% for manual reporting. In terms of privacy and security, the pilot program evaluated the safeguards in place to protect participants' personal information.

This pilot project also included engagement with key stakeholders through both a technical advisory committee and an Executive Steering Committee including key transportation leaders representing various organizations throughout Colorado. The pilot demonstrated that RUC is a viable alternative funding mechanism for transportation. Lessons learned from the pilot include the following:

- Pilot participants after participation in the program supported the RUC concept more readily than the general public.
- Satisfaction with invoicing, account management, and data security led to overall increased support of the RUC concept.
- Reporting reliant on an MRD had the highest levels of satisfaction, while those with the odometer were less satisfied.
- Assessed RUC was generally less than respondents expected.
- Areas for further analysis include out-of-state drivers, alternative rate structures, and the inclusion of an increased gas tax and a combined RUC and gas tax.

Figure 10: Colorado RUC Timeline

Oklahoma

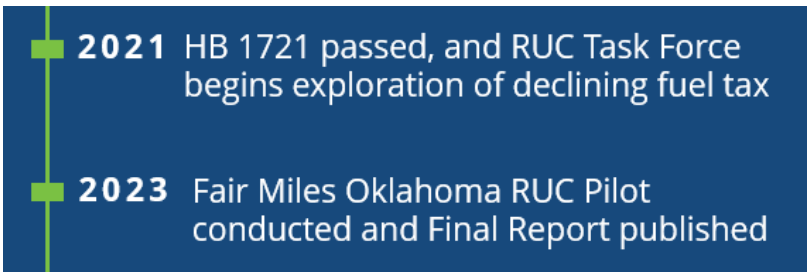
In 2021, HB 1712 was passed to explore alternatives to the declining fuel taxes in Oklahoma. A task force was set up which was directed to study the alternatives and develop a report. As a result, the Fair Miles Oklahoma pilot program was initiated. The task force studied various pilot projects executed in the country before developing its own RUC pilot.

Fair Miles Oklahoma was a pilot to evaluate mock collections under different vehicle types and Oklahoma's fee and taxation structure, gauge participant acceptance and gain public input. The study included all light-duty vehicles of varying fuel efficiency, ranging from 8 mpg to EVs and hybrid vehicles with more than 40 mpg. The pilot launched in July 2023 and ran through November 2023 with over 440 volunteers. The program provided distinct options to report miles, including a manual odometer photo option, plug-in devices (OBD-II) with or without GPS, and a smartphone app using Bluetooth technology. Also, users were provided with a monthly statement, which helped them compare their per mile pay in a RUC system and their pay through traditional fuel taxes. Fair Miles Oklahoma program relied on private third-party vendors to collect mileage data and handle all processing, invoicing, and payment collection. A private third-party account manager, emovis, managed data collection, processing, invoicing, and customer service.

Lessons learned from the Fair Miles Oklahoma pilot include:

- Have more education for Oklahomans on pay-per-mile to increase overall understanding and support
- Make the system as easy as possible to increase active participation
- Increase incentives to keep participants engaged
- Bench test new mileage reporting options before deploying to a live pay-per-mile system

Figure 11: Oklahoma RUC Timeline



Pennsylvania

As part of The Eastern Transportation Coalition (TETC), Pennsylvania has participated in several TETC MBUF pilots and studies.

From May 2018 to July 2018 Pennsylvania participated in a multi-state passenger vehicle pilot. The pilot was designed to lay the groundwork for a viable MBUF system to fund transportation improvements, enabling a smooth transition from the current fuel tax to a more sustainable,

user-based funding source. This pilot involved 155 participants, including transportation stakeholders from Delaware and Pennsylvania, who collectively traveled over 450,000 miles with over 20% of mileage driven outside participants' home states.

From July 2019 to October 2019, a passenger vehicle pilot conducted with 428 participants from the Pennsylvania general public helped close the knowledge gap about transportation funding by providing real-world experiences. Participants traveled extensively, contributing to a substantial data set that informed subsequent MBUF initiatives.

A multi-state truck pilot was conducted from October 2018 to March 2019. During this pilot, truck data was collected, and faux statements were provided to four participating trucking companies. These statements compared costs under a fuel tax system versus an MBUF approach. Over six months, an average of 55 participating trucks each month accumulated 1.43 million miles across 27 states. A single rate for all trucks was used in this pilot. This pilot highlighted the potential financial implications and administrative requirements of MBUF for heavy-duty vehicles.

A national truck pilot took place from October 2020 to March 2021, conducted by TETC. This extensive pilot recorded over 11 million miles from 221 trucks operating across all 48 contiguous US states and four Canadian provinces. EROAD's system was used as a mileage-recording device, and tiered rates based on truck MPG were used. This pilot provided comprehensive insights into the nationwide implementation of MBUF for heavy-duty vehicles.

In 2020 a passenger vehicle pilot was completed between August 2020 and January 2021. The pilot included 383 vehicles from Delaware, New Jersey, North Carolina, and Pennsylvania, which collectively accrued over 1.4 million miles across 27 states. Pennsylvania focused on rural participants for this pilot. The study aimed to further understand the operational aspects and public acceptance of the MBUF system across multiple jurisdictions.

In 2022, a technology focused pilot was conducted using 30 PennDOT fleet vehicles to test whether in-vehicle telematics like OnStar and Ford SYNC can be used adequately for an MBUF program. Pennsylvania also participated in TETC's international truck pilot in 2022, which included over 250 that recorded more than 8 million miles across 48 states and four Canadian Provinces over six months. This pilot evaluated rates based on weight for trucks and tested clearinghouse approaches.

The TETC pilots Pennsylvania was involved in explored various technologies, including GPS-enabled smartphones, plug-in devices with and without GPS, and installed mileage recording devices for trucks. Private third-party account managers were employed for data collection, processing, invoicing, fuel tax credits, and customer service, ensuring accurate and efficient management of the MBUF system.

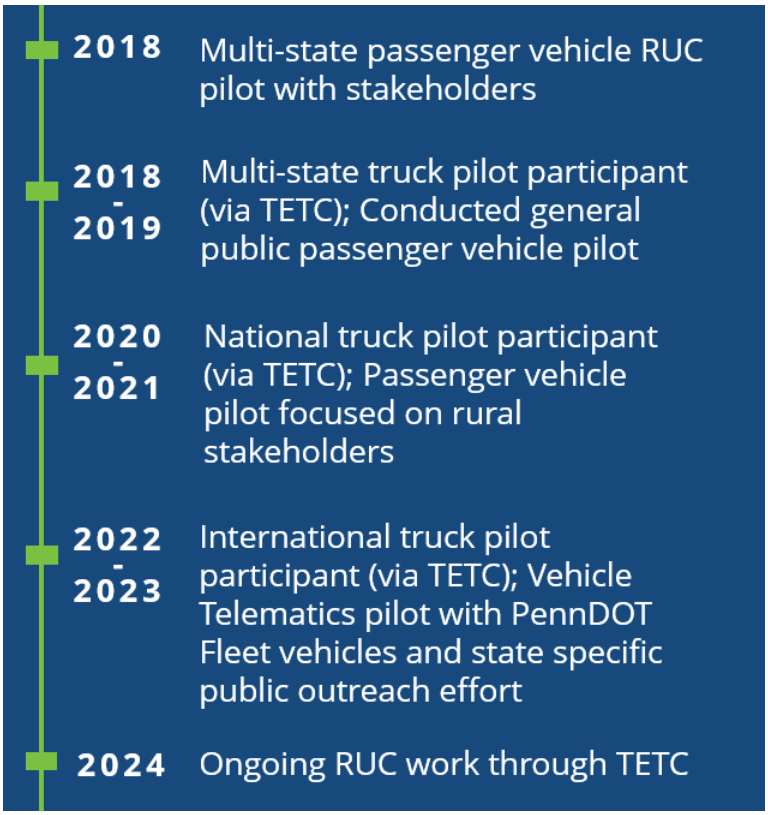
Three of the pilots focused on heavy-duty vehicles, emphasizing the importance of including the trucking industry's perspective. Electric vehicles (EVs) were also included in passenger vehicle pilots, demonstrating the system's adaptability to different vehicle types.

The pilots were supported by various RUC service providers, including EROAD and Azuga.

Lessons learned from the pilots include the following:

- GPS-enabled MBUF technologies can accurately record miles driven and fuel used, differentiating this information by state.
- Administrative and compliance costs can be effectively incorporated into a per-mile MBUF rate.
- Including the trucking industry's voice is essential for developing a feasible MBUF system.
- Pilots provide real-world experiences that help close knowledge gaps about transportation funding.
- Depending on rate settings, rural drivers in Pennsylvania may benefit more from an MBUF system compared to the gas tax.
- Real-world pilots help reduce privacy concerns among Pennsylvania drivers.

Figure 12: Pennsylvania RUC Timeline



RUC Exploration Summary

Table 1 provides an overview of the RUC pilots and programs conducted in RUC America states.

Table 1: Summary of RUC Pilots and Programs by State

State	Pilot Name	Year(s)	Approx. # Vehicles	Mileage Reporting Options	Vehicle Types	Pilot Focus
Oregon	Oregon Road User Fee Pilot Program	2006-2007	300	Custom OBU	Passenger cars and light trucks	Testing a mileage-based fee system with custom-built in-vehicle technology integrated with gas station point of sale systems for a "pay at the pump" experience
	Oregon Road Usage Charge Pilot Program	2012-2013	100	OBDII with or without GPS, OBDII with smartphone app, flat fee	Passenger cars and light trucks	Testing an open system for per-mile charging with two service providers and three technology options
	OReGO	2015-present	728 (as of August 2024)	OBDII with or without GPS, in-vehicle telematics)	Passenger cars and light trucks	Implementing a voluntary program that charges 2.0 cents per mile and credits fuel tax paid at the pump in lieu of annual vehicle registration surcharges for vehicles rated 40 MPG and higher
	OReGO Local RUC Pilot	2021	More than 200	OBDII with GPS	Passenger cars and light trucks	Testing new ways to fund transportation projects at the city and county level with area charging for local jurisdictions and time-of-day charging for certain facilities
Utah	Utah Road Usage Charge Program	2020-present	Approximately 4,700 (as of August 2024)	telematics, odometer image	Electric vehicles	Implementing a voluntary program that charges 1.06 cent per mile in lieu of annual registration surcharges for alternative fuel vehicles
	Utah Local RUC / Tolling Integration Pilot	2023	100	OBDII with GPS	Passenger cars and light trucks	Testing approaches for local governments collecting a per-mile charge for miles driven in their

State	Pilot Name	Year(s)	Approx. # Vehicles	Mileage Reporting Options	Vehicle Types	Pilot Focus
						jurisdictions and testing integration of RUC and tolling systems
Virginia*	Mileage Choice Program	2022	~22,000 (as of Dec 2023)	OBDII, telematics	Passenger cars and light trucks	Implementing a voluntary program that charges a variable rate per mile based on MPG in lieu of flat annual registration surcharges for vehicles rated 25 MPG and higher
	TETC- Exploration of MBUF Approaches for All Users	2020-2021	50	OBDII with or without GPS	Passenger cars and light trucks	Studying and reporting on transportation funding alternatives to address declining fuel tax revenues
Hawaii	Hawaii Road Usage Charge Demonstration (HiRUC) Part 1	2019-2020	360,000	Odometer inspection	Passenger cars and light trucks	Assessing public understanding and preferences
	Hawaii Road Usage Charge Demonstration (HiRUC) Part 2	2020-2021	2,150	OBDII with or without GPS, odometer image	Passenger cars and light trucks	Testing technology approaches as an option in place of vehicle inspection-based odometer reporting
	Hawaii Road Usage Charge Program	Future (2025-onward)	Estimating up to 50k EVs in Jul 2028	Odometer inspection	Electric vehicles	Implementing a program that charges 0.8 cents per mile or $50 per year for electric vehicles until July 1, 2028, then requiring all EVs to pay 0.8 cents per mile capped at $50
Washington	Washington Road User Fee Pilot Program	2018-2019	2,000	Pre-paid permits, odometer image self- reporting, odometer image assisted reporting,	Passenger cars and light trucks	Testing a per-mile charge system with different service providers and devices

State	Pilot Name	Year(s)	Approx. # Vehicles	Mileage Reporting Options	Vehicle Types	Pilot Focus
				smartphone app with optional location, plug-in devices with or without GPS		
	Forward Drive	2022-2023	1,150	Self-reporting, telematics	Passenger cars and light trucks	Exploring RUC policy and program options and conducting mini-pilots to test RUC implementation issues
California	California Road Charge Pilot Program	2016-2017	More than 5,000	Pre-paid permits, odometer image self-reporting, odometer inspection, smartphone app with location, plug-in devices with or without GPS, telematics, heavy vehicle OBUs	Passenger cars, light trucks, heavy vehicles	Testing a mileage-based fee system with different technologies and payment options
	California Four Phase Demonstration	2019-2021	83	Odometer image, various apps	Passenger cars, light trucks	Testing how road charge can work with usage-based insurance, ridesharing, electric vehicle charging stations/pay-at-the-pump systems, and autonomous vehicles
	California Public/Private Roads Pilot	2023	289	OBDII device with GPS	Passenger cars, light trucks	Test the ability of current GPS technology to differentiate when a car drives on public vs. non-public roads; engage rural and tribal communities to better understand potential impacts of a road charge

State	Pilot Name	Year(s)	Approx. # Vehicles	Mileage Reporting Options	Vehicle Types	Pilot Focus
						system; evaluate a tolling agency as a CAM
	California Road Charge Collection Pilot	2024-2025	TBD	OBDII device (with or without GPS), in-vehicle telematics, odometer image upload	Passenger cars and trucks	Identify and evaluate issues related to the collection of revenue for a road charge program; test multiple rate structure
Minnesota	Pay-as-you-drive Demonstration	2006	130	Plug-in device	Passenger cars	Co-sponsored by the FHWA; demonstration to test driving behavior with pay-as-you drive insurance and mileage-based fees; market assessment and public survey
	Minnesota Mileage-based User Fee Regional Outreach	2007	N/A	Custom OBU with smartphone app	N/A	Conducted public opinion research through surveys, interviews, and focus groups to assess public understanding of transportation funding and awareness of RUC as an alternative to the motor fuel tax
	Minnesota Road Fee Test	2011-2013	500	Smartphone app	Passenger cars and light trucks	Testing a per-mile charge system with a smartphone and OBU solution
	Minnesota Distance Based Fee Demonstration	2020-2021	64	In-vehicle and aftermarket telematics	Shared mobility fleet vehicles and a connected/automated vehicle	Validate distance-based fees can be efficiently and effectively collected using vehicle technology already in shared mobility vehicles
Colorado	Road Usage Charge Pilot Program	2016-2017	150	OBDII with or without GPS, odometer image	Passenger cars and light trucks	Testing a per-mile charge system with different mileage reporting options

State	Pilot Name	Year(s)	Approx. # Vehicles	Mileage Reporting Options	Vehicle Types	Pilot Focus
Oklahoma	Fair Miles Oklahoma	2023	500	OBDII, telematics, smartphone app, odometer image	Passenger cars and light trucks	Studying and reporting on transportation funding alternatives to address declining fuel tax revenues
Pennsylvania (via TETC)	Phase 1 – Stakeholder Pilots in DE and PA	2018	155	OBDII with or without GPS	Passenger cars and light trucks	Starting MBUF conversation on east coast, studying and reporting on MBUF to address declining fuel tax revenues
	Phase 2 – Expanded Pilots in PA	2019	428	OBDII with or without GPS	Passenger cars and light trucks	Adding more voices including the general public to the exploration of MBUF as a funding alternative to address declining fuel tax revenues
	Phase 3 – Specialized Pilots in DE, PA, NJ and Northern VA	2020-2021	383	OBDII with or without GPS	Passenger cars and light trucks	Addressing the complexity of users under an MBUF alternative. PA focused on rural participants.
	Phase 4 – Expanded Pilots in PA, NC, NJ, ME and CT	2022	1,420	OBDII with or without GPS, telematics, manual	Passenger cars and light trucks	Building a regional approach to MBUF
	TETC Multi-State Truck Pilot	2018-2019	55	Truck OBUs	Heavy vehicles	Explore feasibility of existing regulations and technology as a framework/foundation for an MBUF approach
	National Truck Pilot	2020-2021	220	Truck OBUs	Heavy vehicles	Evaluate rates based on MPG categories for trucks
	International Truck Pilot	2022	250	Truck OBUs	Heavy vehicles	Evaluate rates based on weight for trucks and test clearinghouse approaches

** Virginia is not a RUC America member state, but is included because it operates one of the four RUC Programs in the U.S.*