THE EASTERN TRANSPORTATION COALITION

MBUF WORK

Compendium of Revenue Alternatives in Response to Fuel Economy Improvements and Vehicle Fleet Electrification

JANUARY 2024

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ACRONYMS AND ABBREVIATIONS

AV	Autonomous Vehicle
CAM	Commercial Account Manager
CNG	Compressed Natural Gas
CPI	Consumer Price Index
cpm	Cents per mile
DBUF	Distance-based user fee
EV	Electric Vehicle
FAST Act	Fixing America's Surface Transportation Act
GPS	Global Positioning System
HB	House Bill
HDOT	Hawaii Department of Transportation
HDV	Hight-Duty Vehicle
HF	House File
HUF	Highway Use Fee
ICE	Internal Combustion Engine
KDOT	Kansas Department of Transportation
kWh	Kilowatt-Hour
LDV	Light-Duty Vehicle
LPG	Liquefied Petroleum Gas
MBUF	Mileage-based User Fee
MnDOT	Minnesota Department of Transportation
MPG	Miles per gallon
NHCCI	National Highway Construction Cost Index
OBD	On Board Diagnostic
OBU	On Board Units
ODOT	Oregon Department of Transportation

OEM	Original Equipment Manufacturer
OReGO	Oregon's Road Usage Charge Program
PHEV	Plug-in Hybrid Electric Vehicle
RUFTF	Road User Fee Task Force
RUC	Road Usage Charge
SB	Senate Bill
SM	Shared Mobility
STSFA	Surface Transportation System Funding Alternatives
TETC	The Eastern Transportation Coalition
UDOT	Utah Department of Transportation
VMT	Vehicle Miles Traveled
WSTC	Washington State Transportation Commission

EXECUTIVE SUMMARY

This compendium explores various revenue mechanisms studied or adopted by states as alternatives to traditional fuel taxes. The purpose of this document is to build a common level of understanding around these transportation funding mechanisms in the United States. It describes the main concepts behind each mechanism and provides examples of where and how these strategies have been implemented.

- **Mileage-based User Fee (MBUF),** also known as road usage charging or road user charging (RUC) and vehicles miles traveled (VMT) fee, charges drivers based on the number of miles they drive. MBUF is generally assumed as a replacement of the fuel tax. As of January 2024, there are four enacted MBUF programs in the U.S.
- **Weight-Distance Fees** impose a mileage-based user fee for heavy-duty vehicles that varies based on the number of axles and/or truck weight.
- **Electric Vehicle/Hybrid Fees** are flat annual registration fees, typically charged in addition to traditional motor vehicle registration fees. At the time of writing, 33 states collect an additional registration surcharge on EVs, and several states also collect additional registration fees on plug-in hybrid EVs, hybrid vehicles, and high fuel-efficient vehicles.
- **Kilowatt-Hour Tax** (kWh tax) is an assessment on use of the road system based on the amount of electricity charged at a public EV charging station. At the time of writing, seven states have enacted per-kilowatt-hour fees on the charging of EVs at public charging stations. No state collects kWh taxes on residential charging stations.
- **Other Potential Strategies** are also described including increases in motor fuel taxes, vehicle-related fees, tolling, taxes on commercial activities such as delivery fees and transportation network company fees, and other tax and fee mechanisms that can be dedicated to transportation.

Figure ES-1 shows the states that have enacted MBUF programs, engaged in formal pilot programs, conducted policy or technical research on MBUF, or are researching MBUF through participation in a muti-state coalition.

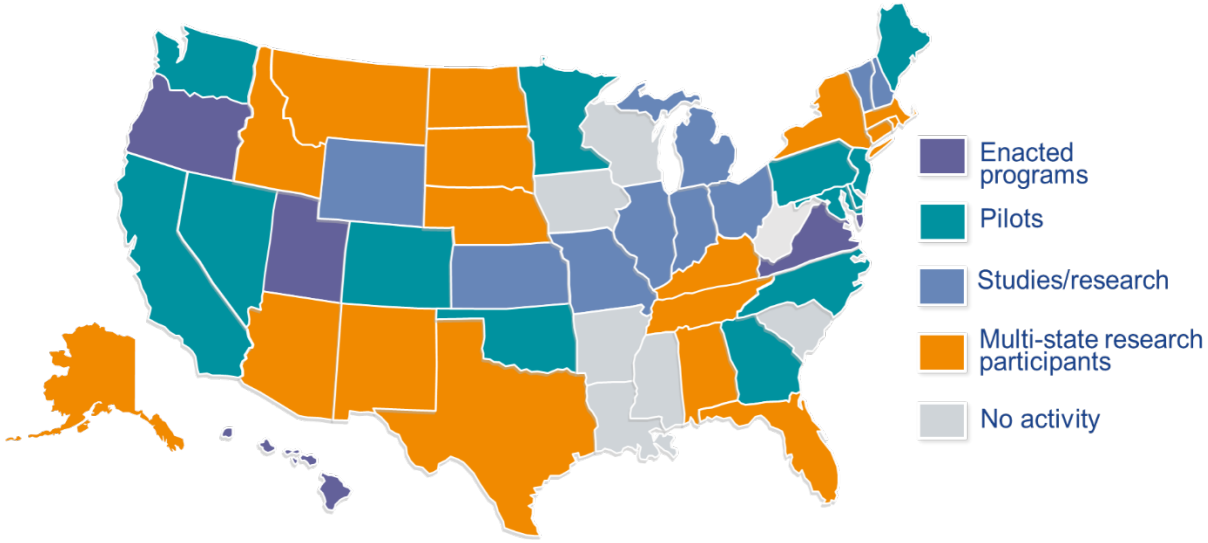


Figure ES-1: January 2024 MBUF Landscape

As of January 2024, four states in the United States have enacted legislation authorizing the collection of per-mile fees: Oregon, Utah, Virginia, and Hawaii. In each case, they are voluntary programs that focus on collecting MBUF from fuel-efficient and/or alternative fuel vehicles. All four of these programs are offered on a voluntary basis, where drivers opting in to pay by the mile are exempt from paying an annual registration surcharge on their vehicles. Furthermore, all but Oregon provides further financial assurance to program participants by capping their annual per-mile charges at no more than what a driver would otherwise have paid if subject to the state's special registration surcharge.

Many other states have conducted demonstration projects, pilot projects, or specific system testing for MBUF. Notable examples reviewed in the compendium include California, Colorado, Minnesota, Kansas, Oklahoma, Washington, and The Eastern Transportation Coalition (TETC) states.

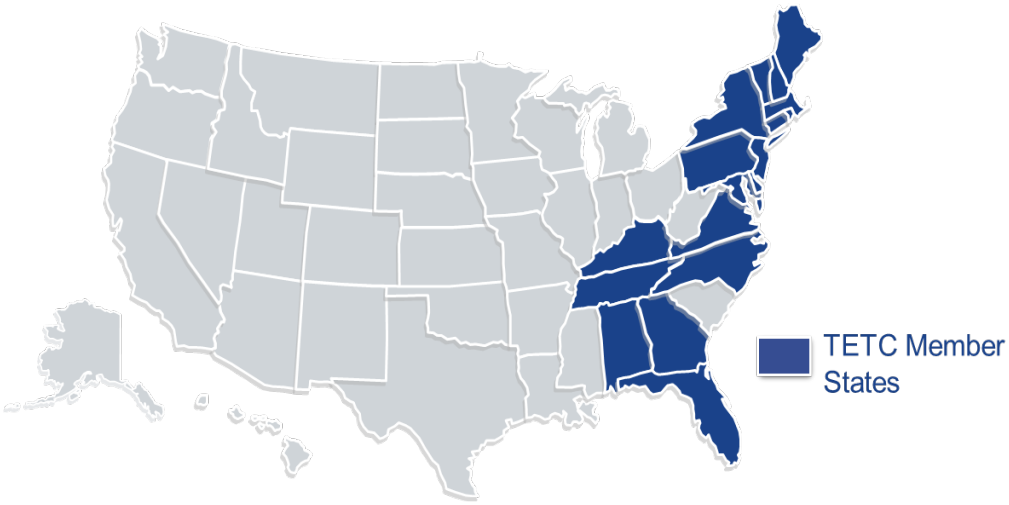


Figure ES-2: TETC Member States

Federal surface transportation legislation from 2015 established the Surface Transportation System Funding Alternatives (STSFA) program, which has provided $95 million in grants to individual states and coalitions of states, with a minimum 50% match requirement for grantees. The STSFA program was intended to inform Congress about whether MBUF could serve as a viable replacement for the gas tax. STSFA has funded pilots in 13 individual states as well as two coalitions of states: RUC America and TETC, which both aim to test the feasibility of regional MBUF systems.

Overall, 44 states have taken some form of action (legislative or executive) to research, test, or enact per-mile fees or other alternative revenue mechanisms to bolster state transportation funds. While legislative action related to per-mile fees may be an indicator of political support for this new revenue mechanism, many states have proceeded with research and pilot testing without explicit legislative direction. Instead, these states relied on existing agency authority or executive-driven policy initiatives to begin research or testing.

Relevant legislative actions and other activities related to per-mile fees are summarized in **Figure ES-3.**

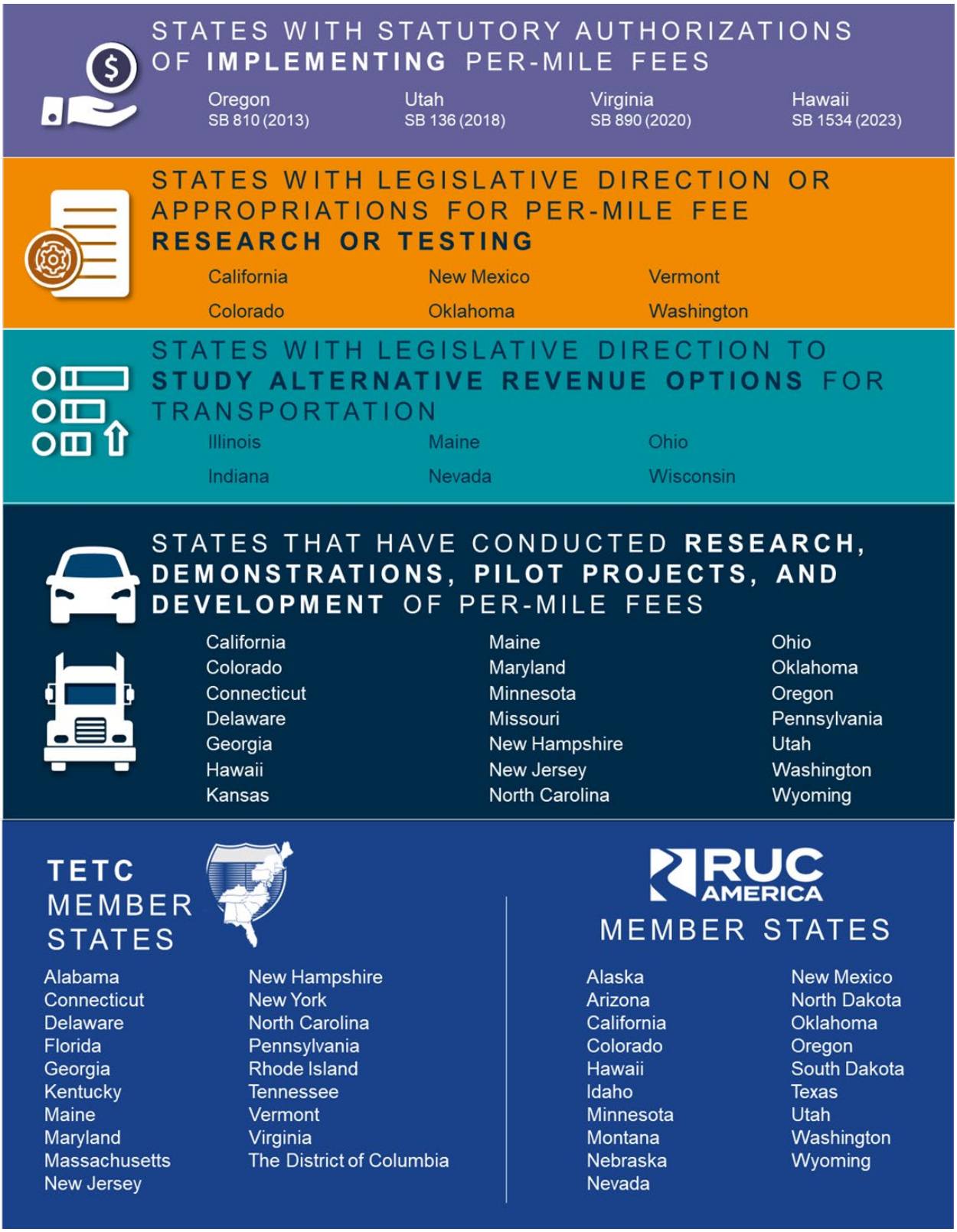


Figure ES-3: MBUF Legislative Actions and Other Related Activities

Table ES- 1 summarizes the main benefits and challenges associated with MBUF.

Table ES- 1: MBUF Benefits and Challenges

BENEFITS	CHALLENGES
• MBUF is a true user pays funding method – charge is proportionate to road usage • Perceived by the public as being fair, pay for what you use resonates • MBUF is transparent to user – users understand how much they are paying and why • Independent of vehicle propulsion method (i.e., you don't have one method for EVs and one for ICE vehicles)	• More complex for states to implement compared with other charges • Potentially more activity required of user than other charges • Low-cost implementation has not yet been demonstrated (although approaches to lowering cost to level of other government fees seem viable) • Perceived by some as invading privacy (although privacy protecting technologies and policies can mitigate this) • Perceived as unfair to rural residents (although in aggregate, data shows that MBUF benefits rural residents in every location where it has been analyzed)

Table ES-3 provides an overview of the MBUF pilot programs conducted in the United States, with key information related to each pilot. More details about individual pilots are provided in Section 2.2 of this document.

Table ES-2: MBUF Pilot Summary

State	Pilot Name	Pilot Year	Approx No. of 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	Up to 5,000	OBDII with or without GPS, manual	Passenger cars and light trucks	Implementing a voluntary program that charges 1.9 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 4,000	OBDII, telematics, odometer image (for reconciliation only)	Electric vehicles	Implementing a voluntary program that charges 1.0 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	Pilot Year	Approx No. of Vehicles	Mileage Reporting Options	Vehicle Types	Pilot Focus
						jurisdictions and testing integration of RUC and tolling systems
Virginia	Mileage Choice Program	2022	N/A	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)	Up to 20k EVs at launch	Odometer inspection	Electric vehicles	Implementing a program that charges 0.8 cents per mile or $50 per year for electric vehicles until 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, smartphone app with optional	Passenger cars and light trucks	Testing a per-mile charge system with different service providers and devices

State	Pilot Name	Pilot Year	Approx No. of Vehicles	Mileage Reporting Options	Vehicle Types	Pilot Focus
				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	N/A	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 Road Charge Public/Private Roads Pilot	2022-2023	250	Plug-in device	Passenger cars, light trucks	Test the ability of current GPS technology to differentiate when a car drives on public versus non-public roads; engage rural and tribal communities to better understand potential impacts of a road charge system

State	Pilot Name	Pilot Year	Approx No. of Vehicles	Mileage Reporting Options	Vehicle Types	Pilot Focus
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	N/A	N/A	Conducted public opinion research through surveys, interviews, and focus groups to assess public understanding of transportation funding and awareness of MBUF 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	2017-2021	64	In-vehicle and aftermarket telematics reporting methods	Shared mobility fleet vehicles and a connected/automated vehicle	Validate that distance-based fees can be efficiently and effectively collected using vehicle technology already in shared mobility fleet 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
Kansas	Midwest Road Usage Charge (RUC) Study	2021-2024	400	Self-reporting, odometer image, smartphone app with location, telematics	Light, medium, and heavy vehicles	Exploring the impacts of RUC implementation in the Midwest, with focus on rural and agricultural populations and intrastate commercial freight

State	Pilot Name	Pilot Year	Approx No. of Vehicles	Mileage Reporting Options	Vehicle Types	Pilot Focus
Oklahoma	Fair Miles Oklahoma	2021-2023	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
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 DE an PA	2019	889	OBDII with or without GPS	Passenger cars and light trucks	Adding more voices including the general public to the exploration of MBUG as a funding alternative to address declining fuel tax revenues
	Phase 3 – Specialized Pilots in DE, PA, NC, NJ and Northern VA	2020-2021	575	OBDII with or without GPS	Passenger cars and light trucks	Addressing the complexity of users under an MBUF alternative.
	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

Figure ES-4 shows the states that have adopted EV fees for light-duty vehicles or where legislation has been considered and not adopted; this map also includes the amount of the EV fee where relevant.

Table ES-3 summarizes the main benefits and challenges associated with this revenue mechanism.

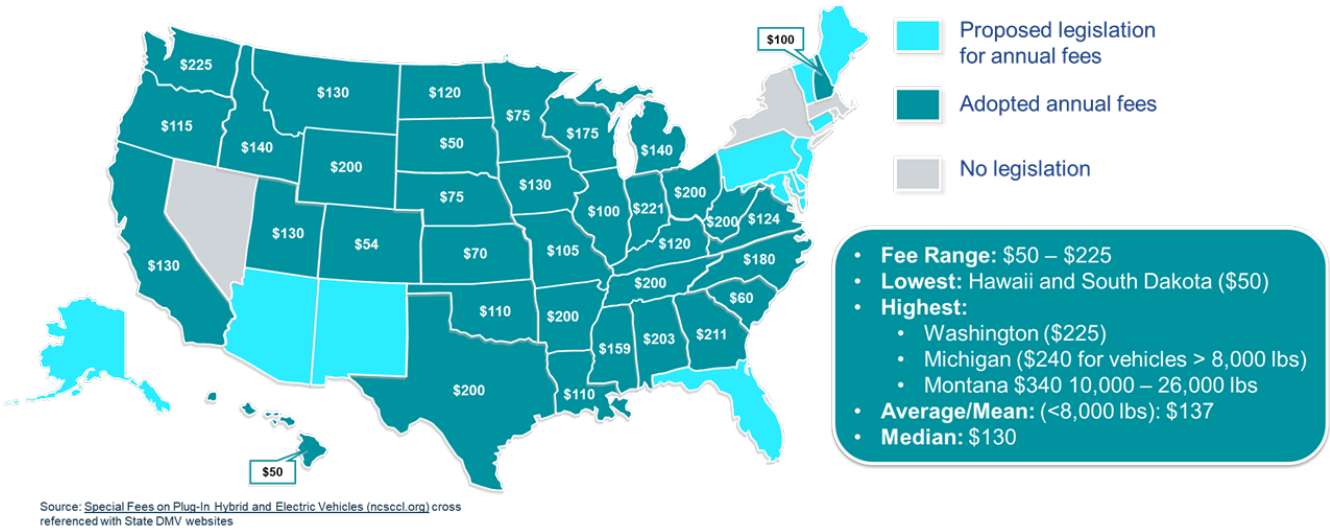


Figure ES-4: Light EV Fees in January 2024 (rounded to nearest dollar)

Table ES-3: Light EV Fees Benefits and Challenges

BENEFITS	CHALLENGES
• Increase equity by ensuring EV drivers pay to fund roadway maintenance and preservation • Easy to administer as all states already collect an annual registration fee for passenger vehicles • Revenues expected to increase significantly with vehicle fleet electrification • Easy to understand and transparent • Additional EV fees are somewhat offset by tax breaks and other financial incentives	• Does not currently result in a high level of revenue • Can be perceived as a disincentive towards cleaner vehicle fleets • Can be considered inequitable since fees are not proportional to miles driven. • Fee can be considered excessive for those driving less miles than the average driver or insufficient for those who drive more than the average driver.

Figure ES-5 shows the states that have adopted some form of Kilowatt-Hour tax legislation or where legislation has been considered but not adopted as of January 2024.

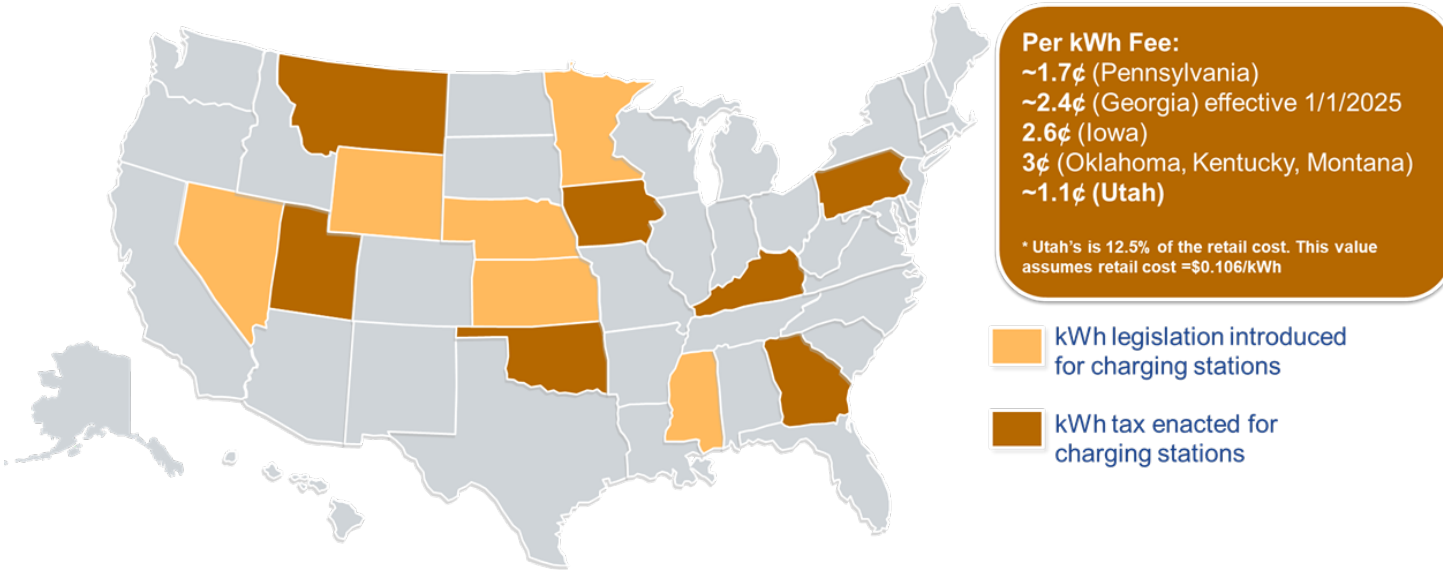
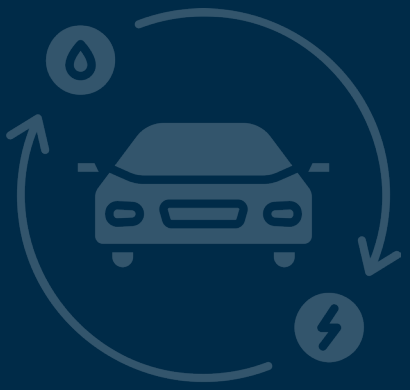


Figure ES-5: Kilowatt-Hour Tax in January 2024

Table ES-4 summarizes the main benefits and challenges associated with this revenue mechanism.

Table ES-4: Kilowatt-Hour Tax Benefits and Challenges

BENEFITS	CHALLENGES
• The kWh tax model is like the fuel tax drivers are familiar with where the tax is collected at the pump/charging station, so should be easy to understand and well accepted by users • It should be relatively easy to implement in a legislature • When applied at public charging stations, captures some travel by out-of-state vehicles	• Generates limited funds because most EV charging (80-90%) occurs at home • Can be perceived as double tax in states that have EV registration fees • Relatively high cost of collection (10%+), complex for utilities to implement • Does not address revenue loss due to ICE vehicle engine improvements • Complex to implement at all EV charging stations including private residences



1 INTRODUCTION

To fund the preservation and maintenance of highway networks, states rely on the motor fuel tax and vehicle registration fees to provide the bulk of revenues for local, regional, and statewide transportation projects. Today, one of the largest sources of funding at the state level – the state motor fuel tax – is forecast to generate less and less revenue in the coming years. Several reasons contribute to declining revenues from the motor fuel tax.

The primary factor driving to erosion of fuel tax revenues, particularly in the short and medium term, is improving fuel economy of internal combustion engine vehicles. Corporate Average Fuel Economy (CAFE) standards regulate fleetwide averages for how far new U.S. vehicles must travel on a gallon of fuel. Currently, the CAFE standards specify that the fleet average of new light-duty vehicles achieve 36.3 MPG (miles per gallon) by 2025; this number rises to 46.9 MPG by 2050. Assuming these regulations are unchanged and averaging across all vehicles in the U.S. fleet, this means that the fleetwide average of light-duty vehicles in the U.S., which currently averages 24.8 MPG, would improve to 36.1 MPG by 2050[1]. Today, an average vehicle would require 40.3 gallons to drive 1000 miles, but in 2050, the average vehicle would just require 27.7 gallons, a 31.3% cut in the fuel consumed, and tax revenue would be reduced in the same proportion.

The introduction of alternative fuel vehicles including electric and hybrid vehicles is also contributing to declining fuel tax revenues. In the short term, revenue losses due to vehicle fleet electrification are relatively small as alternative fuel vehicles represent only a small share of the overall vehicle fleet. However, this share of electric vehicles is anticipated to grow steadily in the future. According to Bloomberg New Energy Finance (BNEF) projections, half of the new light duty vehicle sales will be electric by 2036, and half of the light-duty vehicle fleet in operation will be electric by 2050.

Because fuel taxes are excise taxes (fixed tax amount by volume of commodity consumed, i.e., fixed number of cents per gallon of gas), state fuel tax revenues generally do not track inflation, although a few states have adopted mechanisms to index their tax rates on the consumer price index or the fuel price. However, inflation directly increases the cost of goods and labor needed for road construction and maintenance. As a result, motor fuel tax revenues are not keeping up with roadway spending, particularly when highway construction costs outpace the overall rate of inflation, as has been the case in recent years. The National Highway Construction Cost Index (NHCCI), compiled by FHWA, shows that construction costs have more than doubled between

[1] U.S. Energy Information Administration. Annual Energy Outlook. March 2023

2003 and 2021.[2] From 2020 Q2 to 2023 Q2, the NHCCI grew by 50.8 percent, which represents a significant deviation from the historical NHCCI average and anticipated inflation, reflecting how the NHCCI continues to outpace the historical average growth.[3]

With increases in fuel efficiency and alternative fuel vehicles, people are purchasing less fuel resulting in less revenue for transportation. In response to declining revenues from the fuel tax, states are exploring numerous alternative revenue mechanisms with the primary goal of ensuring long-term stability and predictability of funding. This document focuses on some of the most common revenue mechanisms states are adopting to recapture revenues from vehicles that pay little to no fuel tax. These include the following:

- **Mileage-based user fees (MBUF)**, also known as road usage charging or road user charging (RUC) and vehicles miles traveled (VMT) fee, charge drivers based on the number of miles they drive. MBUF is generally assumed as a replacement of the fuel tax. Four states have enacted MBUF programs in the U.S.
- **Weight-distance fees** impose a mileage-based user fee for heavy-duty vehicles that varies based on the number of axles and/or truck weight.
- **EV/hybrid fees** are annual registration surcharges on electric and hybrid vehicles. Many states collect an additional registration surcharge on electric vehicles (EVs), plug-in hybrid EVs, hybrid vehicles, and in some states on high fuel-efficient vehicles.
- **Kilowatt-Hour tax** is a tax on electricity consumed by EVs. A few states have implemented per kilowatt-hour (kWh) charges at public charging stations.
- A variety of **other potential strategies** include increases in motor fuel taxes, vehicle-related fees, tolling, taxes on commercial activities such as delivery fees and transportation network company fees, and other tax and fee mechanisms that can be dedicated to transportation.

This compendium provides relevant background to build a common level of understanding for these transportation funding mechanisms in the United States. It describes the main concepts behind each mechanism and provides examples of where and how these strategies have been implemented.

The next part of the document covers the history of MBUF, an overview of the status of MBUF for states with pilots or active programs, relevant legislation in the U.S., and a summary of MBUF programs outside of the U.S. An overview of weight-distance fees for heavy-duty vehicles is also included as part of the MBUF section. As much MBUF research has been done, this is the longest section of this document.

Special fees on EVs and hybrid vehicles are discussed next. This is followed by a discussion of the Kilowatt-Hour tax. The final section summarizes a range of other potential road funding strategies and analyzes their advantages and disadvantages.

[2] FHWA. National Highway Construction Cost Index (NHCCI) Interactive Dashboard. https://www.fhwa.dot.gov/policy/otps/nhcci/
[3] https://www.fhwa.dot.gov/policy/otps/nhcci/NHCCI_narrative_article_2023_q2.pdf

2 MILEAGE-BASED USER FEES

2.1. Origins

Over the past two decades, many states have investigated and tested the concept of paying a per-mile or a flat fee as an alternative to the fuel tax to make up for lost revenue from greater usage of increases in electric and other high mileage fuel-efficient vehicles. In 2013, after more than a decade of research and pilot testing, the Oregon legislature enacted a permanent voluntary per-mile RUC of 1.5 cents per mile for volunteer motorists of light vehicles that became operational in 2015. Branded OReGO, the state legislature mandated this program to provide an offset of the fuel tax paid by the operator of the participating vehicle.

The work in Oregon led other states, including Washington, Utah, and California to begin studying and pilot testing mileage-based user fees (MBUF). Some of the findings that came out of this research and pilot testing provided critical information and data on important components of MBUF implementation.

In addition to individual state activities, western states formed a regional coalition, RUC America (formerly known as RUC West) to study MBUF. RUC America is a consortium of states that brings together leaders from transportation organizations to share best practices, ideas, and information on RUC. On the East Coast, The Eastern Transportation Coalition (TETC), formerly known as the I-95 Corridor Coalition, is a group of 18 states and the District of Columbia that was established to collaboratively address transportation issues, such as sustainable transportation funding (tetcoalition.org).

There has also been leadership and interest in MBUF at the federal level. In 2015, Congress passed the FAST Act, which included the Surface Transportation System Funding Alternative (STSFA) grant program. The program provided nearly $20M in funding per year over five years to states to explore MBUF and alternative user fee-based funding mechanisms, totaling $95 Million. Many states have initiated pilot projects to test and evaluate different MBUF systems using these dollars.

As of January 2024, four states have enacted legislation authorizing the collection of per-mile fees: Oregon, Utah, Virginia, and Hawaii. In each case, they are voluntary programs that focus on collecting RUC from fuel-efficient and/or alternative fuel vehicles. **Figure 2-1** shows the states that have enacted MBUF programs, engaged in formal pilot programs, conducted policy or technical research on MBUF, or are participating in MBUF research through a muti-state coalition.

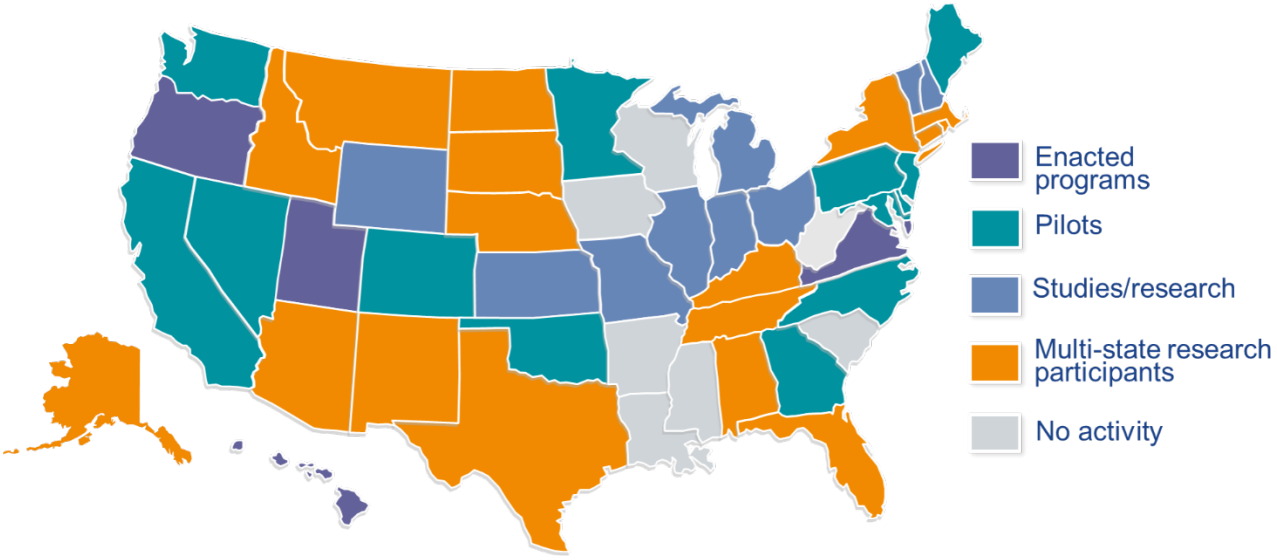


Figure 2-1: January 2024 MBUF Landscape

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BENEFITS	CHALLENGES
• MBUF is a true user pays funding method – charge is proportionate to road usage • Perceived by the public as being fair, pay for what you use resonates • MBUF is transparent to user – users understand how much they are paying and why • Independent of vehicle propulsion method (i.e., you don't have one method for EVs and one for ICE vehicles)	• More complex for states to implement compared with other charges • Potentially more activity required of user than other charges • Low-cost implementation has not yet been demonstrated (although approaches to lowering cost to level of other government fees seem viable) • Perceived by some as invading privacy (although privacy protecting technologies and policies can mitigate this) • Perceived as unfair to rural residents (although in aggregate, data shows that MBUF benefits rural residents in every location where it has been analyzed)

2.2. MBUF History by State

This section presents an overview of the MBUF programs and pilot studies by state or multistate coalitions. The legislative actions are covered in Section 3.

2.2.1. 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) in 2006–2007 and 2012–2013. In 2013, 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 MBUF services to customers. As a result, the nation's first fully operational RUC program, named OReGO, went live in July 2015. During this early start-up 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).

As of October 2023, the OReGO program had less than 1,000 participants. This low uptake is primarily due to lack of advertising. As of 2023, OReGO participants paid 1.9 cents for each mile they drive, with all revenue deposited into the State Highway Fund. Oregon is the only state that does not cap their RUC at the flat fee amount.

OReGO is administered by the 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. Participants can report their mileage using a variety of methods, primarily by utilizing an electronic device that connects to the vehicle's onboard diagnostic (OBD-II) port, which is typically located beneath the steering wheel, but a manual self-reporting option has been available in the past and may be available again. Notably, participants have the option of disclosing the location of their traveled miles by choosing to use a GPS-enabled OBD-II device (instead of a device without GPS). The use of GPS allows 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 OBD-II device, the service does not calculate or credit out-of-state mileage.

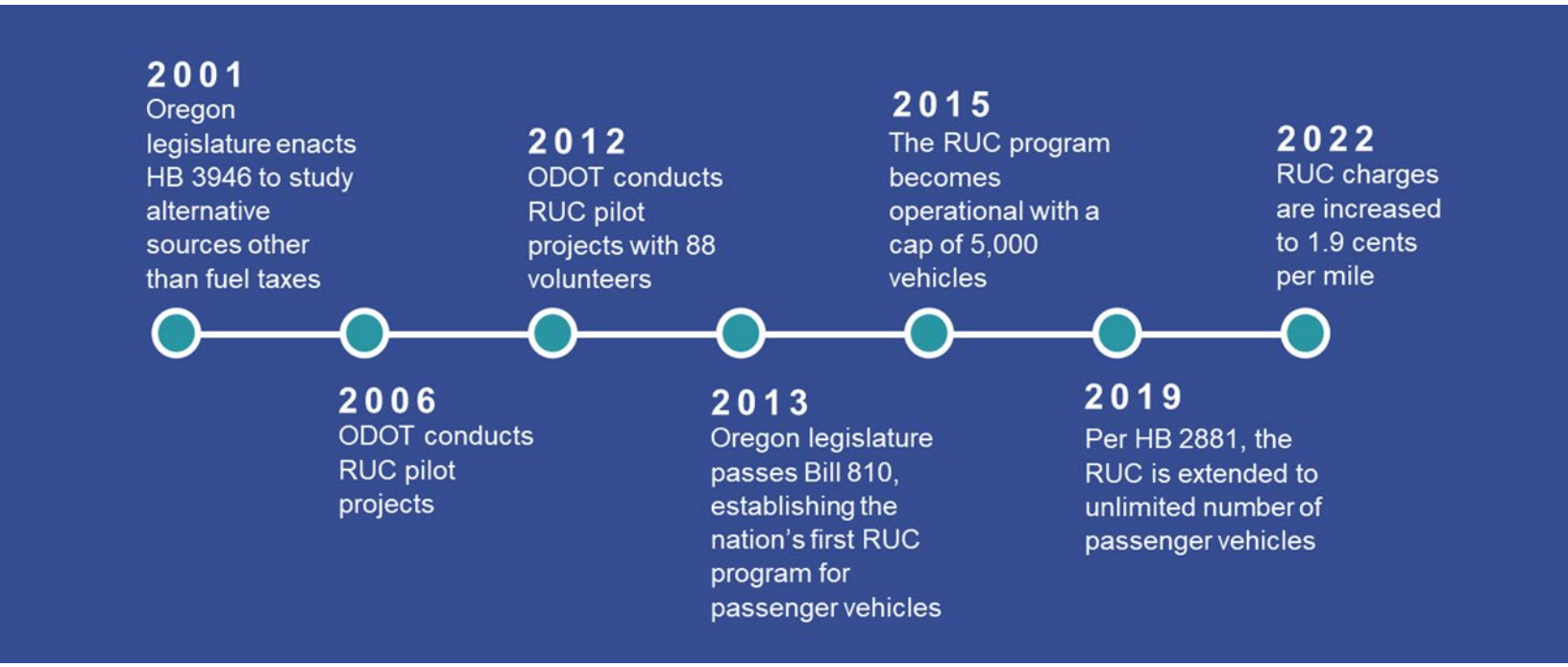


Figure 2-2: Oregon MBUF Milestones

2.2.2. 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 cars (EVs), allowing participants to pay a 1 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 January 2023, there were 4,747 vehicles in the program. 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. 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.

Mileage reporting alternatives in Utah include OBD-II plug-in devices with GPS and in-vehicle telematics for vehicles without OBD-II ports (Tesla models 3 and Y). 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. To eliminate the possibility of OBD-II devices missing miles while they were unplugged and other gaps in reporting, participants using OBD-II devices must record and submit odometer photographs at the start of the program and once a year as an additional guarantee of mileage reporting accuracy and compliance. Participants that use in-vehicle car telematics do not need to send odometer images because Utah's RUC program account

manager obtains the odometer values from a third party that interfaces with the vehicle's telematics system.

Utah's RUC program relies on a private third-party vendor 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.

Figure 2-3: Utah MBUF Milestones

2.2.3. Virginia

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. That fee, assessed when vehicles are registered, is designed to ensure drivers of electric and fuel-efficient vehicles pay 85 percent of what a less fuel-efficient vehicle might contribute in gas and diesel taxes per year. 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 the HUF. The annual Highway Use Fee ranges from $6.45 (for a 25 MPG vehicle) to $123.98 (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 2-4** shows Virginia MBUF milestones.

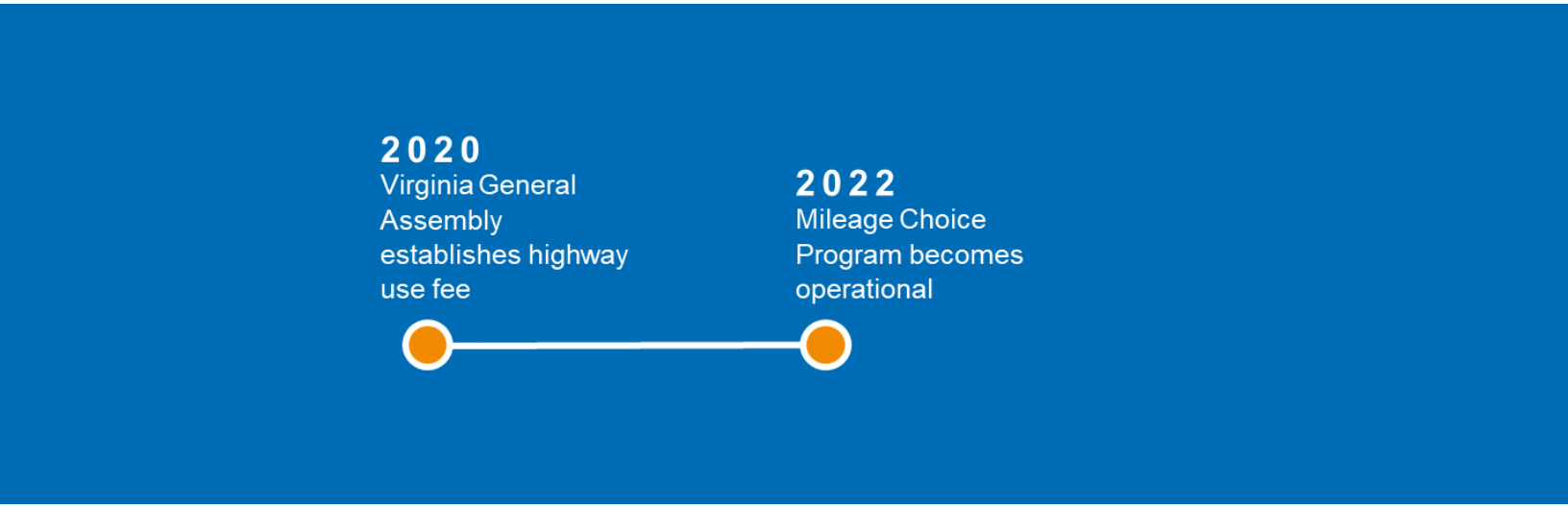


Figure 2-4: Virginia MBUF Milestones

Figure 2-5 compares funding contributions for car mileages (10-60) MPG: Fuel Tax vs HUF.

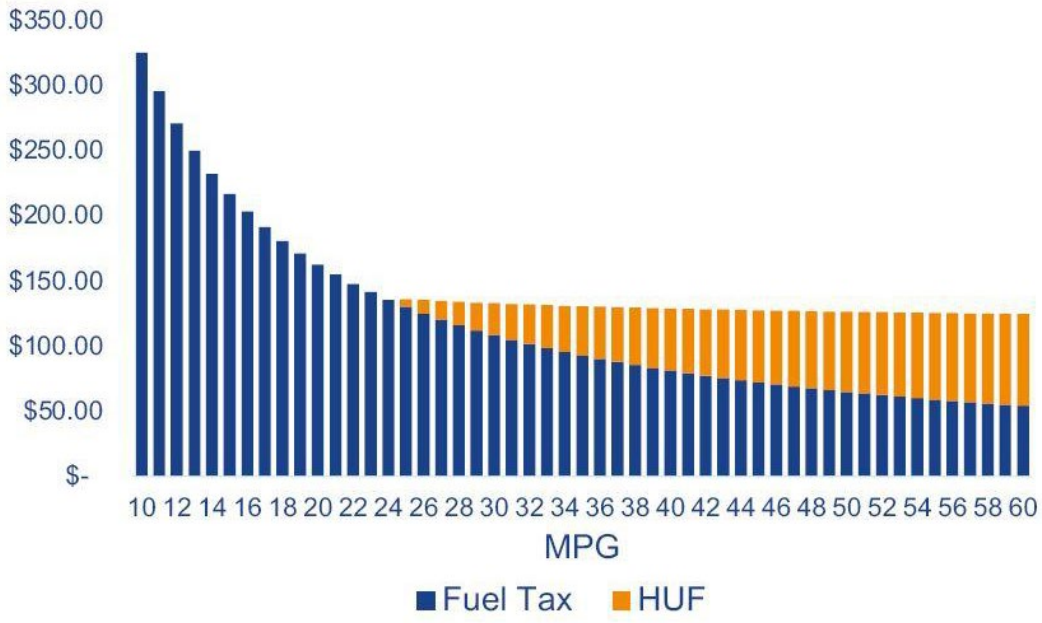


Figure 2-5: Total Annual Roadway Funding Contribution (at 11,600 miles traveled)

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.

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, with one major difference with the Utah RUC program being that in Virginia, most vehicles makes and models equipped with native telematics are eligible to utilize telematics to report MBUF (in Utah, only the Tesla 3 and Y are eligible). 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.

2.2.4. Hawaii

Hawaii launched the Hawaii Road Usage Charge Demonstration Project in 2016, the country’s largest public demonstration and awareness initiative of its kind, eventually reaching nearly 300,000 state residents. 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. 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 vehicles in the RUC program by 2033 in the same measure. By December 2025, the transition plan must be submitted to the legislature.

EV drivers will be offered the option of paying a $50 yearly registration surcharge or participating in RUC during a 36-month start-up period (until June 30, 2028). If a driver chooses to join RUC, the annual fee will be capped at $50. After 2028, all EVs will pay RUC, making Hawaii the first state to introduce a mandatory RUC program.

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 registrations as part of the procedure. Only vehicles that have passed their required inspection are eligible to renew their annual vehicle registration. As Hawaii is composed of islands, it is uncommon for vehicles registered in Hawaii to travel "out-of-state." As a result, there's little incentive to mandate that participants use GPS-enabled electronic mileage reporting devices that can deduct out-of-state miles.

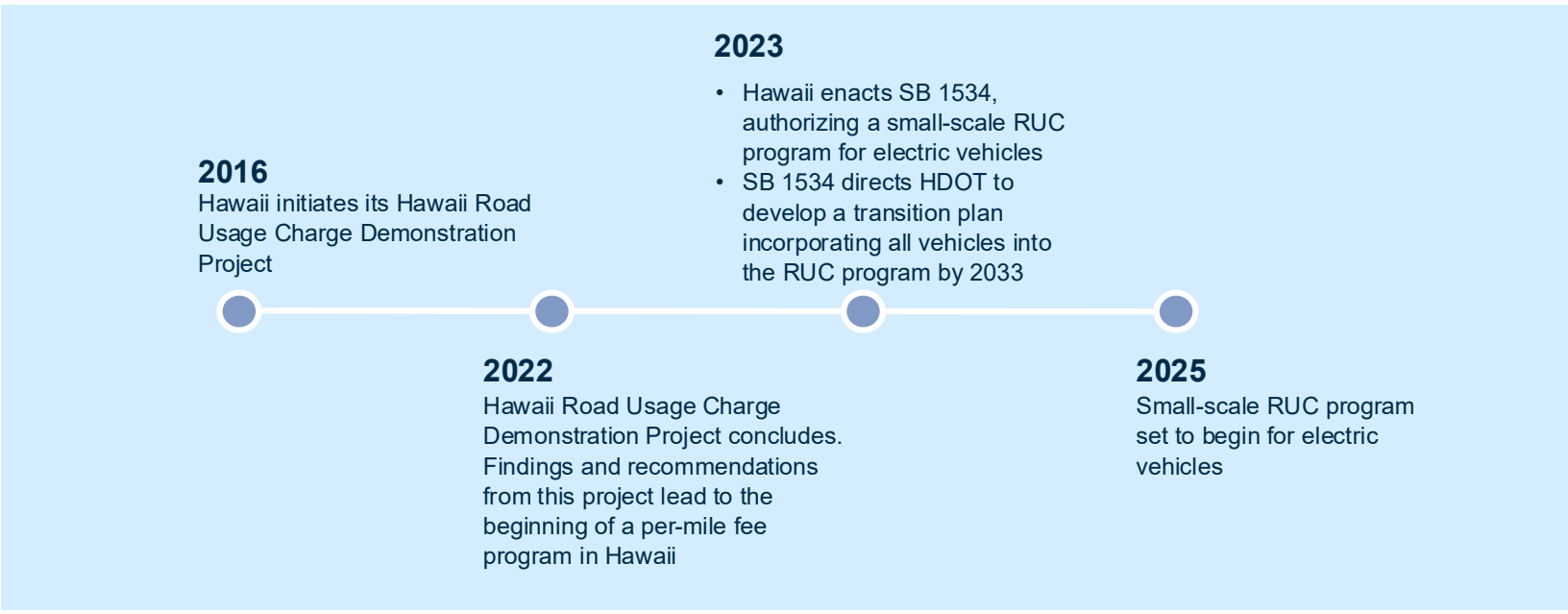


Figure 2-6: Hawaii MBUF Milestones

2.2.5. Washington

In 2012, the Washington State Transportation Commission (WSTC) was directed to research Road Usage Charge (RUC) as a potential alternative to declining revenue from fuel taxes. Over the years, WSTC conducted research, convened committees, and ran a statewide RUC pilot involving 2,000 vehicles from 2018 to 2019 focused on light-duty vehicles (LDV). This pilot program and the one conducted in 2023, focus on LDVs and exclude heavy-duty vehicles (HDVs).

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 WSTC and WA RUC Steering Committee set the foundation for a Road Usage Charge transition in Washington. In response, WSTC 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, WSTC introduced an online RUC simulation allowing drivers to experience enrolling in a RUC program. The simulation 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.

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.

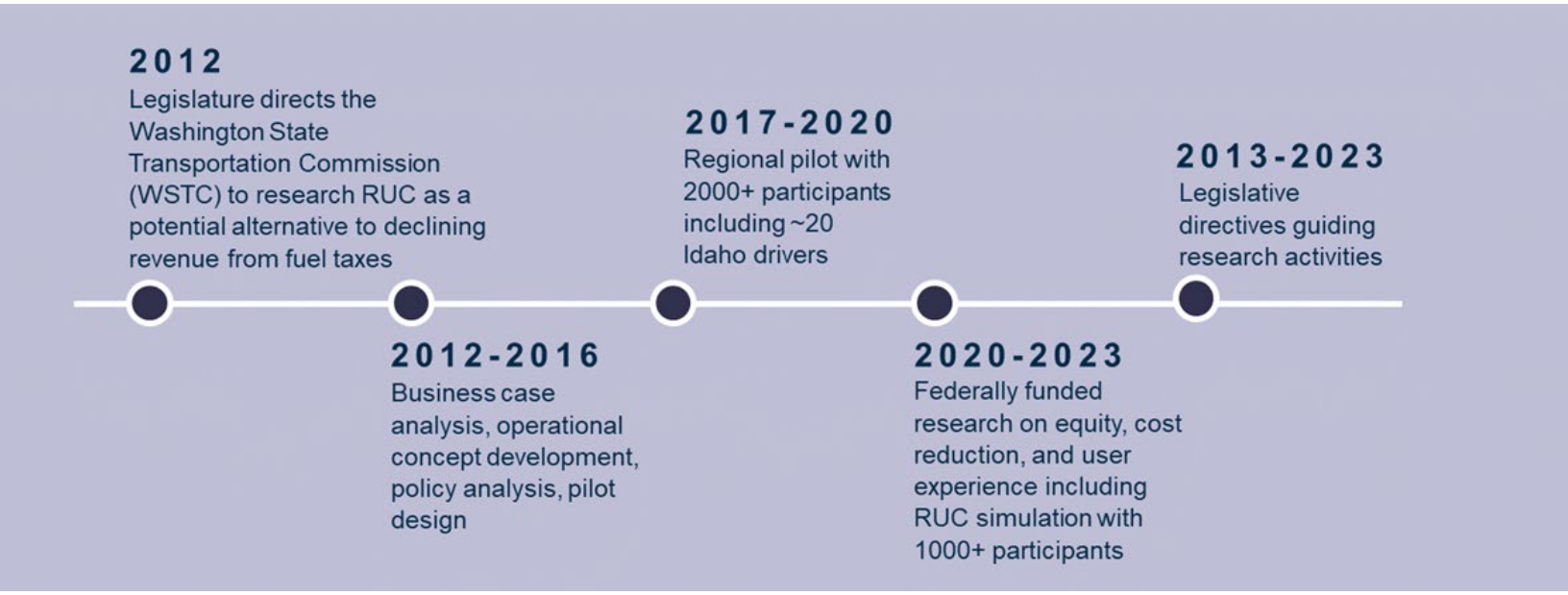


Figure 2-7: Washington MBUF Milestones

2.2.6. 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, 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 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 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). Third parties like GasBuddy and ChargePoint were responsible for collections. 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.

In 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. This pilot focused on engaging rural and tribal communities to provide perspectives on the road charge concept and its potential impacts to their communities, as well as to participate in the pilot, as these communities were underrepresented in previous pilots.

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. That pilot is expected to begin in 2024.

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.

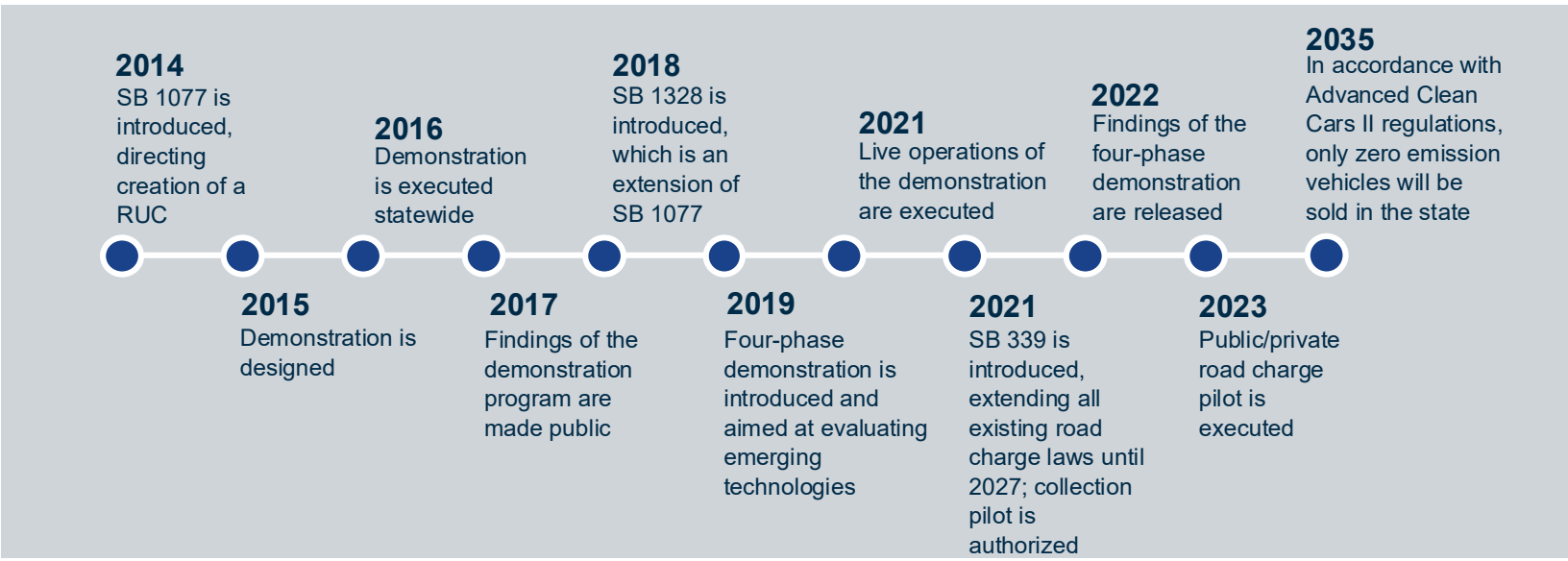


Figure 2-8: California MBUF Milestones

2.2.7. Minnesota

The Minnesota Department of Transportation (MnDOT) has been actively exploring the concept of MBUF (also known as Distance-Based Fee in Minnesota) for several years, employing a range of research methods to gather public opinion and test the technical feasibility. In 2003, Minnesota participated in a 15-state pooled fund study to explore public policy, privacy, institutional, and technical issues related to a new road user charge system. 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 MBUF 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 MBUF 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.

Following the Road User Charge 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 MBUF 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 share mobility fleet

vehicles in total, as well as one connected/automated vehicle. The project proved that fleet services using telematics for assessment and reporting MBUF fees may lower administrative costs due to lower accounts to administer and audit.

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.

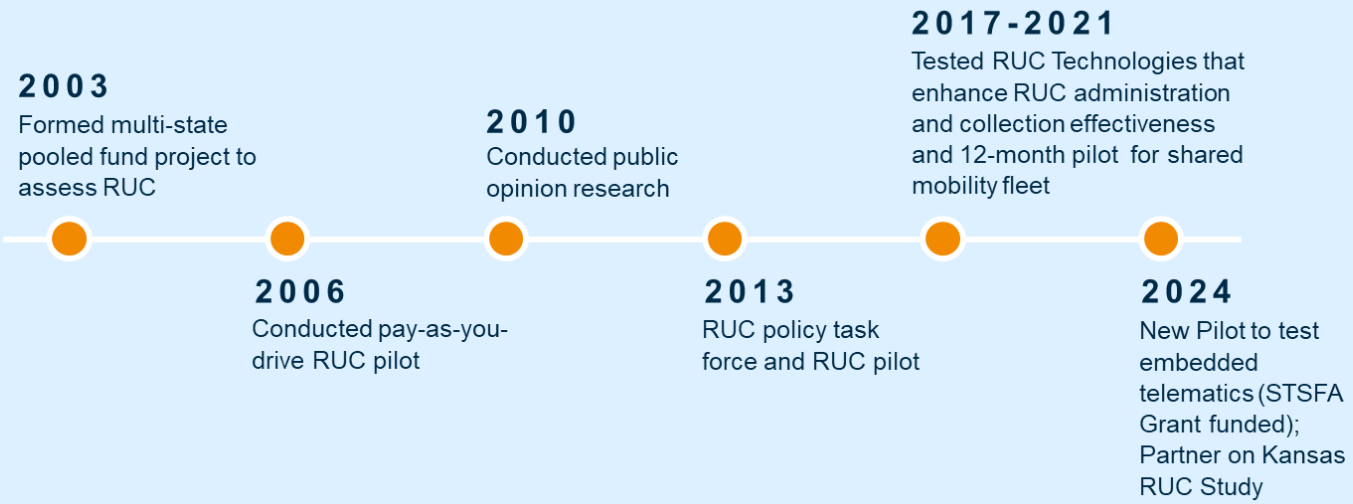


Figure 2-9: Minnesota MBUF Milestones

2.2.8. Colorado

In 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. Another 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.

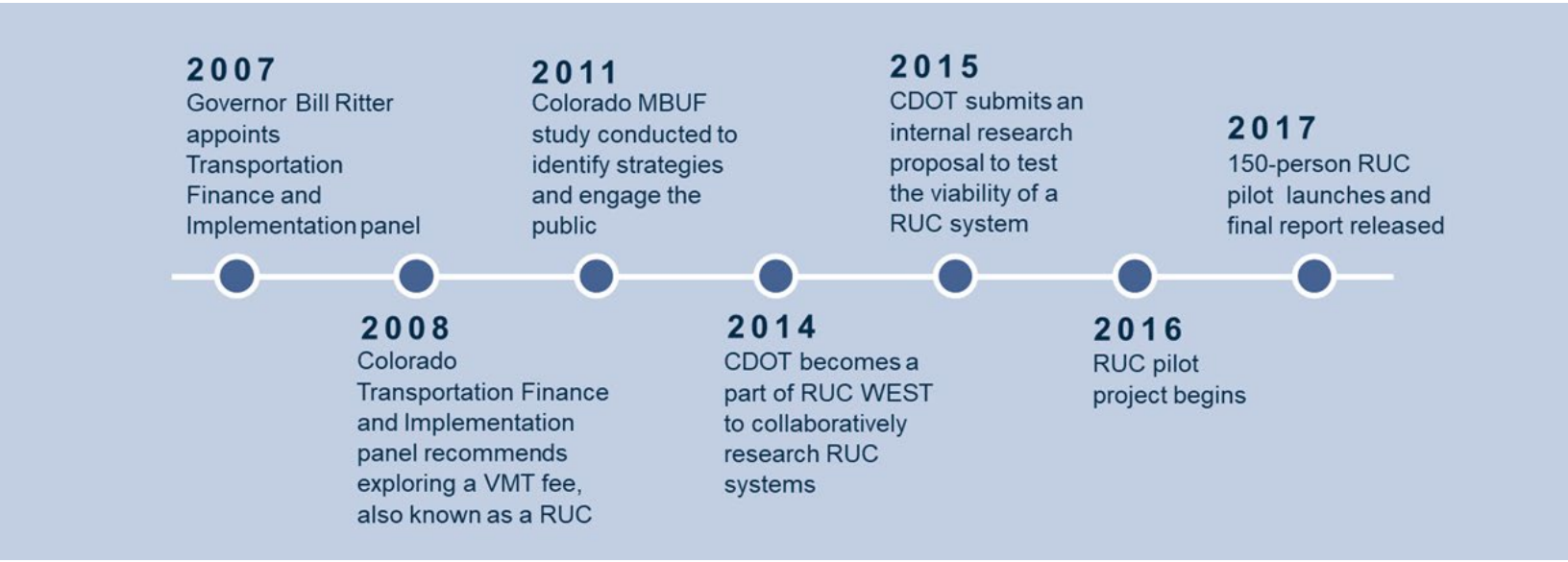


Figure 2-10: Colorado MBUF Milestones

2.2.9. Kansas

The RUC initiative in Kansas is led by the Kansas Department of Transportation (KDOT). The program has been divided into three phases. Phase 1: Outreach was carried out from September of 2021 to June 2022. The primary focus of this phase was to reach out to rural communities, agricultural and freight industries which was done by setting up advisory committees, hands-on workshops, and industry conversations. Phase 2: Design took place from July 2022 to September 2023. This phase focused on user experience research with the three focus areas to inform the design of a pilot fit to Kansans needs. Phase 3: Pilot started in September 2023 and is expected to run through December of 2024. This phase includes a pilot.

The pilot is expected to launch by February of 2024 and end in July 2024. This pilot will include at least 400 light-duty vehicles, 50 medium-duty vehicles, and 50 high-duty and other vehicles. For mileage reporting there are two options considered: (1) participants could submit mileage using either manual odometer readings or (2) using technology-based techniques like smartphone devices.

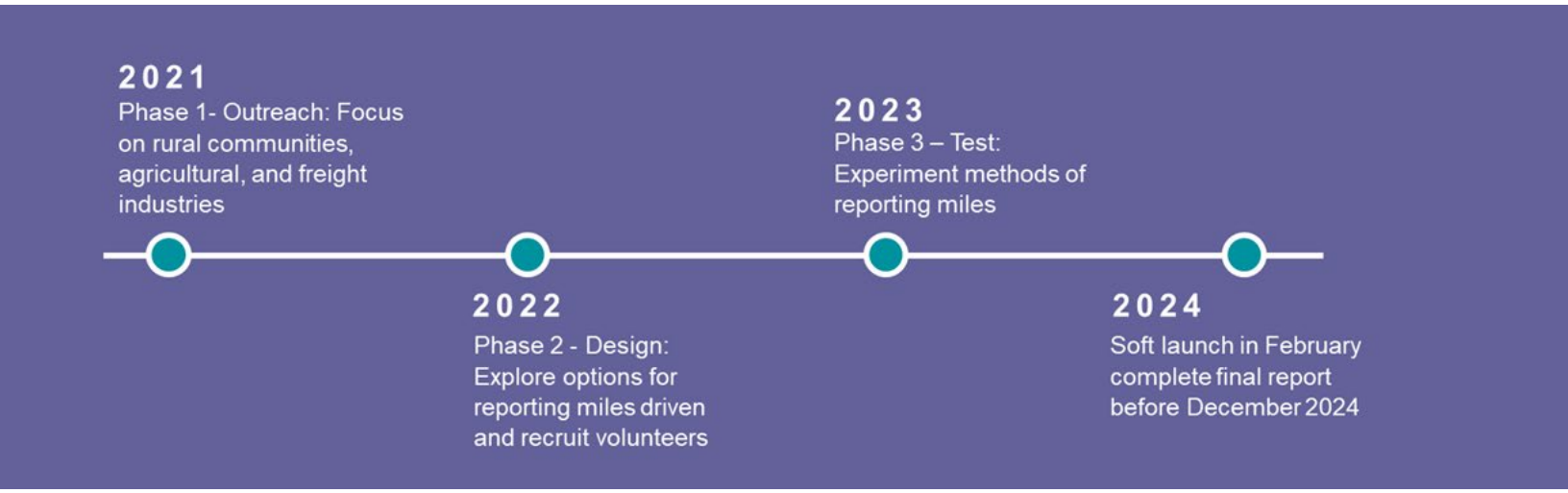


Figure 2-11: Kansas MBUF Milestones

2.2.10. 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 is a pilot to evaluate methods and technology that records the mileage of the participant's car and charge accordingly. The study includes 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 December 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 to help them compare their per mile pay in a RUC system and their pay through traditional fuel taxes. Fair Miles Oklahoma program, like many others, relies on private third-party vendors to collect mileage data and handle all processing, invoicing, and payment collection.

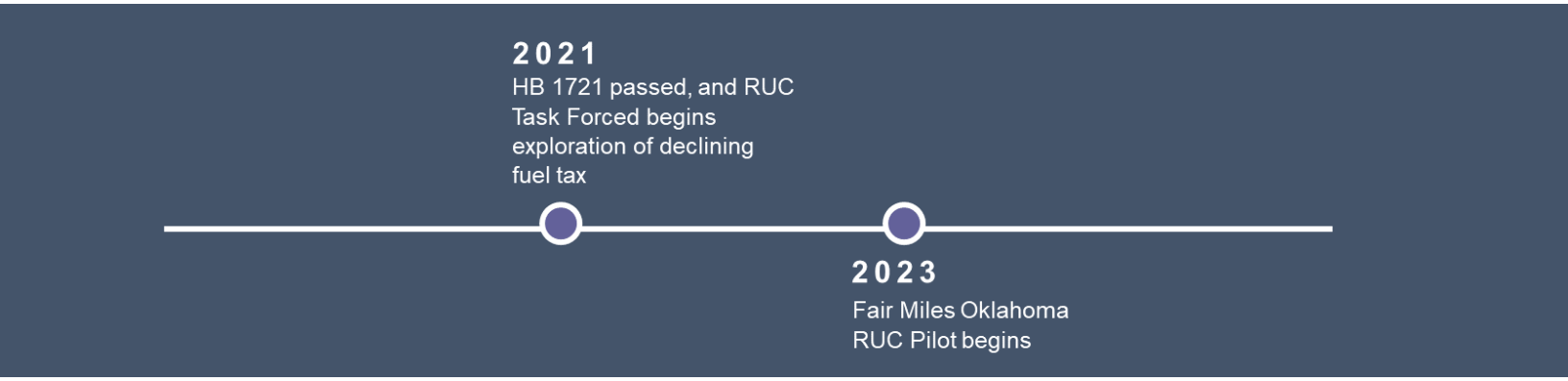


Figure 2-12: Oklahoma MBUF Milestones

2.2.11. RUC America

RUC America, formerly RUC West, is a consortium of states that pool resources to study the viability of per-mile vehicle charging. In 2022, the organization was renamed RUC America from RUC West to reflect the transition to a national entity rather than a regional consortium.

The membership consists of 19 state transportation departments, organized into three tiers based on their current level of involvement in advancing RUC in their jurisdiction:

- The first membership tier consists of states that are actively operating RUC programs, which includes Oregon and Utah and soon Hawaii (2025)
- The second tier consists of states that are conducting, or have conducted, RUC research pilot projects and includes California, Oklahoma, Colorado, Minnesota, and Washington
- The third tier includes states that are monitoring transportation trends and evaluating the RUC environment: Alaska, Arizona, Idaho, Montana, Nebraska, Nevada, New Mexico, North Dakota, South Dakota, Texas and Wyoming.

RUC America allows state departments of transportation to pool resources to study outcomes and share best practices. Since 2013, RUC America has already funded 24 projects related to the feasibility and evaluation of road usage charging, with more on the way.

Since FY 2016, RUC America's program has included the following activities funded through STSFA grants:

- Regional RUC system definition and pilot planning project ($1,500,000)
- Regional RUC (Oregon/California) pilot project ($2,590,000)
- Exploration of RUC and Automated Vehicles at both the state and in a regional interoperable system ($950,000)
- RUC and blockchain ($250,000)
- RUC summit held in June 2022 ($134,875).

2.2.12. The Eastern Transportation Coalition

The Eastern Transportation Coalition (TETC), formerly known as the I-95 Corridor Coalition, is a partnership of 18 states and the District of Columbia focused on connecting public agencies across modes of travel to increase safety and efficiency. It includes Alabama, Connecticut, Delaware, Florida, Georgia, Kentucky, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, Tennessee, Vermont and Virginia, as well as the District of Columbia.

Since 2018, MBUF legislation has been considered by nine TETC member states (Connecticut, Maine, Maryland, Massachusetts, New York, Pennsylvania, Tennessee, Virginia and Vermont). TETC has conducted 13 demonstration pilots using funds allocated by the federal STSFA grant program, including 10 passenger vehicle pilots, and three commercial vehicle pilots. These pilots have included nearly 2,700 passenger cars from 14 eastern states and the District of Columbia, as well as approximately 500 trucks reporting miles across 48 states and Canada.

Importantly, TETC's work takes the study of user fees from theory to practice showing how MBUF would function in an operating environment.

Since 2019, TETC has conducted MBUF research and pilots including the following activities:

- MBUF pilots
- MBUF rate setting analysis
- Public opinion research (surveys and focus groups)
- Public and stakeholder outreach
- Geographic and socioeconomic equity analyses
- Tolling and congestion mitigation studies
- Heavy Vehicle Pilots and motor carrier working group
- MBUF Steering Committee and Peer Exchanges.

States supporting this work include Delaware, Pennsylvania, North Carolina, New Jersey, Virginia, Maine, Georgia, and Maryland.

The TETC model allows member states to benefit from having a close perspective on each other's work, hearing about the work firsthand several times a year, and benefitting from the expertise of other states as well as sharing their own expertise with the other states. This approach provides members states greater benefit than if they pursued STSFA or other federal grants on their own.

Figure 2-13: TETC Milestones

2.2.13. MBUF Pilot Summary

Table 2-2 provides an overview of the MBUF pilot programs conducted in the United States, with key information related to each pilot.

Table 2-2: MBUF Pilot Summary

State	Pilot Name	Pilot Year	Approx No. of 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	630	OBDII with or without GPS, manual	Passenger cars and light trucks	Implementing a voluntary program that charges 1.9 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 5,000	OBDII, telematics, odometer image (for reconciliation only)	Electric vehicles	Implementing a voluntary program that charges 1.0 cent per mile in lieu of annual registration surcharges for alternative fuel vehicles

State	Pilot Name	Pilot Year	Approx No. of Vehicles	Mileage Reporting Options	Vehicle Types	Pilot Focus
	Utah Local RUC / Tolling Integration Pilot	2023	110	OBDII with GPS	Passenger cars and light trucks	Testing approaches for local governments collecting a per-mile charge for miles driven in their jurisdictions and testing integration of RUC and tolling systems
Virginia	Mileage Choice Program	2022	22,000	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)	Up to 20k EVs at launch	Odometer inspection	Electric vehicles	Implementing a program that charges 0.8 cents per mile or $50 per year for electric vehicles until 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	Pilot Year	Approx No. of 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	N/A	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 Road Charge Public/Private Roads Pilot	2022-2023	~250	Plug-in devices	Passenger cars, light trucks	Test the ability of current GPS technology to differentiate when a car drives on public versus non-public roads; engage rural and tribal communities to better understand potential impacts of a road charge system

State	Pilot Name	Pilot Year	Approx No. of Vehicles	Mileage Reporting Options	Vehicle Types	Pilot Focus
Minnesota	Pay-as-you-drive Demonstration	2006	130	Plug-in devices	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 Regional Outreach	2007-2009	N/A		N/A	Conducted public opinion research through surveys, interviews, and focus groups to assess public understanding of transportation funding and awareness of MBUF as an alternative to the motor fuel tax
	Minnesota Road Fee Test	2011-2013	500	Smartphone app and plug-in devices	Passenger cars and light trucks	Testing a per-mile charge system with a smartphone and OBU solution
	Minnesota Distance Based Fee Demonstration	2017-2021	64	In-vehicle and aftermarket telematics reporting methods	Shared mobility fleet vehicles and a connected/automated vehicle	Validate that distance-based fees can be efficiently and effectively collected using vehicle technology already in shared mobility fleet 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
Kansas	Midwest Road Usage Charge (RUC) Study	2021-2024	400	Self-reporting, odometer image, smartphone app with location, telematics	Light, medium, and heavy vehicles	Exploring the impacts of RUC implementation in the Midwest, with focus on rural and agricultural populations and intrastate commercial freight

State	Pilot Name	Pilot Year	Approx No. of Vehicles	Mileage Reporting Options	Vehicle Types	Pilot Focus
Oklahoma	Fair Miles Oklahoma	2021-2023	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
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 DE an PA	2019	889	OBDII with or without GPS	Passenger cars and light trucks	Adding more voices including the general public to the exploration of MBUG as a funding alternative to address declining fuel tax revenues
	Phase 3 – Specialized Pilots in DE, PA, NJ and Northern VA	2020-2021	575	OBDII with or without GPS	Passenger cars and light trucks	Addressing the complexity of users under an MBUF alternative.
	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

3 OVERVIEW OF U.S. STATE MBUF LEGISLATION

Overall, 44 states have taken some form of action (legislative or executive) to research, test, or enact per-mile fees or other alternative revenue mechanisms to bolster state transportation funds. **Table A-1** in Appendix A provides a description of relevant legislation (passed or considered) for each state.

3.1. States with Legislatively Authorized Collection of Per-Mile Fees

As of January 2024, four states have enacted legislation authorizing the collection of per-mile fees: Oregon (2013), Utah (2018), Virginia (2020), and Hawaii (2023). In each case, they focus on collecting RUC from fuel-efficient and/or alternative fuel vehicles. These programs are offered on a voluntary basis, where drivers opting in to pay by the mile are exempted from paying an annual registration surcharge on their vehicles. Furthermore, all but Oregon provides further financial assurance to program participants by capping their annual per-mile charges at no more than what a driver would otherwise have paid if subject to the state's special registration surcharge.

- **Oregon:** In 2001, the Oregon legislature enacted HB 3946 to study alternative transportation funding sources other than fuel taxes. This law created the Road User Fee Task Force (RUFTF) to lead policy development. The RUFTF oversaw the development of two RUC pilot projects conducted by the Oregon Department of Transportation (ODOT) in 2006 to 2007 and 2012 to 2013. In 2013, SB 810 was enacted, directing ODOT to establish the nation's first fully operational RUC program by 2015. This legislation created an open market for RUC mileage processing and account management services, and established privacy provisions to ensure legal protections on the collection and use of participating drivers' data. The new RUC program, named OReGO, went live in July 2015. In 2019, Oregon lawmakers passed HB 2881 that removed the vehicle cap (was 5,000), removed the fuel tax credit refund (stops at zero), enabled high efficiency vehicles (40+ MPG) to opt-in to OReGO in lieu of paying vehicle registration surcharges, and put minimum vehicle MPG at 20+ MPG.
- **Utah:** Originally authorized by the legislature in 2018, Utah became the second state to begin collecting RUC on January 1, 2020. Like Oregon, Utah's program is voluntary for owners of electric vehicles (EVs), allowing participants to pay a RUC of 1 cent per mile

in lieu of the state's special registration surcharge on alternative fuel vehicles (currently $130.25 annually). By opting into Utah's RUC program, per-mile charges are capped at $130.25 per year, assuring EV owners that they will not be financially worse off under the RUC program. In 2020, the legislature passed SB 150, which directed the Utah Department of Transportation (UDOT) to submit a plan for extending their RUC program to all vehicles registered in the state, with a target implementation date of no later than December 31, 2031.

- **Virginia:** The Virginia General Assembly enacted an MBUF in 2020, now known as the Mileage Choice program, that became operational on July 1, 2022. A new Highway Use Fee 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 the HUF. The annual HUF ranges from a low of approximately $6 (on a 25 MPG vehicle), to a maximum of approximately $124 (for fully electric vehicles). Similar to the programs in Oregon and Utah, drivers can opt into the Mileage Choice program to pay by the mile instead of being subject to the HUF. Drivers choosing to pay per-mile are assured that the total owed based on their miles driven are capped at the amount they otherwise would have paid under the annual flat fee. Thus, like Utah's program, there is no financial downside for drivers to participate in the Mileage Choice program, due to the maximum annual cap on mileage fees.
- **Hawaii:** In 2023, the Hawaii legislature enacted SB 1534, authorizing a small-scale RUC program for EVs beginning July 1, 2025. In that same bill, the legislature also required the Hawaii Department of Transportation (HDOT) to develop a transition plan that would incorporate all vehicles into the RUC program by 2033. The transition plan must be submitted to the legislature by December 2025. During a 36-month start-up phase (until June 30, 2028), drivers of EVs will be given a choice of paying an annual registration surcharge of $50 or enrolling in RUC. If a driver chooses to enroll in RUC, the amount they pay will be capped at $50 a year. After 2028, all EVs will pay RUC, making Hawaii the first state to introduce a mandatory RUC program.

3.2. States That Have Taken Some Form of Legislative Action Specific to Per-Mile Fees, Short of Authorizing Collection

Legislatures in Vermont (2023), Washington (2013 – 2023), Oklahoma (2021), Colorado (2021), New Mexico (2019), and California (2014, 2018) have each directed state-level research or testing, in some cases paired with state appropriations or federal grant funding. Legislative actions include direction to state agencies to begin implementation preparations for per-mile fees; conduct more in-depth analysis on policy issues of special interest (e.g., equity implications of per-mile fees); and/or conduct demonstration projects, pilot projects, or specific system testing for per-mile fees. Some of these legislatures have appropriated state funding to support these efforts. In Vermont, H.479 (2023) authorized the creation of a new MBUF for PHEVs. However, H.479 requires that the legislature further authorize and codify the MBUF into statute in 2024 to fully implement it to go live by July 1, 2025.

3.3. Executive Action (Not Requiring Legislative Direction or Authorization)

Many states are active members of multistate research organizations created to explore per-mile fees, even if their respective legislatures have not taken any action related to this revenue mechanism. The Eastern Transportation Coalition (18 member states, plus Washington D.C.) and RUC America (19 member states) are voluntary associations of state departments of transportation that pool resources to investigate issues of common interest related to mileage-based fees.

3.4. Assessment of Alternative Revenue Sources

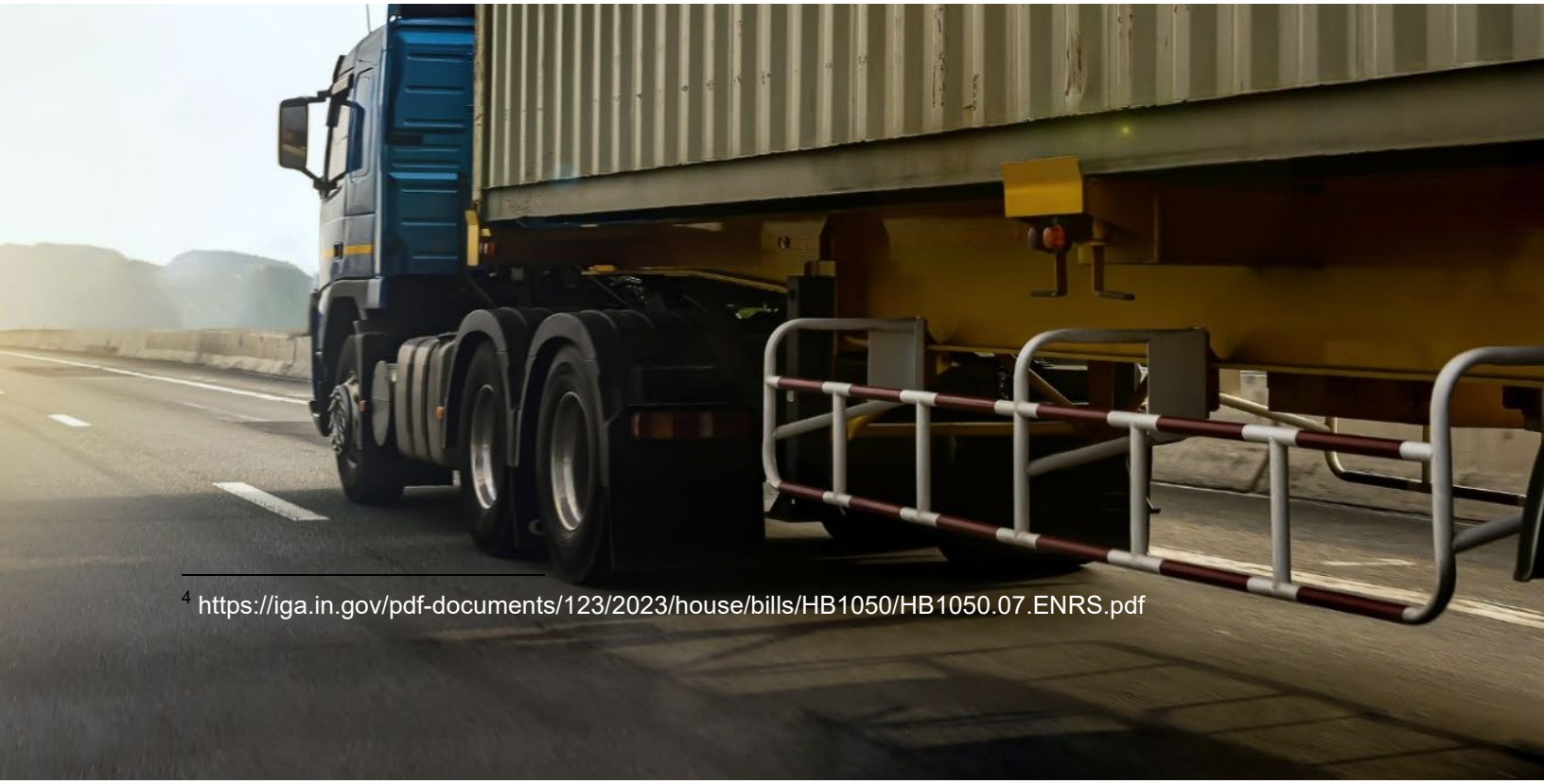
Legislatures often prompt consideration of per-mile fees as part of a broader assessment of alternative revenue sources to bolster transportation funding. In the past 10 years, several state legislatures have created special commissions or advisory groups tasked with analyzing new transportation revenue mechanisms, including Illinois (2022), Nevada (2021), Ohio (2020), Maine (2019), Wisconsin (2014), and Indiana (2014). In each instance, per-mile fees were analyzed as a potential new revenue source for the state.

4 OVERVIEW OF WEIGHT-DISTANCE FEES FOR HEAVY-DUTY VEHICLES IN THE U.S.

Weight-distance fees impose a mileage-based user fee for heavy-duty vehicles that varies based on the number of axles and/or truck weight. These fees support the construction and maintenance of roads suitable for use by heavy-duty vehicles. Since the extent of wear is determined by the weight borne by each wheel on the road, a mile traveled by a heavy-duty vehicle will result in more road wear than a mile traveled by a light-duty passenger vehicle. While measuring weight per wheel on a per trip basis is very labor and cost intensive, gross registered vehicle weight-based road usage fees approximate that calculation to provide revenue to maintain and build roads suitable for heavy-duty vehicles.

More than 20 states had a weight-distance or ton-mile tax in the middle of the 20th century, but most of them discontinued programs in favor of diesel taxation.

As of January 2024, five states collect a weight-distance tax for trucks: Oregon, New York, Kentucky, New Mexico, and Connecticut (see **Figure 4-1**). Of these programs, the only one established recently is Connecticut, which enacted the weight-distance tax in 2022, and it became effective January 1, 2023. In addition, Indiana passed a MBUF in 2023 for electric trucks that is equivalent to the fuel tax for a given fleet, and thus is not based on weight.[4]



[4] https://iga.in.gov/pdf-documents/123/2023/house/bills/HB1050/HB1050.07.ENRS.pdf

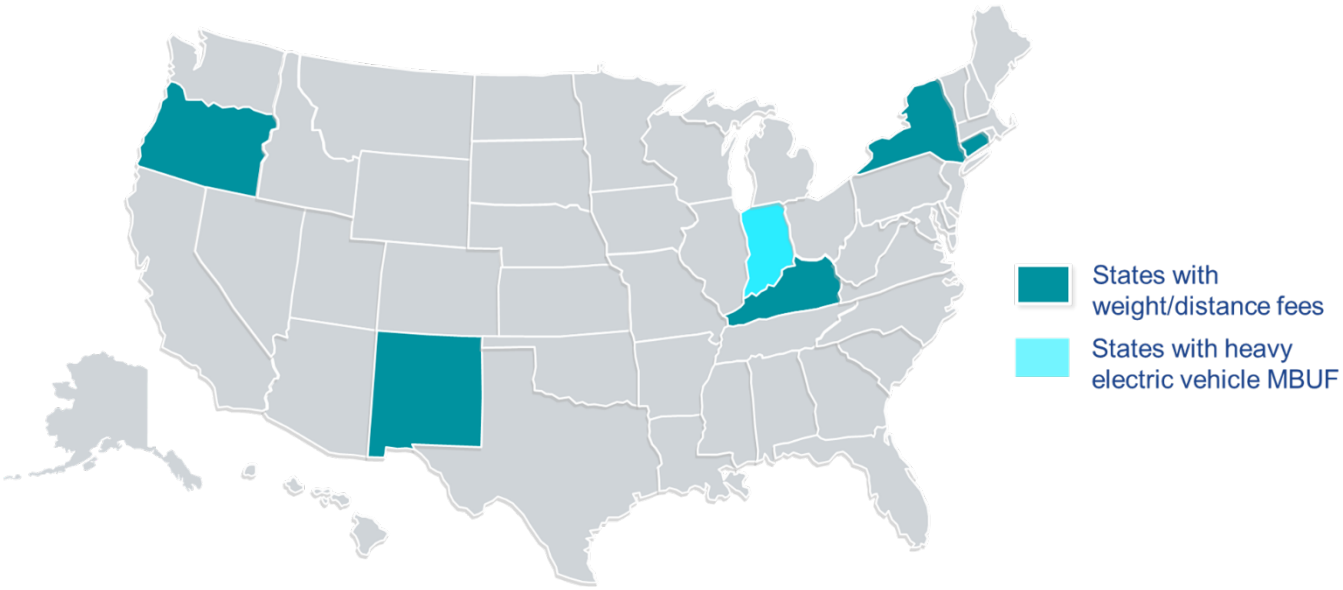


Figure 4-1: Weight-Distance Fees

The weight-mile tax is assessed to vehicles in commercial operations that meet a specific threshold in terms of weight. Classification of heavy vehicles depends upon state: Oregon and New Mexico use over 26,000 lbs. (or 26,001 lbs.) as the threshold (the typical minimum weight for heavy vehicle classification in the U.S.), while Connecticut's is 26,000 lbs. New York's threshold is 18,000 lbs. and Kentucky's 59,999 lbs.

Specifics about each state weight-distance tax program are described in **Table 4-1**

Table 4-1: State Weight-Distance Tax

	Description
Kentucky	• Flat amount per mile driven for all trucks 60,000 pounds and over. • The tax rate is 0.0285 cents per mile. • If vehicles do not make regular trips within or through Kentucky, Kentucky offers a one-time temporary weight-distance permit for purchase.
Oregon	• Oregon's weight-mile tax scales rates at 2,000 lbs. increments for vehicles between 26,001 and 80,001 lbs. (7.2 cents per mile (cpm) to 23.7 cpm). • Vehicles over 80,001 lbs. pay 18.75 – 33.33 cpm depending upon number of axles. Weight-mile tax fees are determined by declared weight and observed weight, where these fees are determined by Oregon's Highway Cost Allocation study. • Vehicles paying the weight-mileage tax in Oregon are exempt from diesel fuel taxes. In FY2021, the state collected $430 million annual revenue from the weight-distance tax.

	Description
New Mexico	• The tax is based on vehicle weight and miles traveled on New Mexico roads. • Companies must register and apply each year for a New Mexico Weight-Distance Tax Electronic Permit for each vehicle. New Mexico implements its weight-mile tax in 2,000-pound increments, each with a full haul rate and a one-way rate (i.e., empty backhaul). For example, trucks between 26,001 pounds and 28,000 pounds, with a full haul rate, are assessed a tax of $0.01101 per mile. However, trucks (also with a full haul rate) between 70,001 pounds and 80,000 pounds are assessed with a tax ranging from $0.03786 and $0.04378. (https://realfile.tax.newmexico.gov/mvd10964.pdf).

New York	• The weight-mile tax in New York is split into three distinct categories:
	  ◦ A truck, tractor, or other self-propelled vehicle, with any trailer, semi-trailer, or dolly (or any other vehicle) with a gross weight of more than 18,000 pounds.
	  ◦ A truck having an unloaded weight of greater than 8,000 pounds.
	  ◦ A tractor has an unloaded weight greater than 4,000 pounds.
	• The tax is based on miles traveled on New York highways, where toll-paid portions of the New York Thruway are excluded.
	• The tax rate is computed at a rate determined by the weight of the motor vehicle and the method chosen to report the tax: (1) Gross weight method or (2) Unloaded weight method.

Connecticut	• Beginning in 2023, Connecticut applies a vehicle mile traveled (VMT) tax for large commercial trucks as a result of HB 6688, enacted in June 2022. The per-mile fee rate increases based on the carrier's gross weight, ranging from 2.5 cents per mile for vehicles weighing 26,000-28,000 pounds (lbs.) to 17.5 cents per mile for vehicles weighing more than 80,000 lbs. The Highway Use Fee return and associated payment is required to be filed on or before the end of the month following the monthly period covered by said return.

Sources:
KY: https://drive.ky.gov/motor-carriers/Pages/KYU.aspx
OR: https://www.oregonlegislature.gov/lro/Documents/Basic%20Facts%202022.pdf
NM: https://www.mvd.newmexico.gov/commercial/commercial-vehicles/weight-distance/
NY: https://www.tax.ny.gov/pubs_and_bulls/tg_bulletins/hut/how_to_determine_tax.htm
CT: https://www.cga.ct.gov/2021/act/Pa/pdf/2021PA-00177-R00HB-06688-PA.PDF

5 INTERNATIONAL MBUF PROGRAMS

5.1. New Zealand

New Zealand has one of the oldest MBUF programs, with roots dating back to 1978, called Road User Charges (RUC). The revenue collected is dedicated to the National Land Transport Fund (NLTF). The NLTF funds new roads, improvements and maintenance, public transport, road safety education and enforcement, and walking and cycling infrastructure[5].

RUC applies to all heavy vehicles (gross vehicle mass greater than 3.5 tons) as well as all light vehicles that are not powered by petroleum, compressed natural gas (CNG), or liquefied petroleum gas (LPG). Light EVs (including plug-in hybrid EVs) are currently exempt from RUC until March 31, 2024. To promote the use of EVs, the New Zealand government agreed that the exemption would continue until light EVs made up 2% of the country's light vehicle fleet[6]. Heavy EVs (buses and trucks) are exempt from paying RUC until December 31, 2025[7].

RUC is paid in advance of travel and purchased in 1,000-kilometer (621 mile) increments. The cost of a RUC license depends on the following criteria: the vehicle type (powered or unpowered); how many axles are on the vehicle; the spacing between each axle; and how many tires are on each axle. Current RUC rates are available here: New Zealand Transport Agency.[8] An administration fee applies to purchases of all types of RUC licenses, except those bought as part of a registered telematics service provider. The administration cost is $12.44 for online transactions and $13.55 for counter-sale transactions with an agent.

Figure 5-1 depicts a RUC license label. Labels must be visible inside the windshield. Heavy vehicles and trailers must either carry their RUC license labels or display them in the windshield as light vehicles do.

[5] https://www.nzta.govt.nz/vehicles/road-user-charges/about-ruc/
[6] https://www.transport.govt.nz/assets/Uploads/2021-07-05-EV-RUC-Exemption-for-website-QAs-1.pdf
[7] Ibid.
[8] https://www.nzta.govt.nz/vehicles/road-user-charges/ruc-rates-and-transaction-fees/#RUC-rates-for-distance-licences-powered

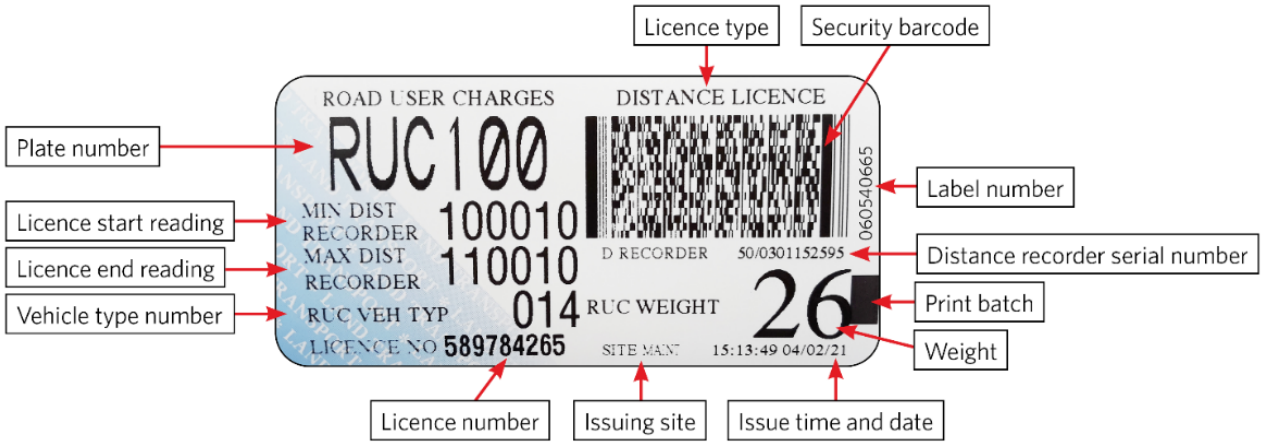


Figure 5-1: RUC License Label in New Zealand

Vehicles that travel off-road or are not suitable to travel on roads are exempt from RUC. To find out more about exempt vehicles refer to www.nzta.govt.nz/ruc-exemptions. Vehicle owners need to fill out an application to qualify for RUC exemption or may automatically be exempt if using a registered telematics service provider. A permanent exemption from RUC is available for light vehicles that are used almost exclusively off-road. Some eligible purposes are agricultural, defense, education, industrial, medical, forestry, and tourism. To maintain the permanent exemption, the following criteria must be met:

- The person who was granted the exemption still owns the vehicle, and
- The vehicle is driven at least 90 percent off-road, and
- The vehicle is only driven on public roads up to 10 kilometers from the property's boundary where it is typically kept, and
- The vehicle has the exemption sticker displayed on the windscreen at all times.

For non-permanent exemptions, New Zealand provides RUC refunds to drivers that traveled off-road, have unused distance, or if the vehicle is destroyed, exported, or its registration is cancelled. Within two years of the date the MBUF license was purchased, the driver must apply to be qualified for a refund. To claim for an off-road travel refund, the following criteria apply:

- Claims must total at least $20
- Claims can only be made after using the entire allotted mileage on the MBUF license, or after selling or deregistering a vehicle
- Suitable records of off-road mileage must be maintained and available upon request.

Additional details about RUC refunds can be found at https://www.nzta.govt.nz/vehicles/road-user-charges/ruc-refunds/.

5.2. MBUF Programs in Europe

In Europe, the use of RUC[9] by distance has existed for over 20 years (for heavy vehicles) and has rapidly expanded in that time. Today 11 countries have operational RUC systems, with another four under development as shown on **Figure 5-2**.

Most of these systems have key characteristics that are distinct from those in the United States:

- They only apply to heavy-duty vehicles, defined as vehicles with a maximum allowable gross vehicle weight of 3.5 tons (7,717 lbs.) or more[10]
- Charges only apply to use of highways and other main roads[11]
- Location measurement is mandatory to identify that distance is travelled within the country of jurisdiction and not outside, and in most cases to identify road type as well, except in Iceland (an island)
- Charges have not been introduced to replace taxation on diesel/gasoline, but rather other fees (like vehicle registration fees/access fees) levied to access the highway network.

Currently, Norway, the Netherlands, Finland, and Iceland are considering whether RUC might, in part, replace tax on motor fuels (and Norway is considering RUC replacing all tolls) including for light vehicles.[12] All other European RUC discussions focus exclusively on heavy vehicles.

Most European systems rely on GPS-based telematics On Board Units (OBUs), but some also allow for original equipment manufacturer (OEM) telematics, already built into the vehicle, to be certified to measure and report trip data. Almost all systems are interoperable across borders, enabling vehicles from one country to be charged for using the roads of another.

The primary objective of most RUC systems in Europe is to generate revenue from through traffic (especially freight traffic). RUC applies to both national and foreign registered vehicles using roads in each country. Before RUC was introduced, many European countries, particularly those without extensive toll road networks, were concerned about truck traffic not paying to use the roads in their territories. This was because fuel was typically purchased in countries where trips commenced, and in some countries no fuel would be purchased (and no fuel tax paid).

A secondary objective of RUC systems is to recover the costs of road maintenance and spending from the vehicles generating the highest proportion of those costs, to encourage greater use of other modes which are seen to be more environmentally friendly.

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[9] European Union law defines “road user charging” as any form of charging for road use based on time, rather than distance. It defines tolls are including distance-based charging. Hence, most systems that would be described as RUC in the United States are called “tolling” in Europe, and systems called RUC are in fact time-based charging systems also known as vignettes.

[10] Pilots in Norway and Belgium, and research in the Netherlands and Germany is considering light-duty vehicles.

[11] Iceland and Switzerland apply RUC on all public roads, and Denmark plans to.

[12] European Union law (which applies to most, but not all countries in Europe) mandates a minimum taxation on motor fuels, which makes it illegal to fully replace such taxes with RUC at present.

Another secondary objective is to incentivize the purchase and use of lower-emitting heavy vehicles, as almost all European RUC systems charge differentially based on vehicle emissions ratings (Euro-ratings).

Almost all European systems have open markets with competing account managers which supply on board equipment, and some have manual options, but only for individual trips by foreign vehicles.

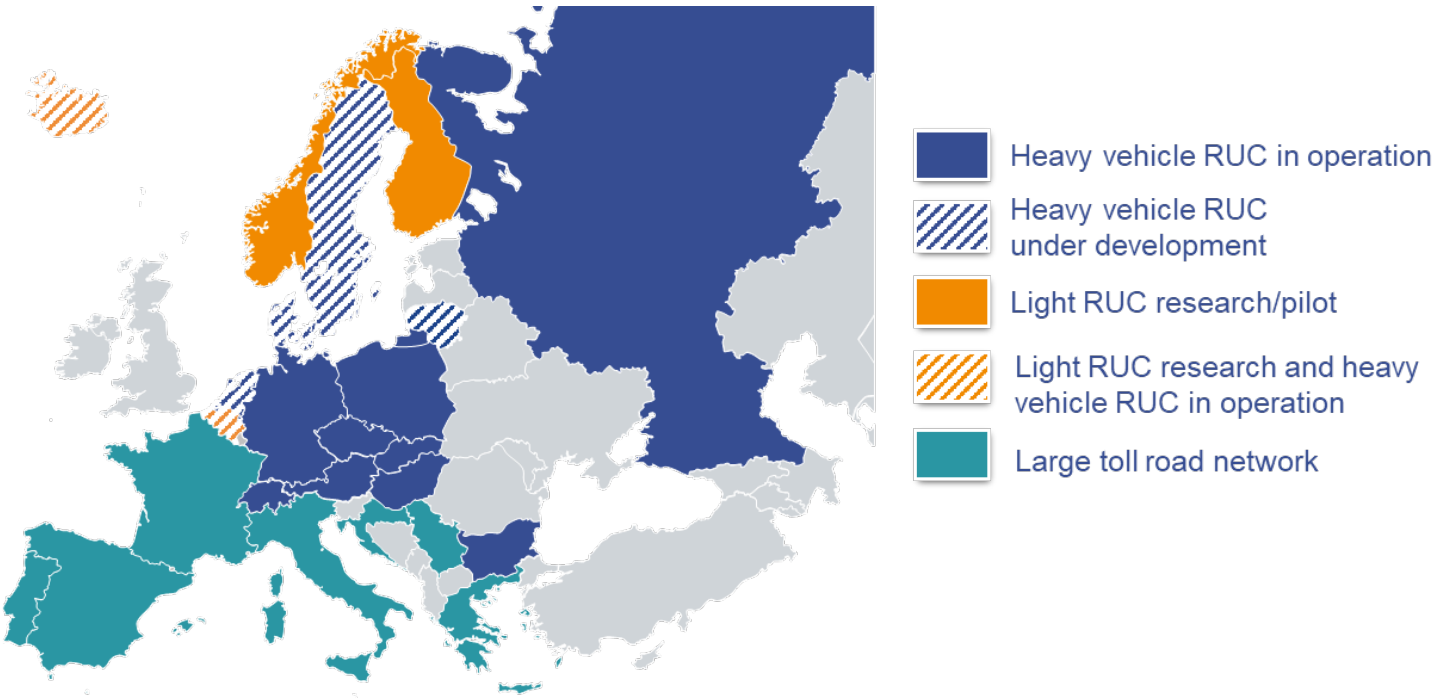


Figure 5-2: RUC Systems in Europe

6 SPECIAL VEHICLE FEES ON EVS AND HYBRIDS

This section reviews another option explored or adopted by states as an alternative to traditional fuel taxes: special vehicle registration fees on electric vehicles/hybrids and/or high fuel-efficient vehicles. To account for the lost motor fuel tax revenue from increased EV adoption, 33 states are now collecting an additional registration surcharge on electric vehicles, plug-in light vehicles, hybrid vehicles, and high fuel-efficient vehicles.

These fees are generally collected with the annual vehicle registration fee, at the time of registration/renewal. Annual fees for EVs range from $50 in South Dakota and Hawaii to $225 in Washington and more for heavier vehicles ($240 for EVs over 8,000 pounds in Michigan, $340 for EVs over 10,000 pounds in Montana).

The number of states that have implemented or considered flat fees for alternative fuel vehicles increased substantially in the last five years.

- Some states have fees for fully electric vehicles only, while others have fees for EVs, PHEVs, and regular gas hybrids. A few states also have fees for high fuel-efficient gas vehicles.
- Because hybrids, PHEVs, and high fuel-efficient gas vehicles still require some fuel to operate, the rate is generally set lower than the EV registration fee.
- Some fees are indexed to CPI or another inflation-related metric (California, Indiana, Michigan, Mississippi and Utah), while others are not.

Figure 6-1 shows the states that have adopted light EV fees or where legislation has been considered and not adopted, and the amount of the EV fee where relevant.

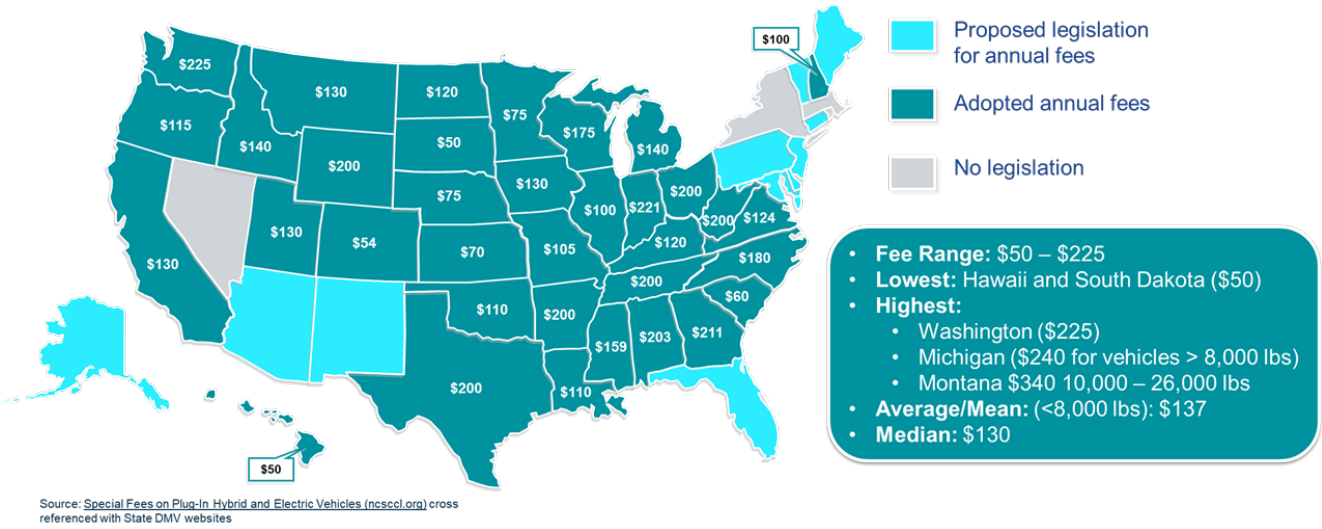


Figure 6-1: Light EV Fees in January 2024 (rounded to nearest dollar)

Revenue from these EV fees is most often directed toward a state transportation fund. However, a few states also allocate some fee revenue to support EV infrastructure or other priorities.

The main arguments in favor of and against such fees are summarized below.

Benefits

- The fee increases equity among drivers by ensuring all drivers pay to fund roadway maintenance and preservation
- The fee is easy to administer as all states already collect an annual basic vehicle registration fee for passenger vehicles
- Revenues from this fee are expected to increase significantly with the trend towards vehicle fleet electrification
- EV fees are easy to understand and transparent since the fee is paid directly by customers.

Challenges

- The flat fee does not account for use of roads and miles driven. Thus, it can be considered excessive for those driving little in a given year, and insufficient for those driving a lot in a given year.
- It can be perceived as a disincentive towards adoption cleaner vehicles
- Does not have a substantial impact on overall road funding levels due to the relatively small number of EVs currently in operation and the corresponding fact that most revenue loss today is caused by the increasing fuel efficiency of internal combustion engine vehicles.

7 KILOWATT-HOUR TAX

The Kilowatt-Hour tax is another potential alternative to traditional fuel taxes. The states that have introduced a Kilowatt-Hour tax have done so because an electricity charging fee, or a tax on electricity used to charge EV batteries, is analogous to the motor fuel tax—it is an indirect usage tax on the propulsion or fuel that approximates the level of road usage.

Seven states have enacted per-kWh fees on the charging of EVs including three states enacting such legislation in 2023 (Utah, Georgia, and Montana). While there are slight variations from state to state, most of the legislation imposes a fee at public charging stations. This means that when a driver pulls up to a public charging station to charge their vehicle, a tax is applied for every kWh of electricity used to charge the vehicle. In some states, this fee is also imposed at charging stations operated by private enterprises. The tax can be levied at several points: on the utility supplying power to the charging site (Montana), on the charging station operator (Utah), or directly on the consumer who is purchasing electricity for their EV (Iowa, Oklahoma, Kentucky).

No state has imposed a per-kWh tax on electricity used to charge a vehicle at residential buildings, which is where most charging of electric vehicles takes place. Because as much as 90% of EV charging occurs at home[13], capturing all electricity consumed by EVs through a kWh tax would require sub-metering all EV charge points at residences and businesses, with the electric utility applying and collecting the tax on those sub-metered locations. Such submetering could cost more than $1,000 per residential location, increasing the cost of collecting a kWh fee far beyond the cost of collecting an MBUF, and even such submeters may not provide an enforceable solution, as most charging occurs on typical 120-volt connections. For these reasons, there has been no attempt to apply kWh charges to residential locations, and no state has indicated any plans to do so.

[13] https://www.energy.gov/energysaver/cost-charge-electric-vehicle-explained#:~:text=Many%20consumers%20worry%20about%20access,to%20charge%20an%20electric%20car.

The following is a state-by-state summary of enacted legislation. Except for Iowa where collection started on July 1, 2023, the states that have enacted the fee have either just started or not yet begun collecting the fee and are at various stages of implementation. As a result, there is little to no data to evaluate how the fee is working.

- **Iowa** enacted HF 767 in 2019. It imposes a $0.026/kWh tax on all non-residential EV charging (i.e., public and private charging stations) beginning July 1, 2023. The law requires collection of this new fee at the point of sale and paid by licensed electric fuel dealers and users. The state is still working out how to allow apartment residents to charge at home without being subject to the tax. Under this law, there is no mechanism to enforce the reporting of the tax.
- **Oklahoma** enacted HB 2234 in 2021. It sets a $0.030/kWh tax on electricity used for EV charging at public charging stations beginning January 1, 2024. It does not apply to residential charging. The per-kWh tax is collected at point of sale and the charging station owner provides notice of the tax on an invoice to electric vehicle owners charging at the station, collects the tax and remits the tax to the state tax commission monthly. The law requires public charging stations to use a metering system capable of imposing the cost for the charging service using a unit per kWh or a comparable measurement.
- **Kentucky** enacted HB 8 in 2022. It imposes a $0.030/kWh excise tax on power used to charge EVs and an additional $0.030 surtax for stations on state land, beginning January 1, 2024. The taxes apply only to public charging stations. The tax rate will be adjusted based on changes in the National Highway Construction Cost Index (NHCCI). The revenue from these taxes will be deposited into the state's road fund.
- **Pennsylvania** law imposes a tax that applies to alternative fuels and technically applies to EV charging. It took effect in 1997 and is meant to create an equivalence to gas tax revenues, using comparable BTUs[14]. The rate is computed annually by the Department of Revenue to identify the equivalent rate as the tax applied to a gallon of gas. The 2024 rate is $.0172/kWh. Owners of EVs currently have to file monthly statements with the Pennsylvania Department of Revenue. They must also remit the alternative fuel tax on how much electricity their vehicle uses. EV owners might not be aware that they are required to file these monthly statements, which leads to those owners forgetting or not doing them at all. The tax is not really enforced.
- **Utah** enacted HB 301 in 2023. This legislation lowers the tax on motor vehicle fuel and implements a 12.5% tax on retail EV charging. The EV charging tax applies per kWh, per hour, per subscription fee, or to any combination of the three, and the revenue from this tax goes into the transportation fund. Charging station operators must provide customers with itemized receipts, breaking out the rate, volume and tax applied. The legislation took effect January 1, 2024.
- **Georgia** enacted SB 146 in 2023, which imposes a fee on electricity at public charging stations. The rate applies the 26-cent-per-gallon gas tax to 11 kWh, which computes to $0.024/kWh. Eleven kWh is the amount legislators determined is the equivalent of one gallon of gasoline. The legislation takes effect January 1, 2025.

[14] The British thermal unit (BTU or Btu) is a measure of heat energy.

- **Montana** enacted HB 55 in 2023, which imposes a fee on electricity at charging stations. The rate is $0.030/kWh. The legislation specifically excludes charging facilities at residential locations. The legislation became effective on July 1, 2023 at public charging stations installed after July 1, 2023. For legacy public charging stations, the legislation takes effect July 1, 2025.

Seven more states have introduced but did not pass per-kilowatt-hour fee legislation: Kansas, New Hampshire, Nebraska, Minnesota, Mississippi, Nevada, and Wyoming.

Figure 7-1 shows the states that have adopted per-kilowatt-hour fee legislation or where legislation has been considered but not adopted.

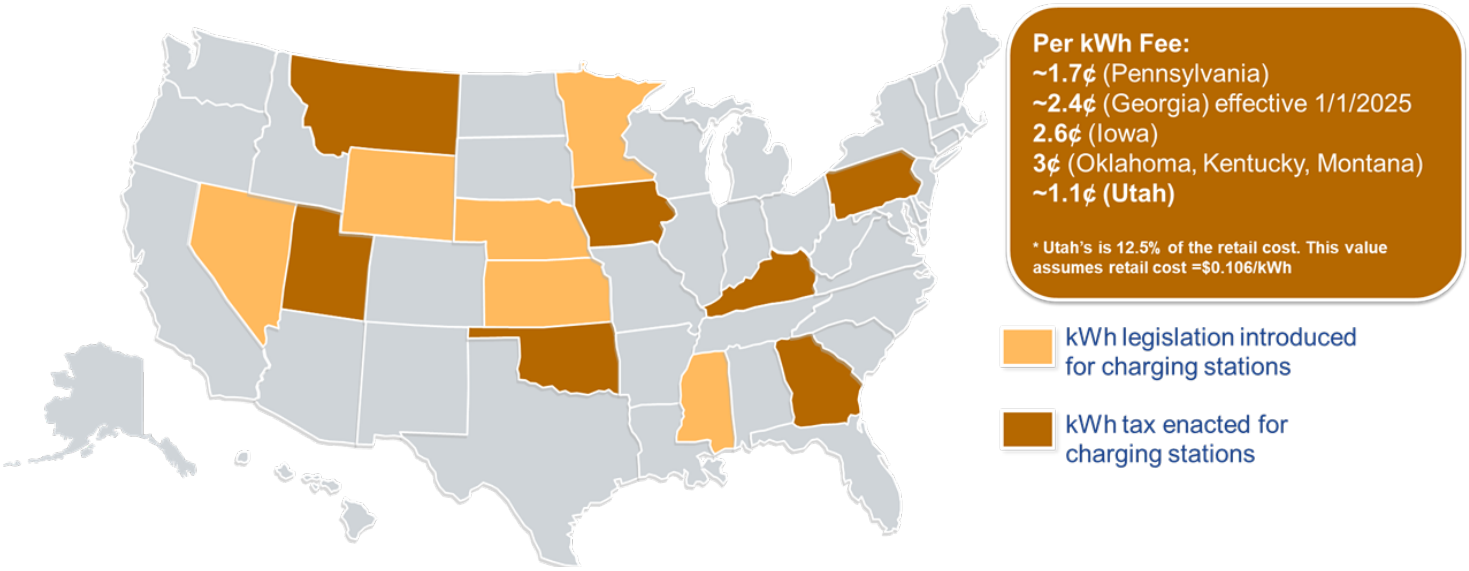


Figure 7-1: Kilowatt-Hour Tax in January 2024

In addition, the state of Vermont has been studying the impacts and feasibility of alternative road funding mechanisms, including a per-kWh charging tax that would apply to all forms of EV charging. The state estimates a tax of $0.034/kWh would be enough currently to replace forgone gas tax revenues. The study reviews challenges of implementing the tax, given the need to include residential charging to cover the lost fuel tax revenues: dedicated meters are seen as a substantial cost burden which may disincentive EV uptake; smart meters do not appear to have adequate technological capabilities; vehicle data may not be precise enough or indicate usage in state.

The main benefits and challenges associated with the kilowatt-hour tax are summarized below.

Benefits

- The kWh tax model is similar to the fuel tax drivers are familiar with where the tax is collected at the pump/charging station, so it should be easy to understand and well accepted by users
- It should be relatively easy to legislatively implement (pass a bill)
- When applied at public charging stations, it covers out-of-state vehicles.

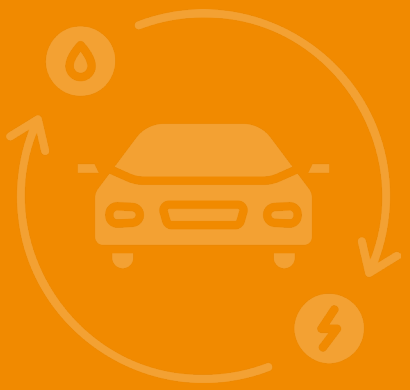
Policy Challenges

- If assessed only at public charging stations, revenue potential is low given that less than 15% of charging occurs at public charging stations; there is no indication that it would be feasible to collect from residential charging in an enforceable or cost-effective manner.
- For states with EV registration fees, EV owners see the kWh tax as a type of double taxation
- It can be perceived as a disincentive towards cleaner vehicle fleets, in the same manner as an MBUF or EV fee
- In some states, “public charging stations” may include multi-family residential locations (e.g., apartment complexes), leading to further equity challenges since the tax applies to apartment-dwelling EV owners but not single-family-unit EV owners
- If it addresses the loss of revenue due to EVs not paying the fuel tax, it does not cover the loss of revenue due to ICE vehicle engine fuel consumption improvements, which accounts for more than 90% of motor fuel tax revenue losses by states today
- May not be a transparent tax. Utilities may not present the tax to road users in a clear way, unless required to do so (in Pennsylvania, for example, they are not required to do so).

Implementation Challenges

- Cost of collection could be high. Montana has allocated 10% of all kWh fees collected for public utilities performing the collection. That 10% cost does not include any costs of state administration and accounting, bringing an expected cost of collection to 11-12%.
- Complex to implement as it would require metering all EV charging points. Public charging providers would have to update point-of-sale systems and change business models to account for taxes, depending on the method of tax.
- If residential charging is attempted, consumers may be required to pay for installation of costly metering equipment at home. Administrative costs would be high due to the need to sub-meter every charge point (in residences, businesses, etc.), and each point would require administration and accounting.

8 OTHER POTENTIAL FUNDING STRATEGIES



This section reviews a range of other potential road funding strategies that have not been previously described. These strategies include increases in motor fuel taxes, vehicle-related fees, tolling, taxes on commercial activities such as delivery fees and transportation network company fees, and other tax and fee mechanisms that can be dedicated to transportation. Each of these options is analyzed at a higher level than the options presented in the previous sections, which are currently generating more interest from state legislators. Also, the options presented in this section are generally simpler to implement and better understood.

8.1. Motor Fuel Taxes

Motor fuel taxes account for most of state's transportation revenue today. State motor fuel taxes can take various forms:

- A **flat per-gallon excise tax**, which charges users a flat excise tax for each gallon of fuel purchased.
    - Main Advantage: this is the standard revenue source, in place in all states
    - Main Disadvantage: eroding/not sustainable, does not apply equally across vehicle fleet
- An **excise tax with inflation index**, which automatically adjusts the per-gallon fuel tax according to inflation levels.
    - Main Advantage: tracks inflation
    - Main Disadvantage: does not track fuel economy, some legislators are opposed to automated trackers, does not apply equally across vehicle fleet
- An **excise tax with fuel efficiency index**, which charges a tax that is based on the state fleet's increasing average fuel efficiency.
    - Main Advantage: tracks fuel economy
    - Main Disadvantage: does not track inflation, some legislators are opposed to automated trackers, does not apply equally across vehicle fleet
- A **sales tax on fuel**, which is an alternative to indexing the motor fuel tax rates to inflation or fuel economy and could be levied on top of the existing per-gallon excise tax.
    - Main Advantage: tracks inflation

- Main Disadvantage: does not track fuel economy, revenues drop when commodity prices drop

- A **variable-rate tax based on fuel price**, which is based on fuel price that varies with the price of gasoline or diesel.
  - Main Advantage: tracks inflation
  - Main Disadvantage: does not track fuel economy, hard to understand, does not apply equally across vehicle fleet

8.2. Vehicle-Related Fees

Vehicle-related fees encompass a wide variety of revenue mechanisms generally tied to annual vehicle registration fees, such as:

- **Basic vehicle registration fees**, which are set by statute that must be amended to implement any changes.
  - Main Advantage: standard existing fee
  - Main Disadvantage: limited revenue potential for roadway usage, as bulk of revenue generally used for non-roadway purposes
- An **engine type fee**, which can be levied on electric vehicles, plug-in hybrid vehicles, and hybrid vehicles. It is covered in Section 7 of this document.
- A **vehicle value tax**, which is based on the value of a vehicle and is paid during registration.
  - Main Advantage: decent revenue potential
  - Main Disadvantage: discourages purchase of high value vehicles, encourages vehicle registration fraud (registering in a neighboring state)
- A **vehicle weight fee**, which is based on vehicle weight class, as determined by the vehicle's gross vehicle weight rating, or its maximum weight class.
  - Main Advantage: easy to understand and implement
  - Main Disadvantage: not really relevant for light vehicles—damage not proportionate to light vehicle weight.
- A **vehicle fuel efficiency fee**, like the registration fee on EVs and hybrids, covered in Section 6 of this document, or Virginia's Highway Use Fee described in Section 2.2.3.
  - Main Advantage: equitable across fuel consuming vehicles
  - Main Disadvantage: somewhat complex to understand, limited revenue potential, does not apply equally across vehicle power sources

- A **vehicle age fee**, which charges newer vehicles a higher fee than their older counterparts to account for increasing fuel efficiency with each model year.
    - Main Advantage: easy to understand, uses age as a proxy for efficiency
    - Main Disadvantage: age is not a good proxy for efficiency somewhat complex to understand, limited revenue potential, vehicle age unrelated to usage/damage

8.3. Tolling and Congestion Pricing

Tolls charge drivers for using an entire highway, bridge, or tunnel or specific lanes with toll rates that can vary by time of day. A form of tolling, congestion pricing regulates demand by applying higher prices during peak periods.

- Main Advantage: easy to understand
- Main Disadvantage: can only be applied to a limited area/roads

8.4. Indirect Usage Fees

Indirect usage fees approximate actual usage by taxing products that are incidental to the use of roadways. The indirect usage fees relate to consumable products used during vehicle operation such as tires, batteries, or electricity, and include the following:

- A **tire fee**, which is levied at the time of purchase and has administrative characteristics similar to the state sales tax.
    - Main Advantage: easy to understand
    - Main Disadvantage: hard to enforce, easy arbitrage (buy from another state); unfair to establish a high fee considering the occurrence of unforeseen tire failures or theft
- A **battery fee**, which could be levied on batteries used in light vehicles powered by internal combustion engines.
    - Main Advantage: easy to understand
    - Main Disadvantage: hard to enforce, easy arbitrage (buy from another state); unfair to establish a high fee considering the occurrence of unforeseen battery failures
- An **electric vehicle, plug-in hybrid electric vehicle, or hybrid battery capacity fee**, which could also be applied to certain types of vehicle batteries (i.e., lithium-ion batteries).
    - Main Advantage: easy to compute
    - Main Disadvantage: battery capacity is unrelated to road usage
- A **Kilowatt-Hour tax**, which is covered in Section 7 of this document.

8.5. Taxes on Commercial Activities

In addition to the weight-distance fees for heavy vehicles described in Section 4, taxes on commercial activities include:

- A **retail delivery fee**, which is charged for the delivery of goods.
    - Main Advantage: easy to compute, understand and apply
    - Main Disadvantage: relatively limited revenue potential
- A **for-hire transportation fee**, which is charged for rides provided by transportation network companies such as Uber and Lyft. These have recently been passed in many states.
    - Main Advantage: easy to compute, understand and apply
    - Main Disadvantage: relatively limited revenue potential
- A **fee on the value of trucking costs**, which would add a surcharge on goods movements as a function of the cost of moving those goods.
    - Main Advantage: have decent revenue potential
    - Main Disadvantage: indirectly related to roadway usage, opposition from trucking industry, as it may be hard to pass on to end customers.

8.6. Other Tax and Fee Mechanisms

Other taxes and fees that can be used to fund transportation include:

- A **dedication of auto sales tax**, which dedicates a portion of the state's auto sales tax collections specifically to transportation purposes.
    - Main Advantage: decent revenue potential
    - Main Disadvantage: unrelated to road usage, limited revenue potential for that reason
- A **street utility fee**, which is a surcharge on residents and businesses based on the estimated roadway use impacts, which itself is based on property type.
    - Main Advantage: significant revenue potential
    - Main Disadvantage: expensive to implement, complex and hard to assess for highways
- A **payroll tax**, which is levied on wages for transportation purposes.
    - Main Advantage: significant revenue potential

- Main Disadvantage: unrelated to road usage, could be seen as discouraging of labor-based businesses

- A **land use impact fee**, which is levied on new construction, on the basis that new residential or commercial buildings generate additional travel and therefore greater use of the road network.
  - Main Advantage: decent revenue potential
  - Main Disadvantage: generally only applies to new construction, which cannot bear the burden of road maintenance; very indirect link to usage
- **Use of General Fund** for transportation as a one-time infusion or a more permanent mechanism.
  - Main Advantage: significant revenue potential
  - Main Disadvantage: unreliable; exposes roadway funding to political concerns and whims

A APPENDIX A

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Table A-1: Summary of U.S. State MBUF Legislation

STATE	LEGISLATION STATUS	TYPE	DESCRIPTION
California	Enacted (2021)	Study Pilot	• SB1077 (2014) [later extended by SB 1328 (2018)] required the Chair of the California Transportation Commission to create a RUC Technical Advisory Committee in consultation with the Secretary of Transportation. Under these laws, the purpose of the technical advisory committee is to guide the development and evaluation of a pilot program to assess the potential for mileage-based revenue collection as an alternative to the gas tax system. These laws require the technical advisory committee to study RUC alternatives to the gas tax, gather public comment on issues and concerns related to the pilot program, and make recommendations to the Secretary of Transportation on the design of a pilot program, as specified. • SB 339 introduced in 2021 extended the operation of these provisions until January 1, 2027. The bill required the Transportation Agency, in consultation with the California Transportation Commission, to implement a pilot program to identify and evaluate issues related to the collection of revenue for a road charge program, as specified. The bill required the RUC Technical Advisory Committee to make recommendations to the Transportation Agency on the design of the pilot program, including the group of vehicles to participate. The bill required that if a group of vehicles other than state-owned vehicles is selected, that participation in the program be voluntary. The bill required the Transportation Agency to convene a state agency work group, as specified, to implement the pilot program and to design a process for collecting road charge revenue from vehicles. The bill required that participants in the program be charged a mileage-based fee, as specified, and receive a credit or a refund for fuel taxes or EV fees, as specified. The bill required that the pilot program not affect funding levels for a program or purpose supported by state fuel tax and EV fee revenues. The bill required the Transportation Agency to submit reports to the Legislature, as specified.
Colorado	Enacted study (2021)	Study	• In 2021, as part of a very comprehensive transportation legislation package, SB 21-260 (2021) required that CDOT study the feasibility of enacting a RUC program (43-1-129). This law should overrule the governor's direction not to study RUC.
Connecticut	Considered (2021); Enacted Heavy Vehicle RUC program (2021)	Program	• In 2017, Substitute SB 76 (public act 17-174) was enacted, which prohibited the Commissioner of Transportation from expending state funds for a federal study of mileage tax on motor vehicles operated on state highways. This had been precipitated by Connecticut DOT's interest in participation in the I-95 Corridor Coalition pilot, which was later cancelled. • Reversing this legislation, State of Connecticut proposed bill CT H 6080 (2021) would have permitted the Department of Transportation to study and participate in federal pilot programs regarding an MBUF on motor vehicles operated on state highways. This bill failed. • Connecticut HB 6688 (2021) was enacted and establishes a series of fees based on truck size and miles traveled that would generate about $90 million per year. Fees apply to all roads, beginning in

STATE	LEGISLATION STATUS	TYPE	DESCRIPTION
			January 2022, and range from 2.5 cents per mile for vehicles weighing 26,000 to 28,000 pounds to 17.5 cents per mile for trucks weighing more than 80,000 pounds. • Connecticut HB 6080 (2021, failed) would have permitted the Department of Transportation to study and participate in federal pilot programs regarding a MBUF on motor vehicles operated on state highways.
Hawaii	Considered (2020); Considered (2022); Enacted program (2023)	Program	• In 2020, HB 1174 (failed) would have established a state VMT for EVs. • In 2022, HI 3313 (failed) would have replaced specified amount annual vehicle registration surcharge for EVs with a capped mileage-based road user fee for EVs, required motor vehicle registration application to specify whether the type of fuel for which the vehicle is adapted is electricity, required certificates of inspection to state the odometer reading of EVs, required the Department of Transportation to plan for the deployment of a state mileage-based road user fee program by 2025. • In 2023, SB 1534 passed the Hawaii State Legislature, and was signed into law by Gov. Josh Green on July 5, 2023. This bill eliminates the $50 annual state registration surcharge for EVs beginning July 1, 2025. It establishes the option for EV drivers to pay $8 per 1,000 miles (or 0.8 cents per mile) and no more than $50 annually
Idaho	Considered (2021, 2022)	Program	• HB 361 (2021) would create an annual $300 EV registration fee. Owners of EVs could forego paying the fee if they elect to pay a per-mile charge of 2.5 per mile driven. An owner electing to pay the per-mile charge would be required to report mileage annually to the Idaho transportation department at a branch office of the department of motor vehicles. • SB 1065 (2022, failed) would have established an optional RUC program of 1-cent-per-mile effective July 1, 2024, for electric and plug-in hybrid vehicles in lieu of a fee as provided for in section 49-457, Idaho Code.
Illinois	Considered (2019)	Program	• In 2019, H 2864 would have created a per-mile RUC pilot program. Under this program, the registered owner of a motor vehicle that is approved to participate in the program would, in lieu of the taxes imposed under the Motor Fuel Tax Law, pay a per-mile RUC for metered use by the subject vehicle of the highways in the state. • Also considered but failed in 2019, an anti-RUC measure HR 77 (2019) would have forbidden the state from implementing any fees based on miles traveled.
Iowa	Considered (2020)	Pilot	• Introduced in 2020, S 2107 would have established a motor vehicle mileage tax pilot program.

STATE	LEGISLATION STATUS	TYPE	DESCRIPTION
Maine	Enacted study (2019)	Study	• In 2019, the state legislature (LD 945) established the Blue Ribbon Commission to study and recommend funding solutions for Maine's transportation system. The study topics included a voluntary vehicle miles traveled pilot program for passenger automobiles. No later than December 4, 2019, the commission was to submit a report that includes its findings and recommendations, including suggested legislation, for presentation to the Joint Standing Committee on Transportation.
Massachusetts	Considered (2019, 2021, 2022, 2023)	Study Pilot	• Introduced in 2019, H 3010 provides for the establishment of a vehicle mileage user fee task force to guide the development and evaluation of a pilot program to assess the potential for mileage-based revenue collection and other related matters. • In 2021-2022, MA S 2350 and MA H 3454 established a vehicle mileage user fee task force to guide the development and evaluation of a pilot program to assess the potential for mileage-based revenue collection for Massachusetts' roads and highways. This legislation established that the department of transportation would develop, implement, and oversee one or more statewide pilot programs. The pilot programs would include at least 1,000 volunteers across the commonwealth who are representative of drivers of trucks, passenger, and commercial vehicles. • Another Massachusetts bill (SB 2265, pending) would authorize the Commonwealth Department of Transportation (DOT) to explore the feasibility of mileage-based revenue collection. The study would also consider public acceptance, costs and payment options. • Finally, SB 2351 (pending) would establish per-mile rates for autonomous vehicles (AV). The base rate would be 2.5 cents per mile and would adjust annually based on changes in the consumer price index. Further, an additional amount could be charged for each mile driven by AVs without a passenger, weighing over 4,000 lbs. and operated between 8 a.m. and 8 p.m. within certain congestion zones designated by the state. • A similar bill was introduced in 2023 as MA H 3428.
Michigan	Considered (2019)	Program	• Introduced in 2019, H 4779 would implement the use of vehicle-miles-traveled tax system by certain commercial motor carriers who operate certain commercial vehicles within this state. • Also introduced but failed in 2019, H 4782 (2019) would have created a Fixing Michigan's Road Fund, which among many other things would have created a review committee to, among many other things, assess the adequacy of user fees and could thus theoretically have moved the state towards a RUC.
Minnesota	Considered (2019) Considered (2021)	Pilot Program	• Minnesota's Legislature has considered two pieces of legislation related to distance-based user fees (DBUFs) since 2019. HF 1146/SF 1122 (failed) would have directed MnDOT to establish a MBUF pilot. The bill outlined objectives such as identifying steps to implement an MBUF system, analyze options related to MBUF and test and evaluate data management and fee collection systems. • Legislation introduced in 2021, HF 523 (failed), would require owners of an all-electric vehicle to pay a RUC beginning July 2022. The RUC would be calculated based on the miles driven, multiplied by the

STATE	LEGISLATION STATUS	TYPE	DESCRIPTION
			excise tax rate for gasoline, divided by the vehicle's fuel economy. The bill also includes a proposed implementation fee surcharge that would be determined annually or on a less frequent basis. The bill would require the state to enter into an agreement with one or more account providers to perform RUC management. The account provider(s) would be required to share certain data regarding an enrolled vehicle owner. • RUC revenue derived from the implementation surcharge would be deposited in the vehicle services operating account for payments to account providers and for administrative costs incurred. The remaining revenue would be deposited in the highway user tax distribution fund. By Nov. 15 annually, the commissioner of public safety would have to submit an annual report to the chairs, ranking minority members and staff of the legislative committees with jurisdiction over transportation policy and finance concerning the RUC. • Companion bill MN S 1880 imposes a RUC, requires a report, and appropriates money.
Missouri	Considered (2018, 2019, 2020, 2021)	Program	• Legislation is required to implement an mpg-based registration fee structure. The Missouri General Assembly has considered five pieces of legislation over three years that would have implemented the proposed revenue mechanism supported by the Missouri DOT. However, none of these bills have been enacted. • In 2018, HB 2600 would have established a base vehicle registration fee totaling $29 for all vehicles with an Environmental Protection Agency (EPA) fuel economy under 30 mpg. Vehicles achieving an EPA fuel economy of at least 30 mpg would have paid an incremental fee per mpg, an amount set by administrative rule. This bill was referred to the House Transportation Committee but did not advance beyond that point. • In 2019, HB 500 and SB 201 would have replaced the current registration fee structure with one based on the combined city and highway mpg rating using the fuel economy label by the EPA or a rating obtained using vehicle identification numbers. • In 2020, HB 2301 and SB 906 also would have replaced the horsepower-based registration fee structure with one using mpg ratings and set annual fees based on such ratings. • In 2021, H 1006 (failed) would have established a road use fee for EVs and plug-in electric hybrid vehicles. • HB 1041 (2021) was not a RUC bill but would have created mpg-based surcharges for vehicles that get over 19 mpg starting at $25 and going up to $75 for vehicles getting over 60 mpg, as well as a PHEV fee of $112 and an EV fee of $125.

STATE	LEGISLATION STATUS	TYPE	DESCRIPTION
Nevada	Enacted study (2019, 2021)	Study Pilot	• In 2019, the Nevada legislature (AB 483) directed the state Department of Motor Vehicles to conduct a pilot program on annual vehicle miles traveled charging, as adjusted by type of vehicle and fuel system. The Nevada Odometer Reading Pilot Program focuses on annual data collection, it does not involve technology, and every motorist in the state will be required to participate. The program, will give lawmakers information on the total miles that drivers travel in the state each year, data that could be used to establish a 'miles-traveled' tax that would help fund road projects in lieu of the state's existing fuel tax. • Also, per SCR 3, the Senate directed the Legislative Commission to appoint a committee to conduct an interim study relating to the use of EVs in the State. The Interim legislative study committee was to explore alternative solutions for transportation funding, citing an increase in EVs, with a final report and recommended legislation to be submitted by February 2, 2020. • In May 2021, the Nevada legislature approved Assembly Bill 413 requiring the Nevada DOT to convene an Advisory Working Group (AWG) to study issues related to sustainable transportation funding. The AWG must prepare and submit a written report describing its activities, findings, conclusions, and recommendations to the Nevada legislature by December 31, 2022. • Enacted in 2021, S 371 revised provisions governing the pilot program that the Department of Motor Vehicles is required to conduct to gather data relating to certain motor vehicles in the State. Existing law requires the owners of certain motor vehicles in the State to report the mileage shown on the odometer of the motor vehicle and certain other information required by the Department at the time of initial registration, renewal of registration and transfer of registration, if applicable. This bill removes the requirement for such reporting for recreational vehicles.
New Hampshire	Considered (2016, 2017, 2018, 2019, 2020)	Program	• Since 2016, five notable pieces of legislation have been considered by New Hampshire's General Court to authorize a Road Usage Fee (RUF) based on a vehicle's combined fuel economy rating. However, none of the bills were subsequently enacted. • In 2016, HB 1602 (failed) would have assessed a RUF on vehicles with a fuel economy rating over 20 mpg and non-gasoline vehicles. RUF assessments ranged from $29.97 up to $149.85. The maximum assessment of $149.85 applied to vehicles rated over 50 mpg, as well as non-gasoline vehicles. • Legislation in 2017, HB 621 (failed), would have collected RUFs upon registering a vehicle rated at 22.5 mpg or more. RUF assessments ranged from $7.70 up to $77.08 for vehicles rated 51 mpg or more. For non-gasoline vehicles, the assessment would have been $123.33. • Two bills in 2018 and 2019, HB 1763 (failed) and HB 478 (failed), would have directed state DOT to create a RUF schedule for vehicles rated over 20 mpg. The maximum RUF was set at $111.

STATE	LEGISLATION STATUS	TYPE	DESCRIPTION
			• In 2020, HB 1649 (failed) stipulated mpg increment ranges of $10 for vehicles rated 20 mpg or less up to $100 for vehicles rated over 50 mpg. Additionally, non-gasoline vehicles would have been assessed $125.
New Mexico	Enacted study (2019)	Study	• In 2019, the New Mexico legislature enacted HM 77 by which the DOT was requested to actively participate in the RUC West consortium regional system definition and pilot planning project and to research options for implementing MBUF systems that would be suitable for New Mexico; and to present its recommendations, including proposed implementing legislation, to the appropriate interim legislative committees by November 1, 2019.
New York	Considered (2015-2016; 2017-2018; 2019-2020, 2021)	Study	• Introduced in 2021, Assembly Bill 4094 (failed) would have created a RUC advisory committee and implemented a pilot program to identify and evaluate issues related to the potential implementation of an RUC program in New York by January 1, 2024. Earlier versions of this bill were introduced in earlier legislative sessions by the same Assembly Member (2015-2016: A9848; 2017-2018: A670; 2019-2020: A2542).
Oklahoma	Enacted study and pay at charging station (2021)	Study Program	• Enacted in 2021, H 1712 creates the Oklahoma Road User Charge Program; creates the Road User Charge Task Force; provides for task force representation from certain groups; provides for duties of task force; requires submission of findings and recommendations to Legislature by certain date; authorizes the Oklahoma Tax Commission to collect certain fees and charges; and requires fees collected to be used for certain purposes. • Also enacted in 2021, H 2234 creates a 3 cent per kWh surcharge to charge an EV at a public for-profit charging station. This is not a RUC per se, because it is not based on the number of miles traveled. Rather, it is a excise fee for electricity used to charge EVs at public charging stations.

STATE	LEGISLATION STATUS	TYPE	DESCRIPTION
Oregon	Enacted program (2013): Considered (2017); Updated (2019); Considered (2021, 2023)	Program	• In 2001, the legislature enacted a law (HB 3946) to study alternative transportation funding sources other than fuel taxes. • The RUFTF oversaw the development of two RUC pilot projects conducted by the Oregon Department of Transportation (ODOT) in 2006 and 2012. • In 2013, the legislature passed, and the governor signed SB 810, directing ODOT to establish the nation's first fully operational RUC program by 2015. This legislation created an open market for RUC account managers, and established privacy provisions in law to assure user privacy. The new RUC program, named OReGO, went live in July 2015. • In 2017, Oregon lawmakers attempted to modify the RUC program with HB 2464, by changing eligibility requirements to participate; however, this bill did not pass. • In 2019, Oregon lawmakers (HB 2881) modified eligibility and other requirements to enroll in their voluntary RUC program, known as OReGO, by exempting vehicles achieving at least 40 mpg from an additional registration surcharge of $33 and by exempting EVs from a registration surcharge of $110 if they enroll in OReGO. The legislature also increased the minimum fuel economy that new vehicles participating in OReGO must achieve, from 17 mpg to 20 mpg. OReGO's enrollment cap was also removed, and the per-mile rate charged to participants was adjusted to 5% of the per-gallon license tax. Currently, the per-mile rate is set at 1.8 cents per mile, according to OReGO. • In 2021, H 2342 (failed) would have imposed a mandatory per-mile RUC for registered owners and lessees of passenger vehicles of model year 2027 or later that have rating of 30 Miles per gallon or greater, beginning on a specified date. • In 2023, HB 2397 (failed) would have imposed a mandatory per-mile RUC for registered owners and lessees of passenger vehicles of model year 2028 or later that have rating of 30 miles per gallon or greater, beginning July 1, 2027, and then of passenger vehicles of model year 2036 or later that have rating of 20 miles per gallon or greater, beginning July 1, 2035; repealed voluntary per-mile RUC on July 1, 2030; allowed annual fee in lieu of mandatory per-mile RUC.
Tennessee	Considered (2021)	Study	• In 2021, Tennessee's Legislature considered a bill (HB 1507, pending) that would establish an infrastructure bank and task it with exploring sustainable financing for state infrastructure projects including the use of RUC, such as vehicle miles traveled, for highway, road and bridge projects.
Texas	Considered (2023)	Pilot	• In 2023, HB 3418 (failed) would have implemented a statewide pilot program to assess a user fee on owners of motor vehicles that is based on the number of miles traveled on public highways in this state by those vehicles.

STATE	LEGISLATION STATUS	TYPE	DESCRIPTION
Utah	Enacted program (2018, updated 2019, 2020, 2021 and 2022)	Program	• SB 136 (2018) and SB 72 (2019) directed UDOT to implement a RUC program for alternative fuel vehicles by January 1, 2020. Participation is voluntary and eligible car owners must opt-in. By doing so, they agree to pay a 1.5-cent-per-mile charge in lieu of an alternative fuel vehicle registration fee of $90 in 2020, which rose to $120 beginning in 2021. • SB 150 (2020) added a requirement for UDOT to submit a written plan to enroll all vehicles registered in the state in the RUC program by December 31, 2031. It also requires UDOT to submit annual reports about the status of the program to a legislative committee. • Introduced but failed in 2021, HB209 would have defined “alternative fuel vehicle” for purposes of the RUC program to include EVs, plug-in hybrid EVs and vehicles powered exclusively by a fuel other than motor fuel, diesel fuel, natural gas or propane. • Enacted in 2021, SB 82 creates the Road Usage Charge Program Special Revenue Fund, defines sources of revenue to be deposited into the Road Usage Charge Program Special Revenue Fund, and defines allowed uses for revenue in the Road Usage Charge Program Special Revenue Fund. • Enacted in 2022, HB 186 modifies eligibility for the RUC program; amends the Department of Transportation's rulemaking authority related to the program; sets the RUC rate and RUC cap for vehicles enrolled in the program; beginning January 1, 2032, allows the Transportation Commission to set the RUC rate for vehicles enrolled in the program.
Vermont	Considered (2021); Enacted study (2023)	Program	• Introduced in 2021, H123 (failed) would have imposed a vehicle miles traveled tax for plug-in EVs. Every owner of a plug-in EV would remit the tax at the time of filing their State income tax return or, if State income tax is not assessed, through a separate filing. The Commissioner, in consultation with the Commissioner of Taxes, would establish a per-mile rate for battery EVs and a different per-mile rate for plug-in hybrid EVs. The total tax assessment would be the established per-mile rate multiplied by the taxable miles traveled. The vehicle miles traveled tax would take effect on January 1, 2023. The legislature adjourned without action, but the Vermont DOT hired a consultant to study possible per-mile charging in the state. • Enacted in 2023, H479 indicates the intent to start collecting a MBUF from all battery EVs registered in Vermont starting on July 1, 2025. According to this legislation, the Secretary of Transportation and the Commissioner of Motor Vehicles would file a written report not later than January 31, 2024 with the House and Senate Committees on Transportation, the House Committee on Ways and Means, and the Senate Committee on Finance that provides the following: (1) a comprehensive implementation plan to commence collecting, on July 1, 2025, a MBUF for miles driven by a BEV registered in Vermont; (2) a recommendation on what language should be codified in statute to enable the State to commence collecting, on July 1, 2025, a MBUF for miles driven by a BEV registered in Vermont, which will include a recommendation for the MBUF rate.

STATE	LEGISLATION STATUS	TYPE	DESCRIPTION
Virginia	Enacted program (2020, 2022)	Program	• The Virginia General Assembly established (SB 890) a MBUF program in 2020, to become operational by July 1, 2022. Eligible participants include owners of any vehicle subject to the new "Highway Use Fee" created by the bill (any vehicle getting more than 25 mpg or fully electric vehicles). Drivers of such vehicles may enroll in the MBUF and not pay the newly created annual highway use fee, which is proportionate to how fuel efficient the vehicle is. The fee starts at $4 on vehicles getting 25 mpg and ranges up to $90 for fully electric vehicles at the start of the program in 2022. Total MBUF fees are capped at the flat fee owed by the vehicle owners. Per mile rates for each vehicle are set so that the vehicle will have paid the full flat fee at the average number of miles driven in the state (approximately 11,000 miles). Annual flat fees are indexed and may be updated. • In 2022, SB 237 established a MBUF program. The program will be a voluntary program that allows owners of vehicles subject to the highway use fee pursuant to Section 46.2-772 to pay a mileage-based fee in lieu of the highway use fee.
Washington	Enacted study and pilot (2012, 2018) Considered program (2021, 2022, 2023)	Study Pilot Program	• In 2012, Washington's Legislature enacted HB 2190 to study the feasibility of transitioning from the gas tax to a RUC system. The law directed WSTC to convene a steering committee to provide direction and guidance on road user assessments and transitioning to an RUC system. • In 2014, the legislature enacted SB 6001 to develop a work plan and concept of operations for RUC pilot, and also directed WSTC to conduct a detailed financial analysis and to seek federal funding for a statewide pilot project. • In 2018, SB 6106 (enacted) required periodic reporting on the RUC pilot to the RUC steering committee. HB 1160 of 2019 (enacted) required a final report on the RUC pilot by January 2020. • Introduced in 2021, SB 5444 and HB 1287 would have implemented a per-mile charge on electric and hybrid vehicles. No action was taken. • Introduced in 2021, SJR 8207 would have amended the State Constitution so that state revenue collected from a RUC, vehicle miles traveled fee, or other similar type of comparable charge, must be used exclusively for highway purposes. • Introduced in 2022, HB 2026 (failed) would have implemented a per-mile charge on vehicles. The bill establishes an early adoption program that requires the registered owner of an enrolled EV to pay a per-mile fee of 2.5 cents per mile upon vehicle registration, beginning July 1, 2025, with participation mandatory for new EVs and voluntary for older EVs. The bill allows certain hybrid vehicles, and light vehicles to voluntarily participate in the RUC program upon vehicle registration. • Introduced in 2023, HB 1832 directs the Department of Licensing (DOL) to establish a voluntary RUC program by July 1, 2025, for light-duty vehicles. The bill also sets a target date for implementing a mandatory RUC program by January 1, 2030. The RUC rate is set at 2.5 cents per mile, which is

STATE	LEGISLATION STATUS	TYPE	DESCRIPTION
			equivalent to what the average vehicle pays today in gas taxes. The revenue will be deposited in a new "Road Usage Charge Account" and dedicated to transportation system preservation and maintenance. HB 1832 waives the current $225.00 EV fee and the $75.00 hybrid fee for vehicle owners who opt into the program, and it caps their total RUC charge at the amount they would have paid for the current combined fees in RCW 46.17.323 and 46.17.324. Participants receive credit toward their annual RUC for any gas taxes paid throughout the year as a reduction to their overall fee. To track and account for vehicle miles traveled, the bill requires DOL to offer vehicle owners the option to submit periodic odometer readings.
Wyoming	Considered (2020)	Program	• Introduced in 2020, HB 37 (failed) would have established a per-mile RUC. It would have imposed a per-mile tax on all vehicles traveling on public roads ranging from 1.3 cents per mile for motorcycles and multipurpose vehicle such as all-terrain vehicles to 14.3 cents per mile for semi-trucks with multiple axels. The tax for passenger cars would be almost 2.2 cents per mile, while the fee for larger vehicles such as pickups and vans would be almost 2.9 cents per mile. Per-mile charges would vary by vehicle class only, not weight or emissions. The bill also would have established penalties for noncompliance. It called for both public and private mileage reporting solutions, but limited potential fees paid to private account managers.