



January 2022

# HIGHWAY TRUST FUND

Federal Highway  
Administration Should  
Develop and Apply  
Criteria to Assess  
How Pilot Projects  
Could Inform  
Expanded Use of  
Mileage Fee Systems

# GAO Highlights

Highlights of [GAO-22-104299](#), a report to congressional committees

## Why GAO Did This Study

Since 2007, GAO has reported that Congress needs to pass a long-term, sustainable funding solution for maintaining the nation's highways. Existing revenue sources—including fuel taxes—for surface transportation have eroded, contributing to the transfer of over \$270 billion in general revenues to the Highway Trust Fund between 2008 and 2021.

In 2015, DOT was required by statute to establish the STSFA program to provide grants to states to explore the feasibility of user-based alternative funding mechanisms, such as mileage fee systems, where drivers would pay fees based on their miles driven. This report examines how states have used STSFA funding and assesses the extent to which FHWA followed leading practices when designing and evaluating the STSFA program, among other objectives.

GAO reviewed relevant statutes and reports on STSFA-funded activities; surveyed 50 states and the District of Columbia; reviewed FHWA annual reports and evaluations of the state pilots; compared FHWA actions with GAO's leading practices for designing and evaluating pilot programs; and interviewed FHWA officials and all states awarded STSFA grants from fiscal years 2016 through 2019.

## What GAO Recommends

GAO recommends that FHWA develop and apply criteria to assess the scalability of the STSFA pilot projects.

DOT concurred with the recommendation.

View [GAO-22-104299](#). For more information, contact Elizabeth Repko at (202) 512-2834 or [RepkoE@gao.gov](mailto:RepkoE@gao.gov).

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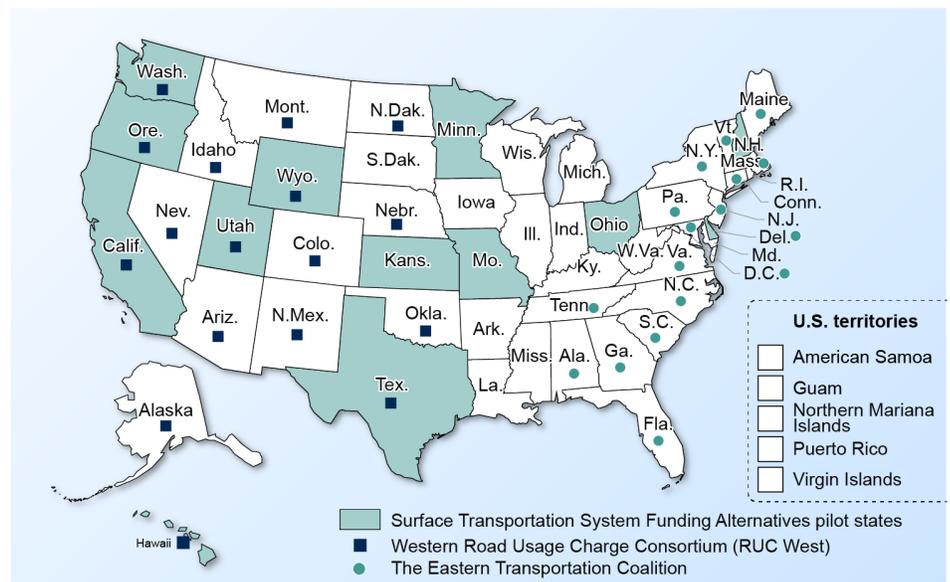
# HIGHWAY TRUST FUND

## Federal Highway Administration Should Develop and Apply Criteria to Assess How Pilot Projects Could Inform Expanded Use of Mileage Fee Systems

### What GAO Found

Since fiscal year 2016, 13 states, including two multistate coalitions, have used Surface Transportation System Funding Alternatives (STSFA) funds to pilot and research user-based funding alternatives to the fuel tax. (See figure.) These projects are at various stages of development and implementation. Most of these states explored mileage fee systems, which track miles driven, with the goal of ensuring that drivers pay for their use of the roads. For example, California used STSFA funds to test various technologies to record and report miles driven as part of its mileage fee system pilot. Driver participation in STSFA projects is voluntary and to date has ranged from about 100 to 5,000 participants per pilot.

**States That Received Surface Transportation System Funding Alternatives Funds and States Participating in Multistate Coalitions**



Source: GAO analysis of Federal Highway Administration Data and Map Resources. | GAO-22-104299

The Federal Highway Administration (FHWA), within the Department of Transportation (DOT), followed most leading practices—including establishing clear, measurable objectives and developing a methodology to assess the pilots—when designing and evaluating the STSFA program. However, FHWA evaluations did not include scalability criteria—as suggested by leading practices—to identify how, if at all, an individual state's pilot approaches could inform national policy. Such criteria could include examining whether the use of technologies to track and report mileage deployed in various pilot projects would be feasible or cost-effective in a national system. Without scalability criteria, FHWA will not be able to assess the potential of mileage fee systems beyond the pilot states nor provide information or recommendations, if any, for congressional consideration of these approaches to address the current insolvency of the Highway Trust Fund—an issue GAO has had on its high-risk list for over a decade.

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## Abbreviations

DOT	Department of Transportation
FAST Act	Fixing America's Surface Transportation Act of 2015
FHWA	Federal Highway Administration
IIJA	Infrastructure Investment and Jobs Act
mpg	miles per gallon
RUC West	Western Road Usage Charge Consortium
state DOT	state department of transportation
STSFA	Surface Transportation System Funding Alternatives
VMT	vehicle miles traveled

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January 10, 2022

### Congressional Committees

The nation's surface transportation system—which includes highways, transit, maritime ports, and rail that move both people and freight—is critical to the economy and affects the daily lives of most Americans. However, this system faces growing strain, as the gap between federal highway spending and revenue sources that support surface transportation widens. Revenues from motor fuel and truck-related taxes that support the Highway Trust Fund for highways and transit—the major source of federal surface transportation funding—have not been sufficient to pay the federal share of highway and transit projects costs for over a decade. Since 2007, we have included funding for surface transportation on our High Risk List, noting that Congress needs to pass a long-term, sustainable funding solution for maintaining the nation's highways.<sup>1</sup> In the absence of such a solution, Congress transferred over \$270 billion in general revenues from 2008 through 2021 to the Highway Trust Fund to maintain spending levels for highway and transit projects and cover revenue shortfalls. This funding approach effectively ends the long-standing principle of “users pay” in highway finance, breaking the link between the taxes highway users paid and the benefits those users received.

To supplement declining revenues from fuel taxes, some experts and stakeholders have proposed charging drivers a mileage fee, which would be based on their miles driven. In 2012, we reviewed issues surrounding mileage fees, including their potential to provide revenue for the Highway Trust Fund.<sup>2</sup> We recommended that Congress consider establishing a pilot program to evaluate the viability, costs, and benefits of mileage fee systems for certain vehicles, such as electric vehicles, to help ensure that fees would cover the costs of these vehicles' use of the nation's roads and bridges. Consistent with our recommendation, in 2015, the Fixing

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<sup>1</sup>GAO, *High-Risk Series: Dedicated Leadership Needed to Address Limited Progress in Most High-Risk Areas*, [GAO-21-119SP](#) (Washington, D.C.: March 2021). Our High Risk List contains a listing of programs and operations that are 'high risk' due to their vulnerabilities to fraud, waste, abuse, and mismanagement, or that need transformation. The list is issued every 2 years at the start of each new session of Congress.

<sup>2</sup>GAO, *Highway Trust Fund: Pilot Program Could Help Determine the Viability of Mileage Fees for Certain Vehicles*, [GAO-13-77](#) (Washington, D.C.: Dec. 13, 2012).

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America's Surface Transportation Act (FAST Act)—required the Department of Transportation (DOT) to establish the Surface Transportation System Funding Alternatives (STSFA) program.<sup>3</sup> The STSFA program, administered by the Federal Highway Administration (FHWA) within DOT, provided grants to states to demonstrate user-based alternative revenue mechanisms, such as mileage fee systems, to maintain the long-term solvency of the Highway Trust Fund.<sup>4</sup>

Due to our longstanding concern about the erosion of the traditional funding sources for the Highway Trust Fund, the lack of a long-term sustainable plan for funding surface transportation, and congressional interest in this topic, we reviewed mileage fee systems under the Comptroller General's authority.<sup>5</sup> Specifically, this report examines mileage fee systems including (1) how states used STSFA funding; (2) state-reported challenges with mileage fee systems and state actions to address them; and (3) the extent to which FHWA followed leading practices when designing and evaluating the STSFA pilot program.

To identify how states used STSFA funding, we reviewed state annual reports for fiscal years 2017 through 2020, FHWA individual evaluation reports of state pilot projects, a report that covered the eight pilot projects funded in fiscal year 2016, FHWA's notices of funding, and FHWA grant approvals, along with other STSFA documents that outlined the purpose of the pilot projects and the activities carried out with the STSFA funds. We also conducted semi-structured interviews with officials from 10 state departments of transportation (state DOTs) and two multistate coalitions.<sup>6</sup>

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<sup>3</sup>Pub. L. No. 114-94, § 6020, 129 Stat. 1312, 1582 (2015) (repealed 2021). Prior to the issuance of this report, the Infrastructure Investment and Jobs Act (IIJA) repealed this provision in the FAST Act in November 2021, and required DOT to establish two new, related pilot programs. Pub. L. No. 117 58, §§ 13001, 13002, 135 Stat. 429, 622-628 (2021) (codified at 23 U.S.C. § 503 note)

<sup>4</sup>These user-based alternative revenue mechanisms for generating revenue can take several forms, including vehicle registration fees and mileage based-user fees. User-based revenue mechanism that charge vehicle owners based on the number of miles they drive—that is, by their vehicle miles traveled—are commonly known as vehicle miles traveled fees, road usage charges, or mileage-based user fees. All user-based alternative revenue mechanisms are referred to as "mileage fee systems" in this report.

<sup>5</sup>The Comptroller General is authorized by statute to initiate the evaluation of a program that the federal government carries out under existing law. 31 U.S.C. § 717.

<sup>6</sup>The Washington funding was awarded to Washington DOT, but all STSFA pilot development related activities have been performed by the Washington State Transportation Commission. We interviewed commission officials for this report.

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The selected state DOTs and coalitions reflect all of the awardees of STSFA grant funds from fiscal years 2016 through 2019.<sup>7</sup>

To identify challenges related to mileage fee systems and state actions to address them, we conducted semi-structured interviews with transportation officials from the selected ten states and two coalitions. We obtained their perspectives on the challenges of researching and developing mileage fee systems, and to learn how, if at all, their pilot projects sought to address these challenges, and the lessons learned from the project activities. We also reviewed reports published by these awardees on their pilot projects to analyze the actions states took to address the identified challenges.

In addition, to determine the extent to which FHWA followed leading practices when designing and evaluating its STSFA pilot program, we reviewed provisions of the FAST Act related to the STSFA program, FHWA reports and documentation that outlined the objectives of the STSFA program and FHWA's methodology and plans to evaluate and report on the pilot projects. We compared FHWA actions to our previous work that identified leading practices for pilot programs.<sup>8</sup> These five leading practices we identified for designing a well-developed and documented pilot program call for:

1. establishing well-defined, appropriate, clear, and measurable program objectives;
2. developing an assessment methodology and data gathering strategy;
3. ensuring the scalability of pilot design (e.g. how well the lessons learned from the pilots can be applied to broader policy);
4. developing a plan to evaluate pilot results; and

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<sup>7</sup>FHWA awarded fiscal year 2017 STSFA funds to Colorado to conduct a pilot project, but according to FHWA officials, the state returned the funds to FHWA in 2020. We interviewed Colorado officials and included their perspectives of mileage fee challenges in our examples because the state was awarded STSFA funds and Colorado conducted a pilot project with its own state funds around the time that the STSFA program was established. FHWA also awarded fiscal year 2020 funds in March 2021 to three states that had not received funding in prior years (Kansas, Ohio, and Texas). We did not interview state DOT officials in these three states because our audit work commenced before these states initially received funding from the STSFA program.

<sup>8</sup>GAO, *Data Act: Section 5 Pilot Design Issues Need to Be Addressed to Meet Goal of Reducing Recipient Reporting Burden*, [GAO-16-438](#) (Washington, D.C.: Apr. 19, 2016).

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5. ensuring appropriate two-way stakeholder communication.

We also interviewed FHWA officials on the steps taken to design, implement, and evaluate the STSFA program.

In addition, related to the objectives, we distributed a survey to state DOTs from each of the 50 states and the District of Columbia to obtain information on actions they have taken to explore mileage fee systems and their views of the potential challenges of these systems. We obtained a 100 percent response rate on the survey. We compared the survey results to those from our 2012 mileage fee survey to see if and, if so, how challenges and actions to address the challenges had changed.<sup>9</sup> More information on the survey and the results can be found in appendix I. Also, to characterize state DOTs' experiences, for example, with mileage fee systems, we defined modifiers (e.g. "some" state DOTs) to quantify results from our interviews with the 10 state DOTs and two multistate coalitions as follows:

- "some" is at least two state DOTs or multistate coalitions;
- "several" is at least three state DOTs or multistate coalitions; and
- "many" is four or more state DOTs or multistate coalitions.

We conducted this performance audit from April 2020 to December 2021 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

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### Financing of U.S. Surface Transportation Programs

Since Congress established the Highway Trust Fund in 1956 as part of funding the construction of the Interstate Highway System, the federal government has financed federal-aid highway transportation projects primarily with revenues collected through federal fuel taxes, with gasoline taxes accounting for the largest portion of revenue. At that time, Congress declared its policy to make the federal-aid highway program self-financing

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<sup>9</sup>[GAO-13-77](#).

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through these revenues—that is, the amount of revenue collected from highway users would be at least equal to the amount of federal funding used on highway projects benefitting these users.<sup>10</sup> States also levy a variety of gasoline and other taxes to collect revenue for their non-federally funded transportation projects.

However, we have reported that the fuel taxes that support the Highway Trust Fund may not be a sustainable long-term source of transportation funding.<sup>11</sup> First, the federal gas tax has not increased since 1993. Because of inflation, the 18.4 cent per-gallon federal tax on gasoline has about one-third less purchasing power than it did when the tax was last raised over 25 years ago. Second, as vehicles have become more fuel-efficient, the amount of revenue generated per mile traveled has decreased. When Congress last increased federal fuel taxes in 1993, the National Highway Traffic Safety Administration's Corporate Average Fuel Economy standards generally required that newly manufactured passenger cars and light trucks manufactured in that model year meet estimated average fuel economy levels of 27.5 miles per gallon (mpg) and 20.4 mpg, respectively.<sup>12</sup> Currently, the minimum fuel standards require, for example, domestically manufactured passenger cars to meet minimum fuel economy levels of 41.1 mpg for year 2023 and 43.1 mpg for 2026.<sup>13</sup> Third, vehicles also increasingly run on alternative fuels, such as electricity, the sale of which do not generate revenue for the Highway Trust Fund. For example, between 2011 and 2020, sales of plug-in hybrid cars increased by 27 percent and sales of all-electric vehicle increased by

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<sup>10</sup>Federal fuel taxes are not directly paid by highway users but are reflected in retail fuel prices. Oil companies typically pay a per-gallon tax on fuels at the point of distribution, and these costs become part of the purchase price paid by highway users.

<sup>11</sup>GAO, *Highway Trust Fund: All States Received More Funding Than They Contributed in Highway Taxes from 2005 to 2009*, [GAO-11-918](#) (Washington, D.C.: Sept. 8, 2011).

<sup>12</sup>The National Highway Traffic Safety Administration sets Corporate Average Fuel Economy standards each model year that apply to a given fleet, such as domestically manufactured passenger cars. The fuel economy standards for passenger cars are located in 49 C.F.R. Part 531 and those for light trucks in 49 C.F.R. Part 533.

<sup>13</sup>Manufacturers must also meet average fuel-economy standards for these model years that are calculated using a formula set by regulation.

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42 percent, although they still make up a small proportion of all light duty vehicles.<sup>14</sup>

As a result, there is an increasing gap between the projected fuel tax revenues and federal highway spending.<sup>15</sup> In its July 2021 baseline projection for the Highway Trust Fund, the Congressional Budget Office estimated that \$191 billion in additional funding would be required to maintain current spending levels plus inflation from fiscal years 2022 through 2031. In November 2021, the Infrastructure Investment and Jobs Act was enacted, transferring \$118 billion in general revenue to the Highway Trust Fund, which will cover estimated revenue shortfalls through, at least, 2026.<sup>16</sup> While this funding will cover a portion of the estimated shortfall in the Highway Trust Fund, this transfer represents a one-time infusion of funding and is not a sustainable long-term source of revenues.

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## Mileage Fee Systems

In light of these trends, some experts have proposed to replace, or supplement, existing fuel taxes with a mileage fee system to improve the long-term sustainability of the Highway Trust Fund. Under such a system, drivers would pay fees based on their miles driven, with the funds going to pay for surface transportation projects. Such fees could be designed in many ways, including three different approaches identified in our previous work: a GPS-based system; a pay-at-the-pump system; and a prepaid, manual system.<sup>17</sup> (See fig. 2.) These approaches vary in terms of the specificity of the mileage data collected as well as the procedures used to charge drivers fees.

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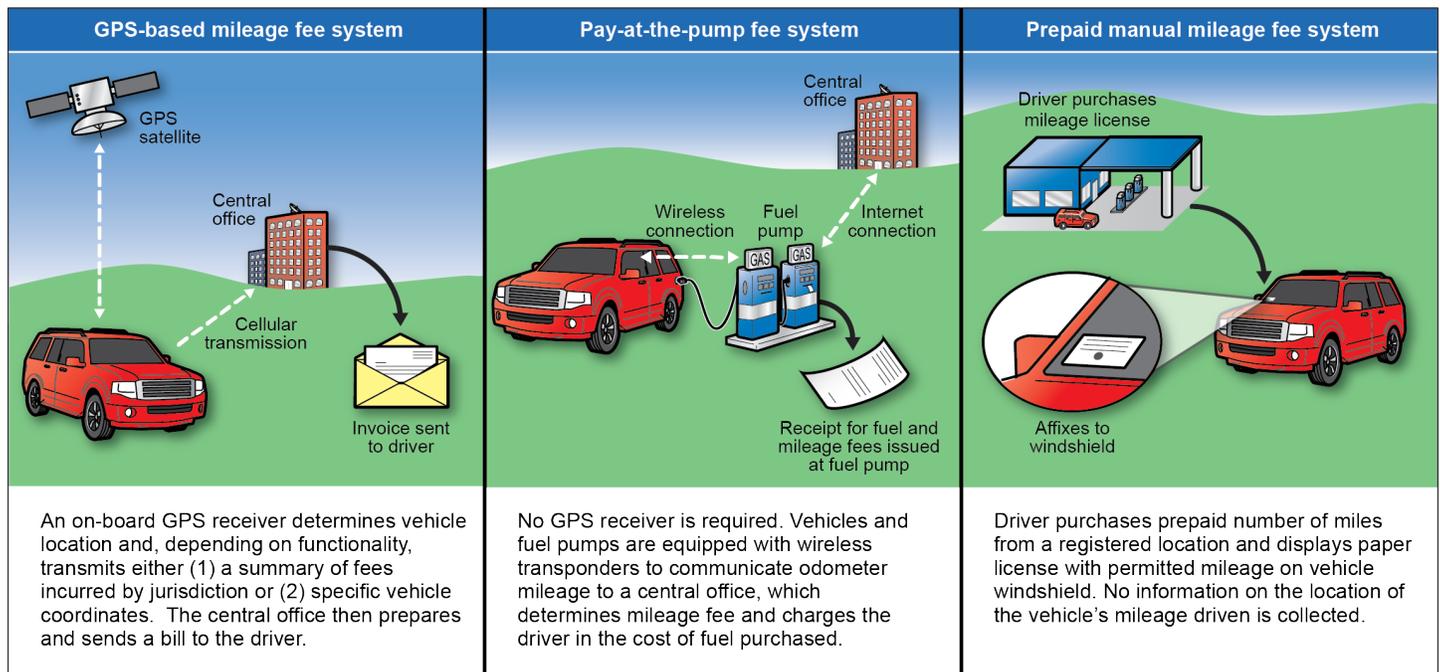
<sup>14</sup>Oak Ridge National Laboratory, *Transportation Energy Data Book*, 39th ed. (February 2021, updated April 2021), table 6.2.

<sup>15</sup>The Highway Trust Fund has two accounts: The Highway Account and the Mass Transit Account. 23 U.S.C. § 9503(e). Federal highway funding is appropriated out of the Highway Account. See, e.g., FAST ACT § 1101(a).

<sup>16</sup>Pub. L. No. 117-58, § 80103, 135 Stat. 429, 1328 (2021) (codified at 26 U.S.C. § 9503(f)(11)).

<sup>17</sup>[GAO-13-77](#).

**Figure 1: Depiction of Three Potential Mileage Fee Approaches**



Source: GAO analysis of mileage fee initiatives. | GAO-22-104299

Advocates of mileage fee systems note that these fees preserve the “user-pays” principle for highway funding, and we previously reported that they could lead to a more equitable use of roadways than fuel taxes by charging drivers based on their actual road use.<sup>18</sup> Equity, in the context of such fees, means that each driver pays their fair share, but there are many ways to think about the definition of fair share. For example, under the beneficiary-pays principle, the beneficiaries of a service pay for the cost of providing the service from which they benefit.<sup>19</sup> Some mileage fee systems address this type of equity by charging fees for road use for all users and vehicle types, such as drivers of electric vehicles, who do not pay any gas tax under the current system. The Congressional Budget Office reported that most drivers currently pay much less than the full cost

<sup>18</sup>GAO-13-77.

<sup>19</sup>Another type of equity is the ability-to-pay principle, where users who are more capable of bearing the burden of fees should pay more for the service than those with less ability to pay. GAO, *Federal User Fees: A Design Guide*, GAO-08-386SP (Washington, D.C.: May 29, 2008).

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of their highway use and that mileage fees could better incentivize efficient highway use than fuel taxes because the majority of highway costs—such as pavement damage—are related to miles driven.<sup>20</sup>

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## Surface Transportation System Funding Alternatives Program

In 2015, the FAST Act required DOT to establish the STSFA program to provide grants to the states to pilot user-based alternative revenue mechanisms, such as mileage fee systems, to maintain the long-term solvency of the Highway Trust Fund.<sup>21</sup> Because FHWA administers the program, it is required under the act to ensure that the state pilot activities meet program objectives, which include testing the design, acceptance, and implementation of user-based alternative revenue mechanisms, such as mileage fee systems, and providing recommendations regarding adoption and implementation of user-based alternative revenue mechanisms.<sup>22</sup> As part of administering the STSFA program, FHWA issued notices of funding opportunities and evaluated the grant proposals, and continues to collect reports from the states on their pilot activities, and publishes a report on its website every 2 years describing the progress of these activities. According to FHWA, these state STSFA pilots could help Congress understand if mileage fee systems could be a viable substitute to the federal gas tax, and if such a system could be implemented nationally at some time in the future.

The FAST Act provided \$15 million in funding for fiscal year 2016 and \$20 million annually for fiscal years 2017 through 2021 to provide STSFA

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<sup>20</sup>Congressional Budget Office, *Alternative Approaches to Funding Highways*, Pub. No. 4090 (Washington, D.C.: March 2011).

<sup>21</sup>The FAST Act did not specify a type of user-based alternative revenue mechanism. As previously noted this report refers to all types of user-based alternative revenue mechanisms, including vehicle-registration-based fees and mileage-based fees as “mileage fee systems”.

<sup>22</sup>The five STSFA program objectives are to (1) test the design, acceptance, and implementation of two or more future user-based alternative revenue mechanisms; (2) improve the functionality of such user-based alternative revenue mechanisms; (3) conduct outreach to increase public awareness regarding the need for alternative-funding sources for surface transportation programs and to provide information on possible approaches; (4) provide recommendations regarding adoption and implementation of user-based alternative revenue mechanisms; and (5) minimize the administrative cost of any potential user-based alternative revenue mechanisms. FAST Act § 6020(c).

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program grants to states.<sup>23</sup> FHWA obligated between \$10 and \$19 million among the states from 2017 to 2020.<sup>24</sup> States were required to provide matching funds to cover at least 50 percent of the cost of each activity carried out under the pilot program.

The FAST Act required each recipient of STSFA funding to address certain aspects of adopting these mileage fee systems, including challenges, such as the protection of personal privacy and equity concerns. States could also address the costs of administering such systems, the ability of the state to audit and enforce user compliance, and other issues as part of implementing their pilots. States were also required to submit annual reports describing how their activities meet the program objectives and lessons learned for the future deployment of mileage fee systems from their respective pilot projects.

The Infrastructure Investment and Jobs Act, enacted in November 2021, continued these efforts by requiring DOT to establish two new pilot programs, both generally aimed at demonstrating user-based alternative revenue mechanisms to help maintain the long-term solvency of the Highway Trust Fund.<sup>25</sup> The first program is similar to the STSFA program in that it shares some of the same statutory objectives and provides for grants to states or groups of states.<sup>26</sup> The second program requires DOT,

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<sup>23</sup>The FAST Act authorized funding for the program only through fiscal year 2020. FAST Act § 6020(j). In 2020, Congress extended the act's authorization of \$20 million in funding for the program through fiscal year 2021. Continuing Appropriations Act, 2021 and Other Extensions Act, Pub. L. No. 116-159, div. B, tit. I, § 1101, 134 Stat. 709, 725-726 (2020). Although the IJA repealed the STSFA program provision in the FAST Act and required DOT to establish two new programs, STSFA awards remain subject to STSFA program requirements.

<sup>24</sup>Under the FAST Act, FHWA was required to determine by August 1 of each year, whether there were enough grant applications meeting program requirements for a fiscal year. If there were not, FHWA was required to transfer the unobligated amount of STSFA funding for the fiscal year to the Highway Research and Development Program. FAST Act § 6020(k).

<sup>25</sup>IJA §§ 13001-13002 (codified at 23 U.S.C. § 503 note).

<sup>26</sup>IJA § 13001. However, this program under the IJA differs from the STSFA program in notable ways. For example, localities and metropolitan planning organizations are also eligible to receive program funding. The IJA provides for an increased federal share of a pilot project's cost, ranging from 70 to 80 percent. The act also expressly requires that, not later than November 2024, DOT, in coordination with other federal entities, must submit to specific congressional committees a report that provides recommendations, if applicable, to enable potential implementation of a nationwide user-based alternative revenue mechanism.

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in coordination with other federal entities, to design and pilot a nationwide mileage-based user fee system and solicit drivers of personal and commercial vehicles to voluntarily participate in the system.<sup>27</sup>

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## States Have Used STSFA Funds to Pilot and Research a Variety of Mileage Fee Systems

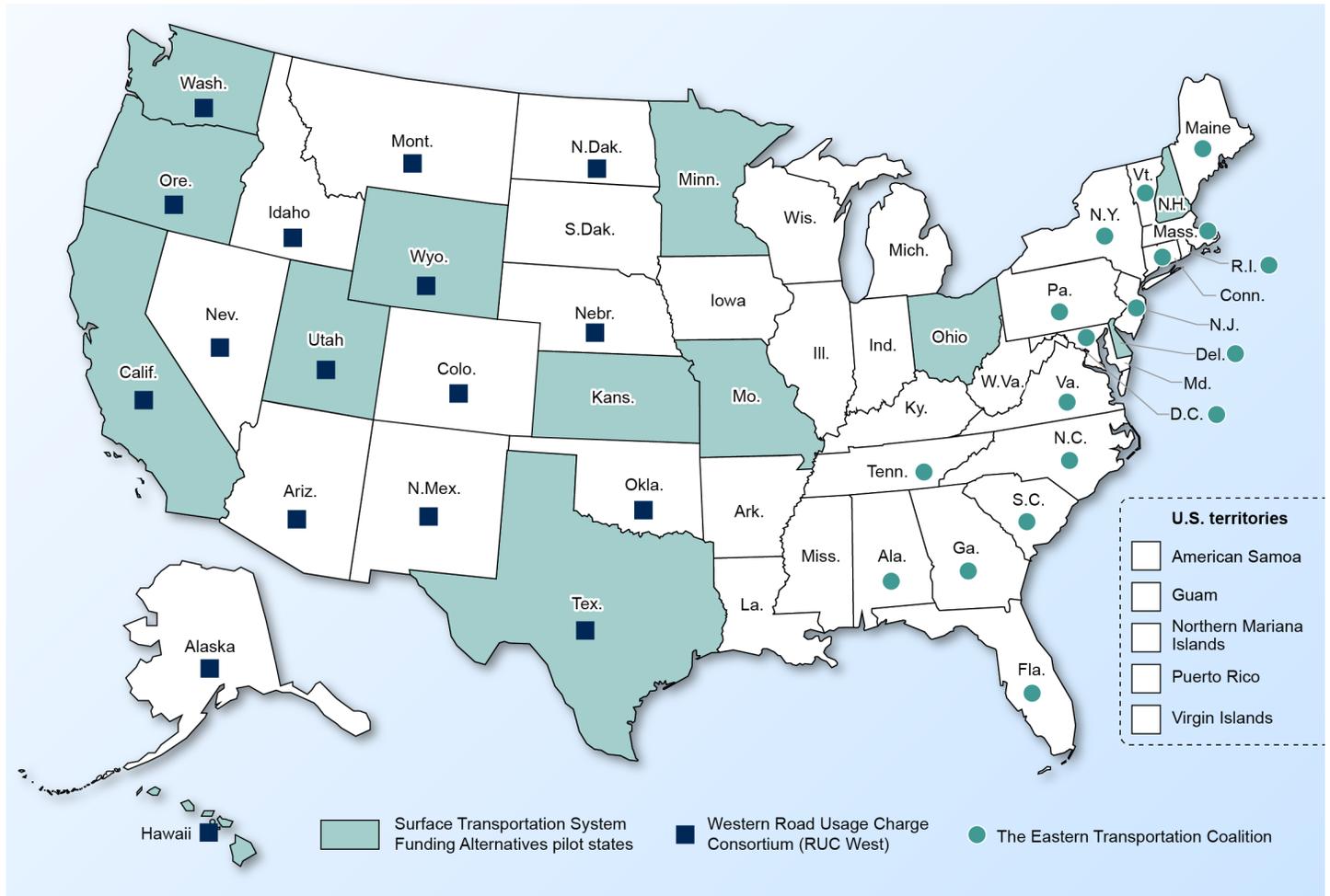
Thirteen states have received STSFA funds to pilot and research mileage fee systems since fiscal year 2016.<sup>28</sup> As part of this funding, two multistate coalitions worked with states regionally to pilot and research mileage fee systems. The two coalitions, the Western Road Usage Charge Consortium (RUC West) and the Eastern Transportation Coalition represent over 30 states, but not all of the states in these coalitions actively participate in the coalitions' mileage fee pilot projects. (See fig. 2.)

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<sup>27</sup>IJA § 13002. For purposes of this program, the Secretary of the Treasury is required to annually establish mileage-based user fees for both passenger vehicles and trucks, and these fees collected from program participants must be deposited into the Highway Trust Fund. DOT will solicit volunteer participants from all 50 states, the District of Columbia, and Puerto Rico, and participants will receive a payment for each calendar quarter they participate in the program.

<sup>28</sup>The 13 states include California, Delaware, Hawaii, Kansas, Minnesota, Missouri, New Hampshire, Ohio, Oregon, Texas, Utah, Washington, and Wyoming.

**Figure 2: States That Received Surface Transportation System Funding Alternatives Funds and States Participating in Multistate Coalitions**



Source: GAO analysis of Federal Highway Administration Data and Map Resources. | GAO-22-104299

Note: States have varying levels of involvement in the coalitions, and not all of the coalition states participate in the pilot projects.

Most of the states receiving STSFA funds are investigating mileage fee systems that charge users for miles driven, with the goal of ensuring that drivers pay for their road use. These state STSFA projects are at various stages of development and implementation:

- Three states have completed their STSFA projects. These states conducted research into mileage fees but did not conduct pilots.

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Missouri and New Hampshire, completed research on designing alternative fee systems. Wyoming used a fiscal year 2019 grant to develop a framework that could be used to deploy a pilot testing mileage fees and to conduct education and outreach. Wyoming DOT officials said they need state legislative approval to start testing this mileage fee system. According to these officials, as of August 2021, the state legislature has not yet provided approval.

- Six states and two coalitions of states have ongoing projects. Some of these states researched and tested mileage fee systems prior to the STSFA program, and currently use STSFA funds to support and enhance these efforts. For example, California completed a state-funded mileage fee pilot project in 2017. It received three STSFA grants between fiscal years 2016 and 2018 to test four different technologies used to record and report miles driven. This pilot was completed in June 2021. In 2021 California received another STSFA grant to research how to distinguish between vehicle-miles traveled on public and private roads. Two of the states, Oregon and Utah, currently operate active mileage fee systems and collect revenue for state-funded transportation projects.
- Three additional states—Kansas, Ohio, and Texas—received grants to study mileage fee systems in 2021. For example, Kansas, which had not previously received STSFA grants, will work with Minnesota to explore the effects of mileage fees in the Midwest, including the impact of such fees on the region’s rural population.

The two coalitions of states also examined the potential of regional mileage fee systems that included multiple states. Specifically, RUC West designed a regional system to promote and establish consistency, interoperability, and compatibility of a mileage fee system throughout the western United States.<sup>29</sup> According to RUC West officials, the coalition designed the regional system to explore how to collect mileage fees from out-of-state drivers. In the proposed system, a central clearinghouse would gather information from the participating states, collect revenue from drivers, and then divide the revenue among the states based on the miles driven in each respective state. RUC West is currently testing this system with pilot projects in Oregon and California. The Eastern Transportation Coalition is also focused on out-of-state travel under a

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<sup>29</sup>RUC West member states include Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, Texas, Utah, Washington, and Wyoming.

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mileage fee system because of the cross-state travel patterns of passenger vehicles and trucks on the East Coast.

Driver participation in all of the STSFA pilot projects has been voluntary and relatively limited, ranging from about 100 to 5,000 participants per pilot. Some states recruited a variety of volunteers to participate in the pilots. For example, California used public service announcements and presentations to try to recruit a mix of drivers from different locations, races or ethnicities, and vehicle types. Other state pilot projects—such as those in Utah and Oregon—allowed drivers to opt-in to the system to avoid paying some registration fees. For example, in Utah, when drivers register their electric or hybrid vehicle, they have the option to enroll in the mileage fee program instead of paying a flat fee for alternative fuel vehicles. This annual fee ranges from \$20 for gas hybrid vehicles to \$120 for electric vehicles. In 2021, about 3,000 vehicles participated in Utah’s pilot program, out of about approximately 71,000 vehicles eligible to do so, according to Utah DOT officials.

Some of the states’ pilot projects provided participants with multiple options for reporting mileage, including different types of technology to track their mileage.

- **Smartphone and plug-in devices.** For example California’s pilot allowed drivers to choose between smartphone applications or small devices that plugged into their vehicle, either with or without GPS tracking.<sup>30</sup> Sixty percent of participants chose plug-in devices, making them the most popular reporting method. However, California reported that by the time it adopts a mileage fee system this technology could be obsolete.
- **Vehicle telematics systems.** Some participants in California’s pilot project could also choose to use systems already built into their cars to transmit their mileage, known as vehicle telematics systems. These systems transmit a range of data about a vehicle to the manufacturer through the internet. Obtaining such data requires agreements between pilot project states and automakers. However, in California’s pilot project only a limited number of manufacturers agreed to provide the state with these data. Further, the majority of vehicles enrolled in the project did not have vehicle telematics.

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<sup>30</sup>Drivers could also choose other reporting methods including time permits, mileage permits, or odometer readings.

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- **Manual mileage reporting.** A few pilot states allowed participants to manually report miles driven as an alternative to using electronic tracking. For example, in Washington, participants could pre-select a block of miles (e.g. 1,000, 5,000 or 10,000 miles) and then report their odometer readings every 3 months. Hawaii’s pilot project used odometer data collected during the state’s existing annual vehicle inspection to create and send personalized “Driving Reports” to over 300,000 drivers comparing how much they would have paid in gas taxes and mileage fees.

Some states limited the types of vehicles that could participate. For example, Utah limited participation in its program to drivers of electric and hybrid vehicles. Utah DOT officials told us that they started with these vehicles because they wanted to test the program with a smaller pool of drivers. Officials said they could eventually expand the program to include all vehicles. Minnesota started its pilot project by working with car-sharing companies operating in the state. Car-sharing services provide individuals with temporary access to a vehicle at a fee, without the costs and responsibilities associated with car ownership. Minnesota DOT officials said this approach allowed the state to collect fees from a few companies rather than from individual drivers. Additionally, according to these officials, Minnesota DOT and the car-share companies avoided the costs of adding devices to track mileage since these vehicles already have the technology necessary to record aggregated mileage and generate the necessary reports.

The Eastern Transportation Coalition has conducted the first multistate pilot focused on commercial vehicles.<sup>31</sup> Coalition officials reported that they conducted a 6-month national pilot with 221 trucks in 2020 and 2021. According to these officials, such pilot projects are important because commercial trucks drivers use roads at high volume, accrue significant out-of-state mileage, and pay a significant amount of the fuel tax that supports the Highway Trust Fund. We recommended a pilot project for commercial trucks in our 2012 report, due to the wear and tear that trucks

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<sup>31</sup>The Eastern Transportation Coalition member states include Alabama, Connecticut, Delaware, Florida, Georgia, Maine, Maryland, Massachusetts, New Jersey, New York State, North Carolina, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont and Virginia, as well as the District of Columbia.

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cause on roads; the pilot was implemented.<sup>32</sup> We also noted that truck mileage fees could pose fewer privacy and cost challenges than passenger vehicle fees. For example, trucking companies may already monitor commercial drivers as a condition of employment and many commercial trucks have existing GPS technology to enable mileage tracking.<sup>33</sup>

While most states used STSFA grants to research and pilot mileage fee systems that charge drivers based on their miles driven, two states used funds to research registration fees. Specifically, Missouri and New Hampshire conducted implementation studies to assess the feasibility and potential impact of imposing registration fees based on fuel efficiency.<sup>34</sup> These states noted that drivers of electric, hybrid, and fuel-efficient vehicles do not contribute as much revenue to support road maintenance as most types of gas-powered vehicles because they pay less, or no, fuel taxes. To address this, the states proposed redesigning registration fees so that vehicles with higher fuel economy ratings would pay a higher fee. For example, Missouri proposed fees ranging from \$25 for vehicles that get less than 20 mpg to \$125 for electric vehicles. Figure 3 shows Missouri's conceptual depiction of how it is proposing to redesign these fees to help ensure that drivers contribute equally for their road use.

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<sup>32</sup>Specifically, we reported that heavier trucks generally pay less than their share of damage costs because the current federal tax structure does not fully account for the increased road wear caused by heavy trucks based on their miles traveled and weight. See [GAO-13-77](#).

<sup>33</sup>[GAO-13-77](#).

<sup>34</sup>The states used the STSFA funds to research and design the fee structures, but Missouri and New Hampshire DOT officials told us they are waiting for their state legislatures' approval to implement them.

**Figure 3: Conceptual Depiction of the Missouri Department of Transportation’s Pilot Project Proposal to Collect Registration Fees Based on Vehicle Fuel Efficiency**

Vehicle type	Registration and decal fees	Fuel taxes	Total contributions
Electric	\$\$\$\$		\$\$\$\$
Plug-in hybrid	\$\$\$\$	\$	\$\$\$\$\$
High efficiency	\$\$\$	\$	\$\$\$\$
Average efficiency	\$	\$\$\$	\$\$\$\$\$
Low efficiency	\$	\$\$\$\$	\$\$\$\$\$

\$ → \$\$\$\$\$ = Inexpensive to expensive

Source: GAO analysis of Missouri Department of Transportation information. | GAO-22-104299

## Selected States Reported Mileage Fee System Challenges and Identified Potential Action to Help Address Them

### Public Acceptance Challenges Stemmed from Privacy and Equity Concerns, and States Identified Potential Actions to Address These Issues

State DOTs cited public acceptance of mileage fee systems as one of the major challenges states faced by their pilot projects.<sup>35</sup> Specifically, many of the states reported that public acceptance of mileage fee systems remains limited by concerns about protecting privacy and achieving equity. As a result of their experiences in the pilot projects, state DOT officials identified some opportunities to increase public acceptance and address some of the underlying privacy and equity concerns. Our prior

<sup>35</sup>In our survey of states’ and the District of Columbia’s DOTs, officials also identified other challenges with less frequency than public acceptance and cost challenges, including interoperability (e.g., reconciling mileage and fees between states and other jurisdictions); public education; and developing the technical capacity to implement a mileage fee system. See appendix I for additional information.

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work highlighted similar concerns about privacy and equity, as well as policy considerations related to public acceptance that may accompany a move to a mileage fee system.<sup>36</sup>

## Privacy

Several states conducting pilot projects reported that privacy concerns limited public support for a mileage fee system in their state. Many state DOT officials told us that drivers felt concerned that a government-administered mileage fee system may track their location and collect personal data and that such data may not be sufficiently secured. For example, RUC West reported that convincing members of the public that the government will protect their data on road usage and will not actively track their travel constituted major challenges facing mileage fee systems. Similarly, a Minnesota DOT official told us that privacy and data security were significant challenges because the public does not want governments to have their travel or personal information and noted concerns about the security or loss of such information.

Officials from a number of pilot states identified various ways to address these concerns, including providing alternative mileage-reporting options, developing security and privacy policies, and using third-party vendors.

- **Alternative mileage-reporting options.** As discussed above, several states provided participants with non-GPS based reporting options, doing so principally to address drivers' concerns about government agencies tracking their location. For example, Washington's pilot project reported that drivers could electronically send photographs of their odometer reading to a state vehicle-licensing office to report mileage information. Similarly, one phase of Hawaii's pilot project allowed drivers to submit mileage data by providing photographs of their vehicle's odometer readings. Hawaii DOT officials told us that 60 percent of participants in this phase of their project preferred to submit odometer photographs instead of using plug-in devices, either with or without GPS tracking.
- **Security and privacy policies.** States also took steps to help safeguard data and limit the retention of personal information. For example, to help protect personal information and alleviate drivers' concerns, the Oregon and Washington anonymized driver data, including miles driven and household information. In addition, some state pilot projects established data retention requirements to place time limits on how long personal data would be kept. For example, the

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<sup>36</sup>[GAO-13-77](#).

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Eastern Transportation Coalition's pilot project required third-party vendors to delete all personal driver data it collected for the pilot project within 30 days of the pilot's completion. Our prior work has noted the importance of protecting data by maintaining safeguards to control risks related to data, such as loss and improper disclosure as well as using policies to disclose privacy practices to pilot project participants.<sup>37</sup>

- **Third-party vendors.** Some state pilot projects used third-party vendors, such as vendors that conduct annual vehicle inspections, to collect and report drivers' mileage data. Officials in these states said they used third-party vendors because pilot participants were more comfortable with an independent third party collecting their individual personal data than a government agency.

## Equity

State DOT officials explained that some drivers expressed concerns that they may pay more than their fair share under a mileage fee system. In particular, some state DOT officials stated that the public perceived that rural drivers may pay more under a mileage fee system than under the current fuel tax structure.<sup>38</sup> For example, Colorado DOT reported that equity concerns were the predominant obstacle to acceptance of mileage fee systems, as 54 percent of those surveyed perceived that a mileage fee would penalize rural drivers.<sup>39</sup> In addition, Washington State Transportation Commission officials reported in a pre-pilot survey that while 44 percent of overall respondents chose mileage fees as a fairer way to fund roads when compared to the gas tax, rural participants were less likely to do so because they believed they would pay more with a

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<sup>37</sup>GAO, *Vehicle Data Privacy: Industry and Federal Efforts Under Way, but NHTSA Needs to Define Its Role*, [GAO-17-656](#) (Washington, D.C.: July 28, 2017).

<sup>38</sup>In our prior work, we have reported that under the beneficiary-pays principle, the beneficiaries of a service pay for the cost of providing the service from which they benefit. While rural drivers, for example, may perceive that they will pay more, and thus be treated unfairly under a mileage fee system, that may not be reality. To the extent that rural drivers pay more in mileage fees because they drive more, this aligns with the beneficiary-pays principle. However, if rural drivers tend to be lower-income drivers than their urban counterparts, this factor could result in inequities under the ability-to-pay principle. Under the ability-to-pay principle, we have also reported that those who are more capable of bearing the burden of fees should pay more for the service than those with less ability to pay. See [GAO-08-386SP](#).

<sup>39</sup>Colorado conducted a baseline survey of 500 people statewide prior to its state-sponsored pilot. According to the Colorado DOT, this pilot was intended to, among other things, gauge knowledge and perceptions of the mileage fee concept and to recruit participants for its pilot.

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mileage fee. While state DOT officials acknowledged a perception that rural drivers may face additional costs under a mileage fee system, several states reported that rural drivers would generally pay less in mileage fees if, for example, they were credited for fuel taxes paid.<sup>40</sup> Additionally, some state DOTs reported that participants perceived that mileage fee systems may unfairly impact drivers of high fuel efficiency vehicles, who would pay more under a mileage fee system. For example, in 2020, Oregon DOT reported that while recent survey results show an increase in the number of drivers who believe mileage fees are fair, a focus group of electric and hybrid vehicle drivers maintained their opposition to mileage fees on the grounds that such fees disincentivized the purchase of low-emission vehicles.

One multistate coalition has considered and some state DOTs have taken actions to address equity concerns related to mileage fee systems, including adjusting mileage fee structures and recruiting participants from various geographic and economic groups. Some state DOTs are also researching other equity concerns.

- **Adjustable mileage fees.** An official from one multistate coalition told us that it has considered the possibility that mileage fee systems could implement adjusted fee schedules to address equity concerns such as income levels and ability to pay fees. An official from this same coalition, the Eastern Transportation Coalition, also testified before the U.S. Senate Committee on Environment and Public Works that one way to address equity concerns regarding rural and urban drivers would be to vary mileage fees based on where a driver lives, income level, and type of vehicle driven. Also, the Eastern Transportation Coalition noted a potential solution could be that low income families could be charged a lower per-mile rate or receive a discount to mitigate adverse effects of a mileage fee.
- **Participant recruitment.** Several states sought to assess equity through the design of their pilot projects by recruiting participants from a variety of demographic groups, such as drivers from rural and urban areas. For example, to assess how its pilot project might affect rural drivers and drivers with less efficient vehicles, California officials told us they recruited participating drivers from differing geographic areas and with varying vehicle types. Similarly, the Washington State Transportation Commission reported that its pilot project recruited drivers in rural areas of the state and drivers of electric vehicles to

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<sup>40</sup>Some mileage fee systems have proposed crediting the fuel taxes paid at the pump against assessed mileage fees.

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ensure diversity in the geographic, economic, and social characteristics of participants. According to the Washington State Transportation Commission, recruiting a diverse cross-section of participants helped officials evaluate the effect that mileage fee systems might have on different drivers and vehicle types.

- **Research on other equity concerns.** In addition to these efforts to address equity concerns, some state DOT officials told us that they needed to conduct additional research on other equity challenges, such as the effect of mileage fee systems on other demographic groups. For example, Colorado officials told us that further study is needed on how to administer a mileage fee system for those who traditionally have challenges with technology, such as the elderly and low-income individuals who, for example, may not have access to bank accounts. Without access to a bank account, a driver may be unable to pay mileage fees electronically.

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### States Experienced High Costs during Pilot Projects and Identified Some Potential Approaches to Achieve Cost Reductions

Many states and FHWA have noted higher costs for operating mileage fee systems than those associated with the collection of vehicle fuel taxes. State DOT officials identified challenges related to start-up costs, operating costs, and the cost of developing and implementing enforcement mechanisms for mileage fee systems. Similarly, FHWA reported that its evaluation of the pilot projects indicate that implementing mileage fees will involve higher programmatic costs due to administrative complexity and changes to existing systems needed to support the mileage fee systems, among other things.

- **Start-up costs.** Officials from some state DOTs noted that they expect high start-up costs for mileage fee systems, such as the costs associated with establishing or upgrading the systems to implement a mileage fee system. For example, Wyoming DOT officials stated that the cost of a mileage fee system would be expensive compared to the current gas tax structure because of the need to obtain technology to administer the program and additional staff to create and manage it.
- **System operating costs.** Officials in some pilot states told us that systems' operating costs—including those related to driver account management, data collection and processing, and invoicing—presented challenges. For example, Colorado reported that a mileage fee system would require additional costs to collect and process data from each participating vehicle.
- **Enforcement costs.** Some state DOT officials also observed challenges related to the cost of enforcing the mileage fee-reporting and payment rules. Minnesota DOT officials told us that driver

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compliance and enforcement could become more problematic depending on the design of the mileage fee system, particularly with add-on devices. According to these officials, with add-on (i.e., plug-in) devices and manual mileage reporting options, there will be an increased risk of fraud, such as misreporting miles driven and payment avoidance. Minnesota DOT officials also noted that fraud and mileage fee evasion would be expensive and costly to manage.

Several pilot project states and multistate coalitions identified potential approaches to help reduce costs related to developing and implementing mileage fee systems. These approaches included using state systems already in place and realizing economies of scale resulting from increased driver participation in a fully implemented mileage fee system.

- **Pre-existing systems:** Officials from some states told us that using previously established systems, such as those used for vehicle inspections and vehicle registration, could help reduce costs for developing and implementing mileage fee systems. For example, Hawaii DOT reported that its pilot project leveraged the state's existing vehicle inspection system and its Department of Motor Vehicles system to demonstrate a simple and lower cost option to implement a mileage fee system. As a result, the state DOT reports that compliance with its mileage fee system will not impose an additional administrative burden on drivers. In addition, Hawaii DOT reported that its mileage fee system will be less costly to implement compared to those in states where already established systems are not leveraged.
- **Economies of scale.** Officials from several states told us they expect that the cost to develop and implement mileage fee systems will decrease when their systems add more users, thus creating economies of scale. For example, officials from Washington State Transportation Commission told us that they believe collection costs will decrease with greater participation. After receiving another STSFA grant in 2020, Washington is now studying opportunities to reduce collections costs, including by collaborating with other states to share costs and systems across a larger population of drivers.

However, even with these approaches, some officials from state DOTs and a multistate coalition anticipated a high cost of administering mileage

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fee systems compared to the current fuel tax structure.<sup>41</sup> Specifically, several pilot states estimated that the cost to administer mileage fee systems in their states during the pilot projects ranged from around 4 to 19 percent of revenues collected compared to 1 percent or less of revenues to collect fuel taxes. However, according to FHWA evaluations, the cost estimates developed by the pilot project states are preliminary, generally limited in scope, and may not reflect the cost of a fully deployed mileage fee system in the state. In the two states that currently operate active mileage fee systems, Oregon and Utah, costs to date have exceeded revenues.<sup>42</sup> For example, Utah DOT officials noted that their mileage fee system collected about \$42,000 from about 3,000 participants in 2020. Officials told us that these collections contributed to but did not fully cover the overall mileage-fee program costs.

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## FHWA Has Followed Most Leading Practices in Designing and Evaluating Its Pilot Program but Lacks Criteria to Assess How State Projects Could Inform National Policy

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<sup>41</sup>We have previously reported that although reliable cost estimates are not available, implementing a system to collect fees from drivers of U.S. passenger vehicles—which number in the hundreds of millions—is likely to greatly exceed the costs of collecting fuel taxes. The current method of collecting federal fuel taxes presents comparatively little administrative burden because these taxes are collected from a small number of companies that store or distribute fuel at the wholesale level. See [GAO-13-77](#).

<sup>42</sup>Utah used STSFA funds to implement its mileage fee system, which is a voluntary, operational mileage fee system for electric and hybrid vehicles only.

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## FHWA Has Followed Most Leading Practices for Designing and Evaluating a Pilot Program

Our previous work has identified five leading practices for pilot program design and evaluation that, when followed, contribute to a consistent and effective pilot program process. In establishing and implementing the STSFA program, we found that FHWA followed four of these practices. Specifically, FHWA (1) established clear, measurable objectives; (2) developed an assessment methodology; (3) developed a plan to evaluate results; and (4) ensured stakeholder communication in the design and evaluation of the pilot program. Our previous work has demonstrated that well-developed and documented pilot programs can help ensure that agency assessments produce information needed to make effective program and policy decisions. Such a process enhances the quality, credibility, and usefulness of evaluations of the pilot program results.

- **Leading Practice 1: Establish clear, measurable objectives.** Well-defined objectives should have specific statements of the accomplishments necessary to meet the objectives. Clear and measurable objectives can help ensure that agencies collect appropriate evaluation data from the outset of pilot implementation so that data will subsequently be available to measure performance against the objectives.

FHWA established clear objectives for the STSFA program by adopting the program objectives established in the FAST Act. These objectives included:

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

In implementing the STSFA program, FHWA also developed criteria for its selection process of grant applications to measure whether the proposed state pilot projects met the program objectives. These

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selection criteria were included in its notices of funding for the STSFA program, and included identifying whether the proposed pilot projects could lead to a viable alternative revenue mechanism, the readiness of the technology, the portability of the pilot project to other jurisdictions, and whether the projects addressed aspects that the states were required or permitted to address or under the FAST Act, including privacy, equity, administrative cost, and interoperability issues. According to our review of its grant approval documents, FHWA awarded grants to pilot projects based on these criteria.

- **Leading Practice 2: Develop an assessment methodology.** Key features of a clearly articulated methodology include a strategy for comparing the pilot implementation and results with other efforts, a clear plan that details the type and source of the data necessary to evaluate the pilot, and methods for data collection including the timing and frequency.

FHWA outlined its methodology for evaluating the state pilot projects in its work statement and evaluation framework. In its methodology, FHWA articulated a strategy to compare the implementation of individual state pilot projects with other state pilot projects that received STSFA funding. According to FHWA's framework, it plans to collect qualitative and quantitative information from the state pilot projects through interviews with state officials and through quarterly reports submitted to FHWA. For example, FHWA documents state that it will evaluate the pilot projects based on a variety of factors, such as whether revenues collected can replace the gas tax, whether the mileage fee systems operate at a reasonable cost, and the changes in user and stakeholder perception of mileage fee systems before and after the pilot project. In addition, FHWA's work statement included a requirement for it to establish milestones and create an evaluation plan to assess the results of each state pilot project. For example, FHWA notes that it will use evaluations of individual pilot projects to assess the effectiveness of different systems and develop a catalogue of best practices and effective technologies.

- **Leading Practice 3: Develop a plan to evaluate results.** A detailed data analysis plan identifies who will do the analysis as well as when and how data will be analyzed to measure the pilot program's implementation and performance. The results of this analysis should show the successes and challenges of the pilot, and in turn, how the pilot can be incorporated into broader efforts. Some elements of a detailed data-analysis plan include talking to users, managers, and

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developers; evaluating the lessons learned to improve procedures moving forward; and other appropriate measures.

FHWA has developed a data analysis plan to evaluate the state activities of each pilot project to identify lessons learned and create materials to support future deployments of related strategies in other states. According to its evaluation framework, FHWA will evaluate state pilot projects to identify best practices and effective technologies. FHWA conducted evaluations of the eight state pilot projects that received fiscal year 2016 funds, assessing their initial pilot project activities, and developed reports for the individual states and a crosscutting report that identified best practices from these initial state projects. According to the FHWA evaluation framework, the evaluations will inform reports that will provide the Secretary of Transportation and Congress information on the progress made and the lessons learned from the mileage-fee pilot projects. FHWA officials also stated that as of April 2021, they are conducting a second-phase of evaluations that will conclude with similar reports. FHWA also published biennial reports in 2018 and 2020, which provided updates on the status of the STSFA pilots, as required by the FAST Act, and described key lessons learned from evaluated state pilot projects.

- **Leading Practice 4: Ensure stakeholder communication.** Appropriate two-way stakeholder communication and input should occur at all stages of a pilot, including design, implementation, data gathering, and assessment. Failure to effectively engage with stakeholders, and understand and address their views, can undermine or derail an initiative.

According to FHWA and state DOT officials, FHWA communicated with state DOTs during the design, implementation, data gathering, and evaluation of the pilots. For example, FHWA conducted a webinar at the outset of the STSFA program to provide state DOTs with an opportunity to gather information on the STSFA program and ask specific questions regarding it, and has held additional webinars annually. In addition, FHWA supports state DOTs through information on its public website, webinars, and regular communication with state DOTs, according to state DOT and FHWA officials. FHWA also obtains quarterly updates and annual reports from each of the state DOTs regarding the status of its pilot project. Some state DOT officials also stated that FHWA helped facilitate information sharing on projects between the states.

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## FHWA Evaluated Individual Pilot Projects, But Lacks Criteria to Assess How the State Pilots Could Inform Expanded Use of Mileage Fee Systems

While FHWA followed most leading practices for designing and evaluating pilot projects, it has not established or used scalability criteria to assess whether pilot project approaches could be expanded or applied nationwide to collect federal revenues to support the long-term solvency of the Highway Trust Fund. We have previously reported that one key purpose of a pilot is to inform a decision on whether and how to implement a new approach in a broader context. Furthermore, the final leading practice for pilot programs we identified calls for agencies to identify criteria or standards to inform decisions about scalability and whether, how, and when to integrate pilot activities into overall efforts. Applied to the STSFA program, criteria that evaluates scalability of the pilot projects would allow FHWA to address how and to what extent, if at all, the pilot activities could be expanded to other states or nationally to help maintain the long-term solvency of the Highway Trust Fund. Criteria could, for example, include whether the use of specific technologies to track and report mileage deployed in pilot program (such as submitting photographs or other documentation) are feasible or cost-effective in a national system.

While FHWA has three different reports that evaluated or plan to evaluate the pilot projects and mileage fees, none of these efforts include the development or use of criteria that would assess the scalability of the projects to other states or nationwide.

- **Biennial summaries of pilot projects.** FHWA published biennial reports in 2018 and 2020 that described the progress of active STSFA projects and the key lessons learned from the pilot projects. FHWA provided information in these reports that described state pilot project activities that occurred between 2017 and 2019. FHWA developed each biennial report using information from quarterly and annual reports from the pilot states and information from other evaluations. The biennial reports identified state actions and key findings from some of the pilot projects, and provided a high-level summary of pilot activities. However, these biennial reports do not include the use of criteria to determine scalability of the pilot projects. As a result, the reports provide limited insight into how lessons learned from the pilots may or may not be applied more broadly or nationally.
- **Independent evaluations of individual pilot projects.** In 2020, FHWA completed independent evaluation reports of several state pilot projects, as well as a report presenting crosscutting findings from those pilot projects. These evaluations covered eight state pilot projects that received funding for fiscal year 2016. In these evaluations, FHWA established and applied specific criteria that would

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be used to assess various aspects of the pilot projects, including the technologies and structures implemented by each individual state pilot projects. However, FHWA did not develop or use criteria to assess whether the technologies and structures used by the states are scalable to other states or nationwide to meet the objectives of the STSFA program. For example, FHWA's evaluation documentation stated that it would assess whether the pilot projects' mileage fee systems operated at a reasonable cost. While FHWA assessed whether the costs of individual projects were reasonable and reported how state pilot projects identified ways to reduce the costs of mileage fee systems, FHWA did not establish criteria that identified whether the pilot project actions could reduce the costs of multistate systems or a nationwide system. Similarly, FHWA evaluated the level of public acceptance of the pilot projects. While FHWA's evaluation notes that having multiple options for reporting mileage could increase public acceptance of mileage fee systems in individual states, FHWA did not develop criteria to assess the feasibility or viability of using these alternatives for hundreds of millions of drivers on a national scale. FHWA officials noted that at the time of its cross-cutting evaluation, only a limited number of small-scale pilots had been conducted by the states, which limited the ability for FHWA to analyze any broader conclusions from the pilots.

- **Research on national mileage fees.** According to FHWA officials, they are researching the administrative and other costs of a national mileage fee system. In addition, according to DOT officials, FHWA is currently assessing data collection technologies based on the STSFA pilots to explore their feasibility for use on a national basis. FHWA officials stated that this research may address some of the cost and data collection issues raised in the state pilot projects. For example, the report on mileage fee costs, expected in 2022, may use information from the existing STSFA pilot projects. However, according to FHWA officials, this research will not evaluate, and is not intended to evaluate, the state pilot projects nor their scalability and applicability to a broader program. Given its focused scope, this research will also not consider many additional issues state DOTs identified during the pilot projects, including privacy, equity, and interoperability.

FHWA officials stated that they had not developed criteria to evaluate the scalability of the pilot projects because they were not given the funding needed to evaluate the applicability of a mileage fee system beyond the individual state pilots. The FAST Act did not dedicate funding for the agency to administer the STSFA program specifically or to conduct

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evaluations of the pilot projects. Rather, the FAST act provided STSFA funding to the states to conduct their pilot projects. As a result, according to FHWA officials, the agency has supported its initial evaluation efforts through other funding sources. FHWA officials stated that they will continue to evaluate the STSFA pilot projects funded in fiscal year 2018 through fiscal year 2021. In conducting future evaluations, officials also noted that they may need additional time to collect data from more recently completed pilot projects. The ongoing evaluations and time needed to collect data on the pilot projects presents FHWA with an opportunity to develop scalability criteria and subsequently integrate it into FHWA's evaluation approach while it obtains results on the remaining pilots.

In addition, FHWA officials stated that the FAST Act does not require the agency to develop recommendations for or define national policy related to mileage fees. However, developing criteria to assess the scalability of STSFA pilot projects beyond pilot states would not require FHWA to do so. Rather, it would position FHWA to provide information and, to the extent it can, make recommendations for congressional consideration regarding the applicability of a mileage fee system beyond pilot states to maintain the long-term solvency of the Highway Trust Fund, which is a program objective. As the federal agency responsible for administering the program, for evaluating the state pilot projects, and for ensuring that the activities carried out using the program funding meet program objectives, FHWA is in the best position to provide information to Congress regarding the adoption and implementation of any national mileage fee system policy.

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## Conclusions

The STSFA program was established to provide funding for states to demonstrate the potential for user-based alternatives revenue mechanisms, such as mileage fee systems, to maintain the long-term solvency of the Highway Trust Fund; this solvency will require an estimated \$191 billion over the next 10 years to cover projected revenue shortfalls. Since the program's inception in 2016, several states have used STSFA funds to explore mileage fee pilot projects with varying design and implementation approaches. Because the scope of each funded pilot project was small and driver participation in each pilot was limited and voluntary, FHWA's role in evaluating the various approaches and their potential scalability to a broader setting is vital. However, without clear information about the scalability of the pilot projects, informed by well-developed criteria, FHWA may be limited in its ability to communicate to Congress and others about whether a mileage fee

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system could generate revenue that could help maintain the long-term solvency of the Highway Trust Fund.

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## Recommendation for Executive Action

The Acting Administrator of FHWA should develop and apply criteria to assess the scalability of the STSFA pilot projects.

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## Agency Comments

We provided a draft of this report to the Department of Transportation for their review and comment. In its comments, reproduced in appendix II, DOT agreed with our recommendation. In addition, DOT provided technical comments, which we incorporated as appropriate.

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We are sending copies of this report to the appropriate congressional committees, the Secretary of the Department of Transportation, and other interested parties. In addition, the report is available at no charge on the GAO website at <https://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-2834 or [repkoe@gao.gov](mailto:repkoe@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix III.



Elizabeth Repko  
Director, Physical Infrastructure Issues

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*List of Addressees*

The Honorable Maria Cantwell  
Chair  
The Honorable Roger F. Wicker  
Ranking Member  
Committee on Commerce, Science, and Transportation  
United States Senate

The Honorable Thomas R. Carper  
Chairman  
The Honorable Shelly Moore Capito  
Ranking Member  
Committee on Environment and Public Works  
United States Senate

The Honorable Peter A. DeFazio  
Chairman  
The Honorable Sam Graves  
Ranking Member  
Committee on Transportation and Infrastructure  
House of Representatives

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# Appendix I: Results of GAO Survey of State Departments of Transportation about Mileage Fees

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To identify states' views on addressing future revenue demands using mileage fees, also known as vehicle miles-traveled (VMT) user fees, we surveyed the departments of transportation in all 50 states and the District of Columbia from February through June 2021 and received a 100 percent response rate. We conducted a similar survey in our prior work on the topic in 2012 and also received a 100 percent response rate.<sup>1</sup> We provide some observations below, followed by the full survey results.

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## Survey Observations

According to the survey respondents, most states have taken some steps to evaluate VMT user fees (referred to as mileage fees in the rest of this report.) For example, 40 of the 51 states have reviewed research, and 28 have reviewed the technologies for administering a mileage fee. Fewer states have actively conducted research into mileage fees. For example, 13 have conducted research into public acceptance of mileage fees, and 13 have conducted a pilot to test mileage fees. This represents an increase from our previous survey in 2012, when three states had taken either of these actions. Seven states have conducted specific research into mileage fees for commercial trucks, unchanged since our last survey. We recommended additional research in this area in our 2012 report, due to the wear and tear trucks cause to the roads.

A few states plan to have operational mileage fee systems in the near future, but most were not interested in piloting such systems. Specifically, two states reported having an operational system at the time of the survey, and three said they plan to implement such a system in the next 12 months. We also asked states about their interest in participating in the Federal Highway Administration's Surface Transportation System Funding Alternatives (STSFA) program. Sixteen states reported applying for a grant through the program. Of the states that did not apply, six reported that they were interested in piloting a mileage fee system, while most (22 states) were not. States cited a variety of reasons for not doing so, including a lack of legislative interest in mileage fees and the challenges with such systems described below.

Although most states are not implementing mileage fees, the number of states describing the challenges with developing such user fee systems as "very challenging" has decreased from the responses in our 2012 survey for all but one issue.<sup>2</sup> For example, 36 states reported in 2012 that

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<sup>1</sup>GAO, *Highway Trust Fund: Pilot Program Could Help Determine the Viability of Mileage Fees for Certain Vehicles*, [GAO-13-77](#) (Washington, D.C.: Dec. 13, 2012).

<sup>2</sup>We did not include interoperability as a challenge in the 2012 survey.

**Appendix I: Results of GAO Survey of State  
Departments of Transportation about Mileage  
Fees**

obtaining public support for a mileage fee program would be a very great challenge; currently 22 states report the same. The top three challenges—obtaining public support (22 states responding “very great challenge”), obtaining support from elected officials (22 states) and addressing privacy concerns (21 states)—remain the top cited challenges since our prior survey. Fewer states also thought the technical aspects of implementing a mileage system would be a very serious challenge—only seven states responded that addressing the technological issues would be a very great challenge, while six responded developing the technical capacity or expertise would be a very great challenge.

**Survey Results**

**Table 1: Question 1. Has your state DOT taken or planned to take any of the following steps to evaluate VMT user fees? (Check one per row.)**

Question	Year	Response				Total responses
		Yes	No, but plan to do so in the next 12 months	No, and have no plans in the next 12 months	Don't know	
a. Reviewed existing research	2021	40	2	7	2	51
	2012	36	3	11	1	51
b. Conducted a review of the technologies and systems available to administer a VMT user fee program	2021	28	6	16	1	51
	2012	16	6	27	2	51
c. Conducted economic analysis on the viability of a VMT system	2021	9	14	25	3	51
	2012	5	5	39	2	51
d. Conducted research (e.g., survey or focus groups) to gauge the public's potential acceptance	2021	13	9	25	4	51
	2012	3	7	41		51
e. Conducted a pilot project to test a VMT user fee system	2021	13	2	33	3	51
	2012	3	4	44		51
f. Conducted specific research to evaluate VMT user fees for commercial trucks	2021	7	9	32	3	51
	2012	7	3	40	1	51
g. Participated in research with other states to evaluate VMT user fees	2021	27	4	18	2	51
	2012	14	5	30	2	51

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Question	Year	Response				Total responses
		Yes	No, but plan to do so in the next 12 months	No, and have no plans in the next 12 months	Don't know	
h. Shared information with other states related to VMT user fees	2021	25	6	17	3	51
	2012	17	5	28	1	51
i. Other (please specify)	2021	15		4	3	22
	2012	6	1	6	8	21

Source: GAO 22-104299

**Table 2: Question 2. Does your state currently have an operational VMT user fee program?**

Yes	2
No, but plan to do so in the next 12 months	3
No, and have no plans in the next 12 months	46
Don't know	0
<b>Total responses</b>	<b>51</b>

Source: GAO 22-104299

**Table 3: Question 3. How much of a challenge might the following issues present to developing a VMT user fee program in your state? (Check one per row.)**

Question	Year	Very great challenge	Great challenge	Moderate challenge	Some challenge	No challenge	Don't know	Total responses
a. Addressing technological issues	2021	7	16	12	9	1	5	50
	2012	8	13	21	4	2	3	51
b. Addressing privacy concerns	2021	21	13	10	1	1	4	50
	2012	23	22	1	2	1	2	51
c. Educating the public about the viability of the current gas tax to meet funding demands	2021	10	23	9	4	1	3	50
	2012	18	9	15	7	2		51
d. Obtaining public support for a VMT user fee program	2021	22	22	2	1		3	50
	2012	36	11	2			2	51

**Appendix I: Results of GAO Survey of State  
Departments of Transportation about Mileage  
Fees**

Question	Year	Very great challenge	Great challenge	Moderate challenge	Some challenge	No challenge	Don't know	Total responses
e. Obtaining support from elected officials for a VMT user fee program	2021	22	15	8	2		3	<b>50</b>
	2012	30	12	6	1		2	<b>51</b>
f. Addressing equity concerns for how different groups (e.g., rural, urban, low-income drivers) could be affected	2021	11	16	14	6	1	3	<b>51</b>
	2012	11	19	14	3		4	<b>51</b>
g. Administrative costs of implementing VMT program (e.g., collection of fees, enforcement, compliance)	2021	12	18	8	5	1	6	<b>50</b>
	2012	14	15	13	5		4	<b>51</b>
h. Developing the technical capacity or expertise to implement a VMT program	2021	6	17	14	7	1	5	<b>50</b>
	2012	7	9	26	7		2	<b>51</b>
i. Legal barriers to implementing a VMT program in state (e.g., required changes to state's constitution)	2021	8	13	8	6	2	12	<b>49</b>
	2012	9	15	9	5	2	11	<b>51</b>
j. Obtaining funding necessary to evaluate or test a VMT program	2021	5	14	15	10	2	4	<b>50</b>
	2012	9	10	17	7	2	6	<b>51</b>
k. Interoperability (e.g. reconciling mileage and fees between states and other jurisdictions)	2021	12	16	12	4	1	6	<b>51</b>
l. Other (please specify)	2021	7	1	1			4	<b>13</b>
	2012	3		1			9	<b>13</b>

Source: GAO 22-104299

Appendix I: Results of GAO Survey of State  
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**Table 4: Question 4. Has your state applied for a Surface Transportation System Funding Alternatives (STSFA) grant through the Federal Highway Administration (FHWA?)**

Yes	16
No	29
Don't know	6
<b>Total responses</b>	<b>51</b>

Source: GAO 22-104299

**Table 5: Question 5. (If No/Don't Know on question 4) Is your state interested in piloting a VMT system?**

Yes, interested	6
No, not interested	22
Don't know	9
<b>Total responses</b>	<b>37</b>

Source: GAO 22-104299

**Table 6: Question 6. Do you have any additional comments regarding VMT user fees? If so, please enter them below:**

Open Ended	6
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Source: GAO 22-104299

# Appendix II: Comments from the Department of Transportation



U.S. Department of  
Transportation

Office of the Secretary  
of Transportation

Assistant Secretary  
for Administration

1200 New Jersey Ave., SE  
Washington, DC 20590

December 1, 2021

Elizabeth Repko  
Director, Physical Infrastructure  
U.S. Government Accountability Office (GAO)  
441 G Street NW  
Washington, DC 20548

Dear Ms. Repko:

The Federal Highway Administration (FHWA) is committed to supporting State departments of transportation efforts to explore user-based alternative revenue mechanisms that could maintain the long-term solvency of the Highway Trust Fund. The FHWA developed a robust national framework designed to address the key questions Congress outlined in the Fixing America's Surface Transportation (FAST) Act Section 6020. As GAO noted in its report, FHWA followed most leading practices when designing and evaluating the Surface Transportation System Funding Alternatives (STSFA) program. In less than five years, the FHWA has supported States in successfully launching multiple mileage-based pilot programs that have provided lessons learned for future deployment of alternative revenue mechanisms that utilize a user fee structure

In addition to administering the grant program, the FHWA continues to advance the objectives of the STSFA by:

- Providing support to conduct an independent evaluation of pilots;
- Sharing results from the pilots and working with stakeholders to increase interest and awareness in other locations;
- Analyzing potential economic, financial, logistic, and administrative impacts of implementing a national pilot; and
- Assessing road user charge data collection technologies for feasibility of use on a national basis and technical and policy implications.

Upon review of the GAO's draft report, we concur with the recommendation to develop and apply criteria to assess the scalability of the STSFA pilot projects. The fiscal year 2021 Notice of Funding Opportunity included evaluation of the scalability of the proposed demonstration mechanism in the proposal selection criteria. The ability to meaningfully assess scalability has been limited to date by the availability of results from only a limited number of small-scale pilots. As pilots continue to progress, additional information should become available to support an assessment. In addition, the Department of Transportation will implement the new requirement in the Infrastructure Investment and Jobs Act to create a pilot program to evaluate

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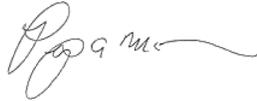
**Appendix II: Comments from the Department  
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the effectiveness and practicability of a per-mile user fee on a nation-wide basis. The FHWA will provide a detailed response to the GAO recommendation within 180 days of the final report's issuance.

We appreciate the opportunity to respond to the GAO draft report. Please contact Madeline M. Chulumovich, Director Audit Relations and Program Improvement, at (202) 366-6512 with any questions or if you would like to obtain additional details.

Sincerely,

A handwritten signature in black ink, appearing to read "P. A. McNamara", with a long horizontal flourish extending to the right.

Philip A. McNamara  
Assistant Secretary for Administration

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# Appendix III: GAO Contact and Staff Acknowledgments

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## GAO Contact

Elizabeth Repko, (202) 512-2834 or [RepkoE@gao.gov](mailto:RepkoE@gao.gov)

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## Staff Acknowledgments

In addition to the contact above, Matt Voit (Assistant Director); John F. Miller (Analyst-in-Charge); William R. Chatlos; Jennifer Clayborne; Steve Cohen; Sarah Green; Catrin Jones; Delwen Jones; Andrea Levine; Mary-Catherine P. Overcash; Malika Rice; and Elizabeth Wood made key contributions to this report.

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