

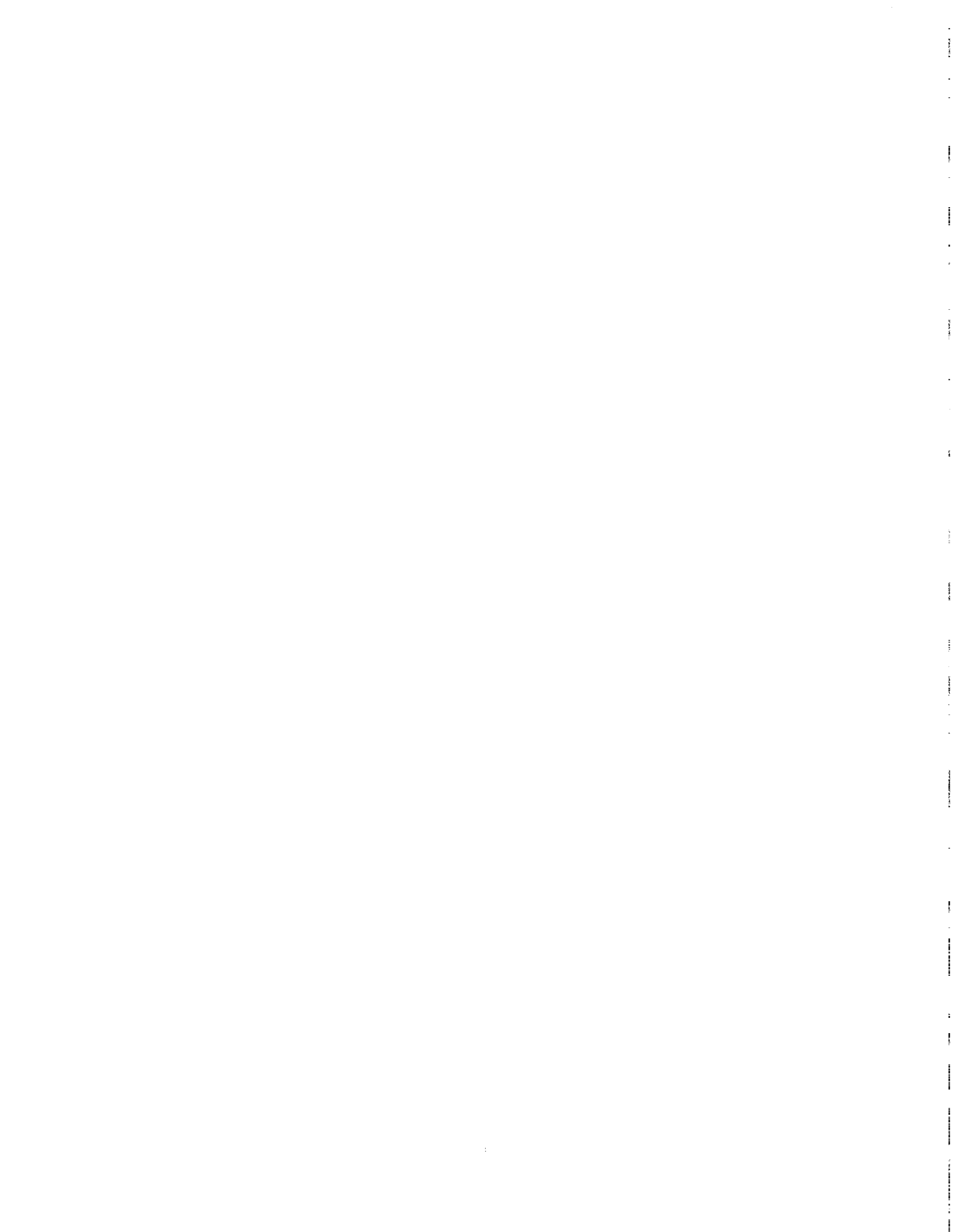
June 1994

# HIGHWAY USER FEES

## Updated Data Needed to Determine Whether All Users Pay Their Fair Share



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United States  
General Accounting Office  
Washington, D.C. 20548

Resources, Community, and  
Economic Development Division

B-256955

June 7, 1994

The Honorable Norman Y. Mineta  
Chairman, Committee on Public Works  
and Transportation  
House of Representatives

Dear Mr. Chairman:

Each year, our nation's deteriorating roads and highways impose billions of dollars in additional costs on their users. The Road Information Program estimates that in 1991, U.S. motorists and truck operators spent \$17.4 billion in wasted fuel, added tire wear, and extra vehicle repairs as a result of driving on roads and highways in poor and fair condition.<sup>1</sup> Likewise, the Federal Highway Administration (FHWA) estimates that the costs of driving on poor pavement are at least 35 percent higher than the costs of driving on pavements in good condition. To develop and maintain highways for use by the nation's 144.2 million automobiles and 45.5 million trucks, the federal government collects user fees. The largest share of these fees, 89 percent, comes from fuel taxes.

There is concern, however, that fuel taxes, combined with other federal user fees, may not be the most equitable and efficient way to allocate highway costs because such taxes do not sufficiently correlate the charges that users pay with the damage that they cause.<sup>2</sup> Highway wear increases exponentially with the weight of a vehicle's axle load, and past studies have suggested that heavy trucks may not be paying their fair share of highway costs. In 1982, for example, FHWA found that the largest trucks (over 75,000 pounds) paid only 50 cents for every dollar's worth of highway damage they caused, while the smallest trucks (under 26,000 pounds) paid \$1.30 for every dollar's worth of highway damage they caused. In light of such findings, you asked us to (1) summarize the rationale for and arguments against assessing fees explicitly according to the wear a user causes to highways, (2) evaluate the recent experiences of the states that assess or have rescinded wear-based fees, and (3) identify potential approaches that might be used to overcome the obstacles to implementing such fees.

<sup>1</sup>The Road Information Program is a nonprofit organization that researches, evaluates, and distributes economic and technical data on highway issues.

<sup>2</sup>Other costs associated with highway use include congestion and pollution. However, federal highway programs primarily address pavement costs. As requested, this report therefore focuses on the extent to which the current federal system charges highway users for the wear they cause.

## Results in Brief

Charging users according to the wear they cause to highways is based on the premise that such fees would increase both equity and efficiency. Proponents contend that the current fees do not capture the key elements that cause highway wear: a vehicle's weight per axle and the miles traveled. They argue that a user fee based on the weight and distance traveled would more accurately charge heavy trucks for the wear they cause and, in the long run, provide truck operators with an incentive to use loading configurations and choose truck designs that reduce pavement wear. Opponents argue that such wear-based fees are (1) unnecessary because heavy trucks are currently paying their fair share, (2) costly to administer and enforce, and (3) easy to evade. It is difficult to determine whether the current federal user fee system undercharges heavy trucks because the last comprehensive FHWA study of this issue, done in 1982, is out of date.

The states' recent experiences with charging heavy trucks on the basis of weight and distance have varied. In 1989, 11 states employed such fees; today, only 6 continue to do so. Two states that had attempted to charge on a per-trip basis abandoned their fees because the administrative costs (i.e., data collection and verification costs) consumed about 20 percent of the revenues collected. Another state rescinded its fee because of widespread evasion. Finally, two states rescinded their fees following legal challenges that their systems favored intrastate truck operators over interstate operators. The Supreme Court has held that favoring intrastate over interstate operations is unconstitutional. Officials from those two states, as well as the six states that currently impose weight-distance user fees, emphasized that they efficiently implemented such fees, spending only between 2 and 5 percent of the revenues collected on administrative costs.

The obstacles that prevented some states from efficiently administering and enforcing weight-distance user fees—high administrative costs and evasion rates—can be minimized. Intelligent Vehicle Highway Systems technologies now emerging, such as weigh-in-motion and automatic vehicle identification systems, are beginning to allow states to more efficiently collect data on vehicle weight and miles traveled. FHWA officials emphasized that the efficient implementation of a national weight-distance user fee is currently feasible. They noted that new technologies could facilitate the enforcement of such a fee and allow greater precision in charging trucks on a weight-per-axle basis.

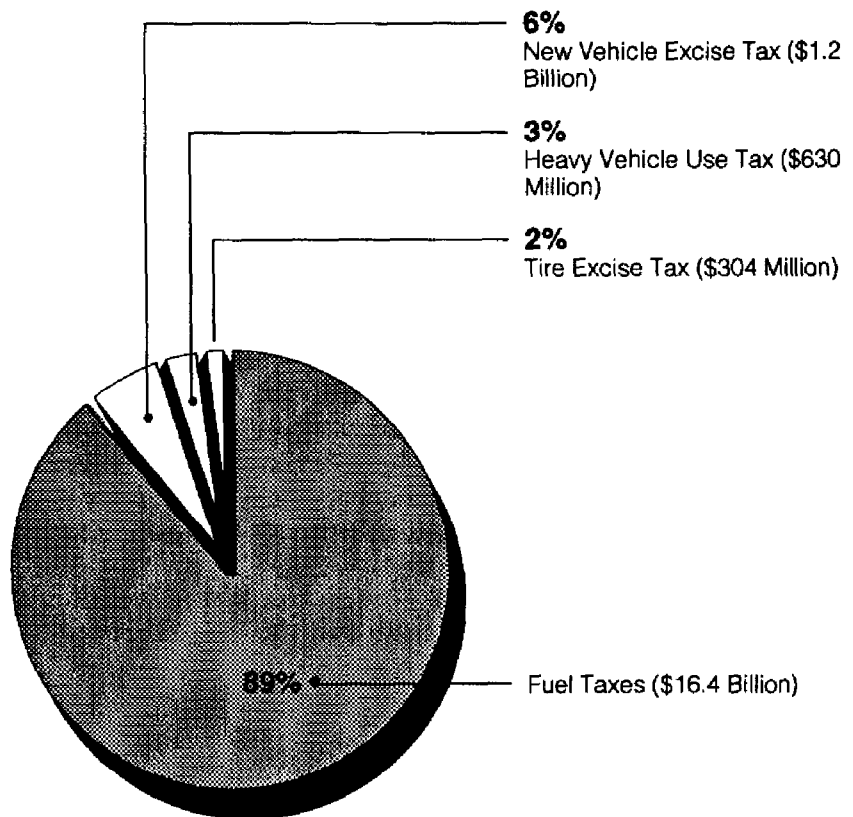
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## Background

Damage to highway pavement, such as cracks and potholes, is caused by a combination of weathering and use by vehicles. Damage increases exponentially as the weight carried on each axle of a vehicle increases. Between 1958 and 1960, the American Association of State Highway Officials conducted road tests to determine the relationships between axle weights and pavement wear. The tests showed, for example, that an axle weight of 30,000 pounds causes 8 times more pavement damage than an axle weight of 18,000 pounds. The relationships developed from these tests are still used today to attribute the pavement wear caused by various vehicles.

To develop and maintain major highways, the federal government collects user fees and disburses the funds to the states. In fiscal year 1993, the federal government collected over \$18.5 billion from four user fees: fuel taxes (gasoline and diesel), a heavy vehicle use tax, a new vehicle excise tax, and an excise tax on heavy tires. (App. I provides additional information on these fees.) As figure 1 shows, fuel taxes are the largest source of revenue.

**Figure 1: Receipts From Federal Highway User Fees by Category, Fiscal Year 1993**



Source: Based on data from FHWA.

Concerned that under the federal fee structure, heavy trucks were not paying their fair share relative to the wear they caused to the nation's highways, the Congress mandated, as part of the Surface Transportation Assistance Act of 1978, that FHWA conduct a formal study of the equity of highway user fees. After a 3-year review, FHWA reported that there were sizable inequities in the federal highway user fee system. Specifically, FHWA found that the heaviest trucks were underpaying their fair share of taxes by about 50 percent, lighter trucks were overpaying by between 30 and 70 percent (depending on weight), and automobiles were overpaying by

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10 percent.<sup>3</sup> To increase highway revenues and respond to the study, the Congress passed the first major increase in federal highway use taxes since 1956. In the Surface Transportation Assistance Act of 1982, the Congress raised gasoline and diesel taxes from 4 to 9 cents per gallon to increase revenues. To improve equity, the Congress also mandated that the ceiling for the heavy vehicle use tax be increased from \$240 a year to \$1,900 a year by 1989.

In response to concerns of the trucking industry about the new tax structure, the Congress again revised the system in 1984 with the passage of the Deficit Reduction Act. Under that act, the ceiling for the heavy vehicle use tax was lowered from \$1,900 to \$550 a year. To ensure that this action was revenue neutral, the Congress raised the tax on diesel fuel by 6 cents per gallon, from 9 cents to 15 cents per gallon. The Congress also mandated that the Secretary of Transportation (1) determine if vehicles weighing 80,000 pounds or more were paying their fair share of highway costs and (2) study the feasibility of a national user fee based on weight and distance that would replace all federal highway user charges on trucks except fuel taxes.

Emphasizing that the results could not be compared with those of its formal cost allocation study in 1982 because of methodological differences and a more limited scope, FHWA reported to the Congress in November 1988 that trucks weighing between 70,000 and 80,000 pounds were paying about 81 percent of their fair share of highway costs relative to all other trucks but that those weighing between 80,000 and 90,000 pounds were paying only 49 percent of their share.<sup>4</sup> In December 1988, FHWA also reported to the Congress that a national highway user fee based on weight and the distance traveled was feasible.<sup>5</sup> Since these reports, a national weight-distance user fee has not been adopted, but federal user fees have increased: the gasoline tax from 9 cents to 18.4 cents per gallon; the diesel tax from 15 cents to 24.4 cents per gallon; the new truck and trailer sales tax from 10 percent of the wholesale price to 12 percent of the

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<sup>3</sup>Final Report on the Federal Highway Cost Allocation Study, U.S. Department of Transportation, FHWA (Washington, D.C.: May 1982).

<sup>4</sup>Heavy Vehicle Cost Responsibility Study, Department of Transportation, FHWA (Washington, D.C.: Nov. 1988). Unlike the 1982 study, which examined whether all highway users pay their fair share, the 1988 study examined only whether the heaviest trucks pay their fair share relative to other trucks. According to FHWA officials, if all highway users had been considered, the 1988 study would likely have shown heavy trucks paying an even smaller portion of their fair share.

<sup>5</sup>The Feasibility of a National Weight-Distance Tax, Department of Transportation, FHWA (Washington, D.C.: Dec. 1988).

retail price; and the heavy tire tax from 9.75 cents to 50 cents a pound for tires over 90 pounds.

In addition to receiving federal funds, the states charge user fees—generally a combination of fuel taxes and registration fees—to finance road construction and maintenance. Six states—Arizona, Idaho, Kentucky, New Mexico, New York, and Oregon—also impose user fees based on weight and distance.

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### **Rationale for and Arguments Against Assessing Fees Explicitly on the Basis of the Wear a User Causes**

Assessing highway user fees explicitly on the basis of the wear a user causes to the highways is based on the premise that such fees would increase both equity and efficiency. According to proponents of wear-based fees, the current user fees do not effectively capture the key elements that cause wear on highways. In their view, a user fee based on weight and distance is a simple and accurate way to charge heavy trucks for the wear they cause and, in the long run, will provide truck operators with an incentive to choose truck designs that minimize pavement wear. Opponents argue that such a wear-based fee is (1) unnecessary because heavy trucks currently pay their fair share, (2) costly to administer and enforce, and (3) easy to evade. It is difficult to determine whether the current system overcharges or undercharges heavy trucks because the last comprehensive FHWA study to determine if all users pay their fair share, which in 1982 found that heavy trucks were underpaying, is out of date.

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### **Rationale for User Fees Based on Weight and Distance**

FHWA officials, as well as representatives from the American Association of State Highway and Transportation Officials (AASHTO), the Automobile Association of America, and several states, maintained that heavy trucks—particularly the approximately 500,000 combination trucks that have gross weights over 75,000 pounds—continue to pay far less in federal highway user fees than the costs they impose for highway maintenance and repair. According to these officials, the current federal highway user fee structure continues to be inequitable because it does not effectively capture the two key components of travel that cause highway wear: severity (the vehicle's weight per axle) and amount (the miles traveled). They added that under a wear-based user fee that accounted for these factors (i.e., a weight-distance user fee), heavy truck operators would be charged more accurately for the highway wear they cause and would, in the long run, have an incentive to use trucks designed to reduce pavement wear. Supporting this view, the Congressional Budget Office found, in 1992, that the current federal highway user fee structure is "not as efficient



as it could be" and concluded that charging users on the basis of "the damage caused by heavy loads on each axle would encourage more efficient distribution of these loads and reduce damage to roadways."<sup>6</sup>

Although they emphasized that the agency has not conducted a formal cost allocation study since 1982, FHWA officials told us that their internal analyses have produced results similar to those of the 1982 study. These officials stated, however, that these analyses are not based on a formal study. They also noted that the 1982 study is out of date because it depended on data on highway wear from the 1958-60 road tests and data on highway costs from 1977.

In addition to citing FHWA's 1982 study, proponents of a weight-distance user fee also argue that fuel taxes (1) do not adequately reflect the different amounts of pavement wear caused by automobiles and trucks and (2) are subject to extensive evasion. Although heavier trucks consume more fuel and therefore pay more fuel taxes, pavement repair costs rise more rapidly with a vehicle's weight than do fuel taxes. For example, according to AASHTO, an 80,000-pound, 4-axle truck typically does twice as much damage per mile as a 50,000-pound, 4-axle truck but uses only 14 percent more fuel. As a result, the heavier truck is undercharged relative to the damage caused while the lighter truck is overcharged.

In addition, fuel taxes have been characterized by a high level of evasion. Evasion is possible because, under federal law, both gasoline and diesel fuel can be purchased tax-free if the fuel will be used for certain specified purposes (e.g., in farm vehicles or as home heating oil).<sup>7</sup> Several evasion schemes have been used in the past. Under the most popular scheme, wholesale distributors purchase the fuel tax-free and pass ownership—on paper only—through several companies that are registered with the Internal Revenue Service to possess tax-free fuel. The fuel is then sold to an unregistered company, such as a gas station, that sells it for a taxable use, such as truck operations. Although the unregistered company collects the tax from truck operators, it does not remit the funds to the Internal Revenue Service. Given the numerous changes in the ownership of the fuel in such cases, the Internal Revenue Service has difficulty collecting the tax. In June 1993, FHWA estimated that the level of gasoline tax evasion was between 3 and 7 percent of the gallons consumed and the level of diesel

<sup>6</sup>Paying for Highways, Airways, and Waterways: How Can Users Be Charged?, Congressional Budget Office (Washington, D.C.: May 1992).

<sup>7</sup>For a fuller discussion of fuel tax evasion, see Tax Administration: Status of Efforts to Curb Motor Fuel Tax Evasion (GAO/GGD-92-67, May 12, 1992).

tax evasion was between 15 and 25 percent of the gallons consumed.<sup>8</sup> According to FHWA, evasion at these levels translates into a loss of \$1.3 billion in federal revenues each year.

Likewise, proponents of a weight-distance user fee argue that federal efforts to make highway user fees more equitable through the heavy vehicle use tax, new vehicle excise tax, and heavy tire tax have been ineffective. For example, they note that the heavy vehicle use tax is relatively small and is capped at a low amount (\$550) for trucks weighing over 75,000 pounds. As a result, it fails to charge for the additional wear caused by the heaviest trucks on the highways. Proponents of a weight-distance user fee emphasize that funding equity cannot be achieved by simply adjusting the fees charged under the current system. (App. I provides additional discussion on the strengths and weaknesses of the current federal highway user fees.)

In light of the shortcomings of the current system, proponents call for the federal government to implement a new, wear-based method of taxation. Proponents claim that besides providing a fairer tax system, federal highway user fees that reflect the damage caused by heavy axle loads would encourage more efficient distribution of these loads, discourage overloading, and eventually reduce the damage to roadways. Heavily loaded trucks would pay more, and lightly loaded trucks or trucks spreading heavier weights over more axles would pay less. In the long run, adjustments would be likely because trucking companies replacing old equipment with new would have an incentive to increase the number of axles on their vehicles, use smaller trucks, or urge vehicle manufacturers to develop truck designs that cause less pavement damage.

Furthermore, proponents state that a weight-distance user fee would be most equitable if users were charged on the basis of the actual operating weight per axle. They note, however, that a system that tracked the axle weights and mileage of every trip made by each truck operator would be too burdensome to administrate for both the trucking industry and the government. Instead, they advocate a system in which trucks are charged on the basis of their registered maximum gross vehicle weight (the maximum a truck is licensed to carry), the number of axles, and the number of miles traveled. FHWA officials noted that Oregon employs such a system for trucks with registered weights exceeding 80,000 pounds. These officials emphasized that (1) Oregon's system could serve as a model for a

<sup>8</sup>The Joint Federal/State Motor Fuel Tax Compliance Project: Fiscal Year 1992 Status Report, Department of Transportation, FHWA (Washington, D.C.: June 1993).

national weight-distance user fee and (2) most, if not all, states already collect the data needed to administer such a fee through their participation in the International Fuel Tax Agreement and the International Registration Plan.<sup>9</sup> These officials and other proponents contend that the increased equity and eventual reduction in pavement wear that would result from such a user fee would come with little increase in administrative and enforcement costs for the government or compliance costs for the trucking industry. Some advocates also note that if such a wear-based fee replaced diesel fuel taxes, the federal government's revenues would increase by millions of dollars because of the reduced potential for evasion.

In supporting their position, advocates of a weight-distance user fee also cite the results of the congressionally mandated study released in December 1988 on the feasibility of a national weight-distance fee. In that study, FHWA reported to the Congress that (1) current federal highway user fees created "glaring inequities" between the different users, (2) a national weight-distance user fee could substantially reduce these inequities and also protect highways from pavement damage caused by trucks with heavy axle weights, and (3) a national fee was feasible in part because "administrative and compliance costs . . . would not be prohibitive, nor would there be significant adverse impacts on interstate commerce."

Finally, advocates of a weight-distance user fee note that other countries impose such fees and that the European Union has recently taken action to implement them. For example, New Zealand has charged heavy trucks on the basis of weight and distance since 1978. And, in October 1993, the Council of the European Communities directed member countries, by January 1995, to charge all trucks over 12 metric tons (approximately 26,400 pounds) at least a minimum fee based on weight, the number of axles, and the distance traveled.

In February 1992, in a formal policy statement, AASHTO reiterated its support for a national fee of this type:

<sup>9</sup>The International Fuel Tax Agreement is an interstate agreement for the collection and distribution of fuel taxes. The International Registration Plan is an interstate agreement for the apportionment of registration fees. The Intermodal Surface Transportation and Efficiency Act of 1991 encouraged states to participate in these agreements. The act (1) prevents states not participating in the agreements from limiting the operations of truck operators from participating states and (2) requires that state laws on the collection of fuel taxes from interstate truck operators conform to these agreements by Sept. 30, 1996. As of May 1994, 47 states were participating in the registration agreement, and 27 states were participating in the fuel tax agreement. Under these agreements, states collect data on the miles that truck operators travel in their state and on registered truck weights.

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"A federal weight-distance tax should be considered by Congress as a substitute for the heavy vehicle use tax and all other federal user fees on trucks except for a federal fuel tax levied at the same rate as on all other vehicle classes. The truck tax structure should be designed to yield revenues at least equal to the existing structure of taxes and to achieve as much equity as possible both between and within different truck classes."

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## Arguments Against Weight-Distance User Fees

The U.S. trucking industry vehemently opposes weight-distance user fees. Specifically, representatives of the American Trucking Associations (ATA) and the National Private Truck Council, as well as representatives we interviewed from several trucking companies, emphasized that they believe weight-distance user fees to be (1) unnecessary, (2) inequitable in both theory and practice, (3) difficult and costly for governments to administer and truck operators to comply with, and (4) vulnerable to more evasion than current user fees. Finally, they noted that the relationships between axle weight and pavement damage established in the 1958-60 road tests, on which most highway cost allocation studies are based, are out of date.

First, these trucking representatives believe that one of the premises underlying weight-distance user fees—that large truck operators are not paying their fair share of highway costs—is erroneous. Acknowledging that highway users should pay their fair share relative to pavement wear, they stated that the current federal user fee system adequately captures weight and distance factors and that because of several federal tax increases since the 1982 FHWA study, heavy trucks are now paying their fair share. They argue that the current system of registration fees and fuel taxes is a good theoretical surrogate for a weight-distance fee and that these fees are easier to collect and administer. They contend that registration fees take vehicle weight into account and that fuel-tax liability increases with both vehicle weight and miles traveled. ATA officials also emphasized that several recent state studies have found that heavy trucks are paying their fair share of highway costs. Although these officials did not endorse a new cost allocation study by FHWA, they believe that such a study would confirm their position. They noted that FHWA's 1988 Heavy Vehicle Cost Responsibility Study found that trucks weighing between 70,000 and 80,000 pounds paid 81 percent of their fair share of highway costs relative to other trucks.

Second, trucking representatives held that weight-distance user fees are inequitable in both theory and practice. Noting that pavement wear increases exponentially as the weight per axle (not the total weight)

increases, these officials emphasized that to approximate actual highway costs, a weight-distance user fee must be based on a truck's axle weight, not on the gross weight. They note that to date, only Oregon has implemented a user fee (for trucks weighing over 80,000 pounds) designed to account for the weight per axle and distance traveled. They emphasized that such a fee would be costly to implement and administer on a full scale. Other states that have implemented weight-distance user fees have based their fees on the registered maximum gross weight of the trucks.

Fees imposed according to the registered gross vehicle weights do not take adequate account of the trips a vehicle may make when it is only partially loaded or when it is empty. In some kinds of trucking businesses, such as tank-truck operations, vehicles operate empty nearly half the time. Numerous other trucks operate most or all of the time at a weight less than their registered weight. According to trucking representatives, a fee that does not take into account these variations in weight is less equitable than the current fees.

In addition, these representatives argue that a weight-distance user fee levied according to the registered gross vehicle weight does not factor in the weight of each axle, which is the key factor in pavement wear. For example, an 80,000-pound, 5-axle truck (with a heaviest axle weight of 17,000 pounds) will cause far less pavement damage than a 80,000-pound, 3-axle truck (with a heaviest axle weight of 35,000 pounds). However, under most weight-distance fees as currently designed, the 5-axle truck is charged the same as the 3-axle truck even though the 3-axle truck does more damage. Trucking representatives noted that the only truly equitable fee would be one that takes into account the axle weight per mile of operation. They emphasized, however, that such a user fee would be impossible to administer and enforce at a reasonable cost.

Similarly, trucking representatives noted that most heavy trucks spend most of their time on rural Interstate and primary highways and very little on the high-cost urban or secondary roads that do not generate sufficient highway user revenue to support themselves. Weight-distance fees, they argue, thus shift the tax burden for roads as a whole largely to interstate heavy truck traffic. Support for urban and secondary roads should come instead, they believe, from broadly shared tax sources, such as registration fees, fuel taxes, and property taxes.

Third, trucking representatives assert that a weight-distance user fee of any kind is difficult for the government to administer and truck operators

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to comply with. To administer the fee, states must collect, maintain, and verify truck operators' reports of the miles traveled and registered vehicle weight. They believe that this need would entail the creation of new government bureaucracies. Such record-keeping and enforcement, they argue, would entail much higher costs than the current system. In addition, trucking representatives say that they incur higher costs when they operate in states that have such fees because of the additional record-keeping and the checking required at the ports of entry into those states. They note, for example, that New York and New Jersey carriers report spending as much or more to collect the information necessary to pay the New York weight-distance user fee as they pay in actual fees.

Fourth, trucking representatives argue that weight-distance user fees are more susceptible to evasion than other taxes. They assert that the tax is regarded as an unfair tax by those who are expected to pay it and that, other things being equal, an unpopular tax is more likely to be evaded than more acceptable taxes. They also say that such fees are easy to evade because of the extensive record-keeping required and the limited auditing conducted. This ease of evasion would give a carrier that could avoid paying a weight-distance user fee a considerable advantage over its more honest competitors. Thus, trucking representatives contend, honest truckers will face the choice of leaving the road or evading the tax.

Finally, trucking representatives stated that the pavement damage relationships derived by the American Association of State Highway Officials (now AASHTO) from the 1958-60 road tests are out of date. These relationships do not reflect the numerous changes that have occurred since the early 1960s in pavement design and trucks' operating characteristics. For example, the road tests did not include any pavements with special drainage layers and pipes, which are commonly used today. Adequate drainage is now considered critical in reducing pavement damage during wet seasons. In addition, many trucks now use radial tires and new suspension systems, which are less damaging to pavement surfaces. Trucking representatives and AASHTO officials noted, however, that a study of long-term pavement performance currently being conducted by the Strategic Highway Research Program will provide updated data on the relationships between pavement damage and axle weights.<sup>10</sup> These data could be used as a part of a new FHWA cost allocation study.

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<sup>10</sup>The Strategic Highway Research Program was created by the Congress in 1987 to conduct research, development, and technology transfer activities that the Secretary of Transportation determines to be strategically important to the national highway transportation system.

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## States' Recent Experiences With Weight-Distance User Fees

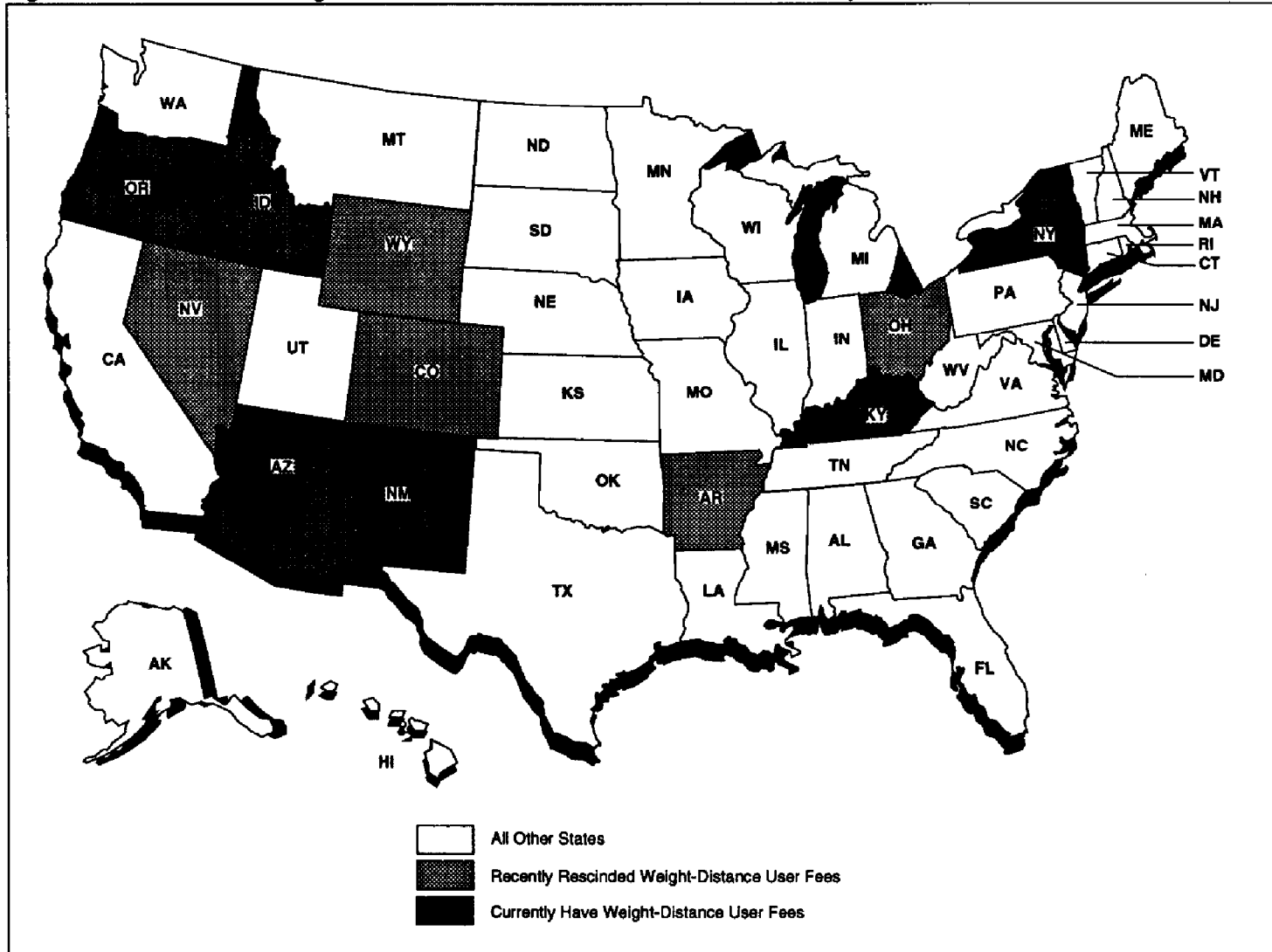
The states' recent experiences with charging heavy trucks on the basis of weight and distance have varied, depending largely on the type of system employed. Those states that attempted to charge on a per-trip basis abandoned their fees because of high administrative costs. Other states have implemented less precise weight-distance user fees. According to officials in those states, they have been able to efficiently collect such fees and increase funding equity among users.

Only six states currently charge heavy trucks on the basis of their weight and the distance traveled. Between 1989 and 1991, five states repealed their weight-distance fees—two because of legal challenges and three because of high administrative costs and/or compliance problems. Our discussions with state officials and trucking representatives and our review of relevant studies from the (1) six states that currently have weight-distance fees and (2) five states that have recently repealed their fees indicate that these states have had differing experiences. The 11 states we examined are shown in figure 2.<sup>11</sup>

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<sup>11</sup>Since the 1920s, 22 states have implemented—in varying forms—user fees on heavy trucks based on their weight and the distance traveled. In examining recent state experiences, we focused on the 6 states currently charging such fees and the 5 states that have repealed them since 1989 because the other 11 states abandoned their fees between the 1920s and the 1970s.

Figure 2: States That Have Weight-Distance User Fees and States That Have Recently Rescinded Such Fees



Source: Survey of states by The Road Information Program for GAO.

Highway officials in all 11 states said that their weight-distance user fee involved a trade-off between equity (all highway users paying their fair share) and administrative and enforcement costs. Officials in 8 of the 11 states told us, however, that their user fee had increased equity at a relatively low level of administrative and enforcement costs. Highway



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officials in the other three states provided a much different perspective: For them, the administrative costs and/or the rate of noncompliance had been unacceptably high.

Of the 11 states, officials in Arizona, Arkansas, Idaho, Kentucky, Nevada, New Mexico, New York, and Oregon stated that they have increased equity with a relatively small increase in administrative and enforcement costs. In states with a relatively simple fee structure, such costs were extremely low (2.8 percent of the revenues collected in Arkansas and 2.2 percent in Nevada). The simple fee structure in Arkansas, for example, consisted of an annual charge of 2.5 cents per loaded mile for trucks weighing over 73,280 pounds. In states with a more complex fee structure, administrative and enforcement costs were somewhat higher. For example, Oregon collects a fee based on a graduated scale for trucks over 26,000 pounds and an axle-based weight-distance charge for trucks over 80,000 pounds. Oregon officials placed administrative and enforcement costs at between 3.8 and 4.4 percent of total collections. These officials emphasized that such costs were acceptable given the high level of highway funding equity among users that Oregon has achieved.

However, three states have abandoned weight-distance user fees because of high administrative costs and/or widespread evasion. Wyoming and Colorado—states that attempted to achieve more exact equity by charging on the basis of actual weight and mileage per trip—experienced very high administrative costs. Officials from both states estimated that administrative costs were about 20 percent of the revenues collected, causing both states to repeal their fee in 1989. In addition, the rate of evasion was high in both states. In Wyoming, a 1981 state-sponsored study reported that state and trucking officials' estimates of evasion ranged from 10 to 40 percent of the revenues collected. In Colorado, a 1982 state auditor's report found that evasion could be as high as 31 percent of the revenues collected. Finally, Ohio, where administrative costs were relatively low, experienced widespread evasion, in part because the state only employed five full-time staff to enforce the fee. Ohio highway officials also noted that the fee was unpopular because it actually encouraged increased pavement wear in that it charged truck operators more if they used a greater number of axles. A study by Cleveland State University in 1982 for the Ohio Department of Taxation estimated the evasion rate at 45 percent of the revenues collected. As a result, Ohio repealed its fee in 1991.

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Estimates of evasion in the other states varied greatly. In Oregon, state officials estimated that collections totaled at least 95 percent of the fees due, resulting in a 5-percent evasion rate. In Nevada, officials stated that the state collected 93.2 percent of the taxes due, resulting in a 6.8 percent evasion rate. However, in Arizona, a 1993 study by Sydec, Inc., for the Arizona Department of Transportation estimated that the evasion rate could be as high as 35 percent of the revenues collected. In 1994, using the same methodology, Sydec concluded that there was "relatively little evasion" of Idaho's weight-distance fee.

Although Arkansas and Nevada had positive experiences implementing a weight-distance user fee, officials in those states told us that the states repealed their fee because of legal challenges. Both states had provisions granting exemptions for some intrastate truckers or allowing intrastate truckers to pay a lower fee than interstate truckers. After 1987—when the U.S. Supreme Court invalidated Pennsylvania's fee structure because it placed an unconstitutional burden on interstate commerce by favoring intrastate over interstate truckers—Arkansas and Nevada rescinded their weight-distance fee.<sup>12</sup> However, officials from Nevada and Arkansas emphasized that before rescinding these fees, they had positive experiences in administering them.

Finally, trucking representatives we interviewed noted that the truck operators' costs of compliance rose as the complexity of the fee structure increased. In Wyoming and Colorado, for example, trucking representatives estimated that truck operators' costs for record-keeping, stopping longer at ports of entry for verification of information, and other activities actually exceeded the amount the operators paid in fees. However, in Arkansas—where the fee structure was much simpler—the President of the state's Motor Carrier Association told us that the costs of compliance were minimal.

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<sup>12</sup>American Trucking Assoc. v. Scheiner, 483 U.S. 266 (1987).

## New Technologies Could Reduce Administrative and Compliance Costs of Weight-Distance User Fees

Advances in technology offer the promise of improving the collection and enforcement of a more precise weight-distance user fee. Two Intelligent Vehicle Highway Systems (IVHS) technologies—automatic vehicle identification (AVI) and weigh-in-motion (WIM)—are increasingly being employed by states to capture, among other things, information on vehicle weights and to document highway users' presence in the state.<sup>13</sup> FHWA officials emphasized that the efficient implementation of a national weight-distance user fee is currently feasible, and they noted that AVI and WIM could facilitate the enforcement of such a fee and allow for greater precision in charging trucks on the basis of their weight per axle. However, trucking representatives disagreed with FHWA's conclusion about the feasibility of a national fee and stated that they were skeptical about the potential benefits of IVHS technologies in implementing such a fee.

Several states currently employ AVI and WIM to facilitate the safe and efficient passage of trucks over state lines and to gather information to, among other things, assist in tax administration. AVI equipment enables a vehicle fitted with a transponder to be identified as it passes specific points on the highway. Once a vehicle is identified, a computer located centrally or in a weigh station can determine whether the vehicle—as it continues moving down the highway—is registered and whether it has had a recent safety inspection. WIM equipment can obtain and record information on the axle weights and gross weight of a moving vehicle when it drives over in-pavement sensors. Oregon currently uses AVI and WIM technologies to help administer and enforce the state's axle-based weight-distance user fee. According to Oregon officials, these technologies have been a key factor in minimizing that state's administrative costs and the compliance costs.

The most visible of the states' efforts employing AVI and WIM is the Heavy Vehicle Electronic License Plate (HELP) Program, initiated in 1984. HELP is a developmental research effort designed to improve safety and increase the efficiency and effectiveness of the operations of state law enforcement and taxation agencies and thereby improve the productivity of the motor carrier industry by reducing trucks' delays at state ports of entry and weigh stations. In this program, AVI transponders are placed on trucks to provide electronic data on their credentials (e.g., registration, date of last safety inspection, etc.). In addition, WIM sensors are placed along the highway to record the axle weights and gross weight of each truck. These

<sup>13</sup>IVHS technologies are a group of highly interdisciplinary systems, such as advanced traffic management, vehicle control systems, and roadside monitors, whose purpose is to save lives, time, and money on roads and highways. See *Smart Highways: An Assessment of Their Potential to Improve Travel* (GAO/PEMD-91-18, May 1, 1991).

technologies, in combination with automatic vehicle classification technology, are designed to facilitate the efficient movement of trucks, with minimal paper records, because information about a truck's weight, configuration, and registration is automatically verified and recorded. The HELP project allows participating trucks to travel with minimal stops along an interstate highway route from British Columbia, Canada through six western states—Washington, Oregon, California, Arizona, New Mexico, and Texas.

## Conclusions

A strong economic rationale exists for charging highway users explicitly according to the wear they cause to the nation's highways. The potential long-term benefits of replacing some or all of the current federal highway user fees with a weight-distance fee could be substantial in terms of additional revenues and reduced pavement wear, especially if heavy trucks are only paying 50 percent of their fair share, as FHWA found in 1982. However, the data on which this calculation is based are out of date. Over the last 12 years, federal taxes on heavy trucks have been increased, in part to provide greater equity between heavy trucks and other highway users. In a more limited analysis in 1988, FHWA found that some heavy trucks were paying about 80 percent of their fair share relative to other trucks. Given (1) the tax increases since 1982; (2) FHWA's findings in 1988; (3) the effort under the Strategic Highway Research Program, which will provide new data on the relationship between axle loads and pavement damage; and (4) the intense disagreements surrounding weight-distance user fees, we believe that it is now time for FHWA to conduct another formal cost allocation study.

As a practical matter, however, a trade-off exists in weight-distance user fee structures between increased funding equity and increased administrative and compliance costs. The experiences of Colorado and Wyoming demonstrate that charging users on the basis of the actual weight and mileage per trip results in an administrative quagmire. Other states with less ambitious programs have achieved better results. Oregon's fee, which takes into account a vehicle's registered weight, number of axles, and the miles traveled, demonstrates that surrogates for more precise fees can be designed. In addition, with the emergence of IVHS technologies, the trade-off between increased equity and increased administrative and compliance costs may be reduced significantly over the next several years.

Finally, the preferential treatment that some states have accorded intrastate truck operators over interstate operators has blunted the states' efforts to increase equity. However, if a weight-distance user fee were national, this problem would not arise. In 1988, FHWA reported to the Congress that such a national fee was feasible, and during our review, FHWA officials emphasized that the emergence of IVHS technologies has served to further support the agency's original conclusion.

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## Recommendation

To determine whether all highway users are paying their fair share of federal highway costs and to ensure that FHWA and the Congress have up-to-date information when making future decisions affecting federal highway user fees, we recommend that the Secretary of Transportation direct the Administrator, FHWA, to conduct a formal cost allocation study, with appropriate input from the affected parties. In conducting this study, the Administrator should utilize, to the extent possible, the data currently being developed by the Strategic Highway Research Program on the relationship between axle loads and pavement damage.

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## Matter for Congressional Consideration

If the results of FHWA's study indicate that certain highway users underpay their share of highway costs, the Congress should consider examining policy options, including a national weight-distance user fee, that would increase equity and promote a more efficient use of the nation's highways.

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## Agency Comments

We discussed our findings and recommendation with FHWA's Chief, Systems Analysis Branch, and Chief, Highway Revenue Analysis Branch, in the Office of Policy Development. These officials generally agreed with the information presented and concurred with our recommendation for a new study. These officials noted that, in their view, the time had come for an updated cost allocation study. They said that since the last study in 1982, both the quality of data and analytical methods have improved. They also stated that such a study would not impose an undue burden on the agency. These officials suggested several revisions to our report, which we incorporated where appropriate. However, as requested, we did not obtain written comments from the Department of Transportation on a draft of this report. Finally, we provided AASHTO's Executive Director and ATA officials with appropriate sections of a draft of this report. They generally agreed with the information presented but suggested several wording revisions, which we incorporated where appropriate.

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## Scope and Methodology

To examine the rationale for and arguments against wear-based user fees, we reviewed past studies by the Congressional Budget Office, FHWA, AASHTO, ATA, and the states. In addition, we interviewed FHWA headquarters officials, as well as representatives of AASHTO, ATA, the National Private Truck Council, the Owner-Operator Independent Drivers Association, The Road Information Program, the Highway Users Federation, and the Automobile Association of America. We also interviewed officials from three private trucking firms—Ryder Trucks, Georgia Pacific, and Frito-Lay. These firms were suggested by the National Private Truck Council as having extensive knowledge of and experience with weight-distance user fees. To supplement this information, we interviewed academic experts in highway finance, as well as representatives of Cambridge Systematics, Systems Design Engineering, and the Strategic Highway Research Program. Each of these organizations has conducted or is conducting studies relevant to the issues examined during our review.

To evaluate the states' recent experiences with such fees, we interviewed state highway officials and trucking representatives from 11 states that have weight-distance fees or have recently rescinded them. We reviewed available studies conducted on the experiences of these 11 states. In addition, to document the states' experiences and opinions concerning weight-distance user fees, The Road Information Program, at our request, included several questions on weight-distance fees in its annual survey of all 50 states.

To examine the obstacles that have prevented the implementation of such fees and assess the potential approaches to overcoming them, we interviewed FHWA officials responsible for promoting commercial applications of IVHS technologies. We also interviewed representatives of the International Bridge, Tunnel & Turnpike Association about current technological advances that allow the collection of data on vehicles' operating weight and the distance traveled. Finally, we interviewed representatives from highway programs currently implementing IVHS technologies, including the HELP and Advantage I-75 projects. We conducted our work from January through May 1994 in accordance with generally accepted government auditing standards.

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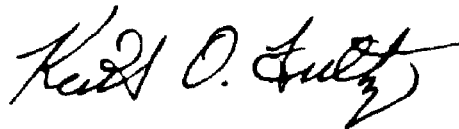
As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies to the Secretary of Transportation; the Administrator, FHWA; the Director, Office of

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Management and Budget; and other interested parties. We will also make copies available to others on request.

This work was performed under the direction of Kenneth M. Mead, Director, Transportation Issues, who can be reached on (202) 512-2834. Major contributors to this report are listed in appendix III.

Sincerely yours,

A handwritten signature in cursive script that reads "Keith O. Fultz". The signature is written in black ink and is positioned above the printed name and title.

Keith O. Fultz  
Assistant Comptroller General

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## Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ATA	American Trucking Associations
AVI	automatic vehicle identification
FHWA	Federal Highway Administration
GAO	General Accounting Office
HELP	Heavy Vehicle Electronic License Plate
IVHS	Intelligent Vehicle Highway Systems
WIM	weigh-in-motion





# Additional Information on Federal Highway Funding, Fiscal Year 1993

The federal government currently collects four main highway user fees. Several weaknesses in these fees affect their ability to assess users on the basis of vehicle weight and distance traveled. Specifically:

- The federal gasoline tax is 18.4 cents a gallon, and the diesel fuel tax is 24.4 cents a gallon.<sup>14</sup> As discussed in this report, fuel taxes have been subject to high levels of evasion. Likewise, fuel taxes do not adequately charge users according to the increasing weights of their vehicles.
- The new vehicle excise tax is a 12-percent excise tax on the retail price of trucks weighing over 33,000 pounds. Overall, this one-time fee scores poorly on equity. While there may be some correlation between the weight of a vehicle and its price, this correlation is weak. Likewise, a vehicle's price correlates poorly with its total lifetime mileage and the aggregate highway costs occasioned by that mileage.
- The heavy vehicle use tax is an annual tax on heavy motor vehicles. For vehicles with gross weights of 55,000 to 75,000 pounds, the tax is \$100 plus \$22 per 1,000 pounds over 55,000 pounds; for vehicles over 75,000 pounds, the tax is capped at \$550. Therefore, under this fee, vehicles weighing 75,000 pounds are charged the same amount as heavier vehicles that may cause more highway wear. This fee also does not factor in the number of axles. In addition, this fee is relatively small and does not relate the wear caused to the distance traveled.
- New tires are taxed at 15 cents for each pound between 40 and 70, and \$4.50 plus 30 cents for each pound between 70 and 90. Tires heavier than 90 pounds are taxed at \$10.50 plus 50 cents for each pound over 90 pounds. While tire wear may be considered a surrogate for distance, this substitution is inexact. Moreover, retreaded tires are not subject to this tax. As a result, vehicles equipped with retreaded tires cause pavement wear but do not pay the heavy tire excise tax.

In fiscal year 1993, the federal government collected over \$18.5 billion from these user fees, as shown in table I.1.

<sup>14</sup>Of the 18.4-cents-per-gallon gasoline tax, 6.8 cents is allocated to the general fund for deficit reduction. Of the 24.4-cents-per-gallon diesel tax, 6.8 cents is allocated to deficit reduction. In 1995, the amount set aside from both fees for deficit reduction will be lowered to 4.3 cents per gallon.

**Appendix I  
Additional Information on Federal Highway  
Funding, Fiscal Year 1993**

**Table I.1: Federal Highway User Fee  
Receipts, Fiscal Year 1993**

<b>Category</b>	<b>Amount collected</b>
Fuel tax	
Gasoline	\$12,249,017,600
Diesel	3,554,045,000
Other	576,374,000
New vehicle excise tax	1,199,291,000
Heavy vehicle use tax	630,401,000
Heavy tire excise tax	304,482,000
<b>Total</b>	<b>\$18,513,610,600</b>

Source: FHWA.

# Results of the 1982 Federal Highway Cost Allocation Study

As mandated by section 506 of the Surface Transportation Assistance Act of 1978, FHWA conducted a study of the equity of federal highway user fees. In May 1982, FHWA released its Final Report on the Federal Highway Cost Allocation Study, in which it found that certain users underpaid and others overpaid their fair share of highway costs. Table II.1 summarizes these results.

**Table II.1: Ratio of User Fees Paid to Allocated Costs, by Vehicle Class**

Vehicle class	Ratio of fees paid to cost responsibility
Passenger vehicles	
Large automobiles	1.2
Small automobiles	0.7
Motorcycles	0.5
Intercity buses	1.2
Other buses	0.3
Pickups/vans	1.2
All passenger vehicles	(1.1)
Trucks	
Single unit trucks under 26,000 pounds	1.3
Single unit trucks over 26,000 pounds	1.7
Combination trucks under 50,000 pounds	0.8
Combination trucks, 50,000-70,000 pounds	0.9
Combination trucks, 70,000-75,000 pounds	0.6
Combination trucks over 75,000 pounds	0.5
All trucks	(0.8)
All vehicles	1.0

Note: A ratio greater than 1.0 indicates that a vehicle class is overpaying its fair share, and a ratio less than 1.0 indicates that it is underpaying its fair share relative to the pavement wear that category causes. The total cost responsibilities of all vehicles were assumed to equal the total user charge payments, in order to illuminate relative differences between the cost responsibilities and tax payments among the vehicle classes.

Source: FHWA.

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# Major Contributors to This Report

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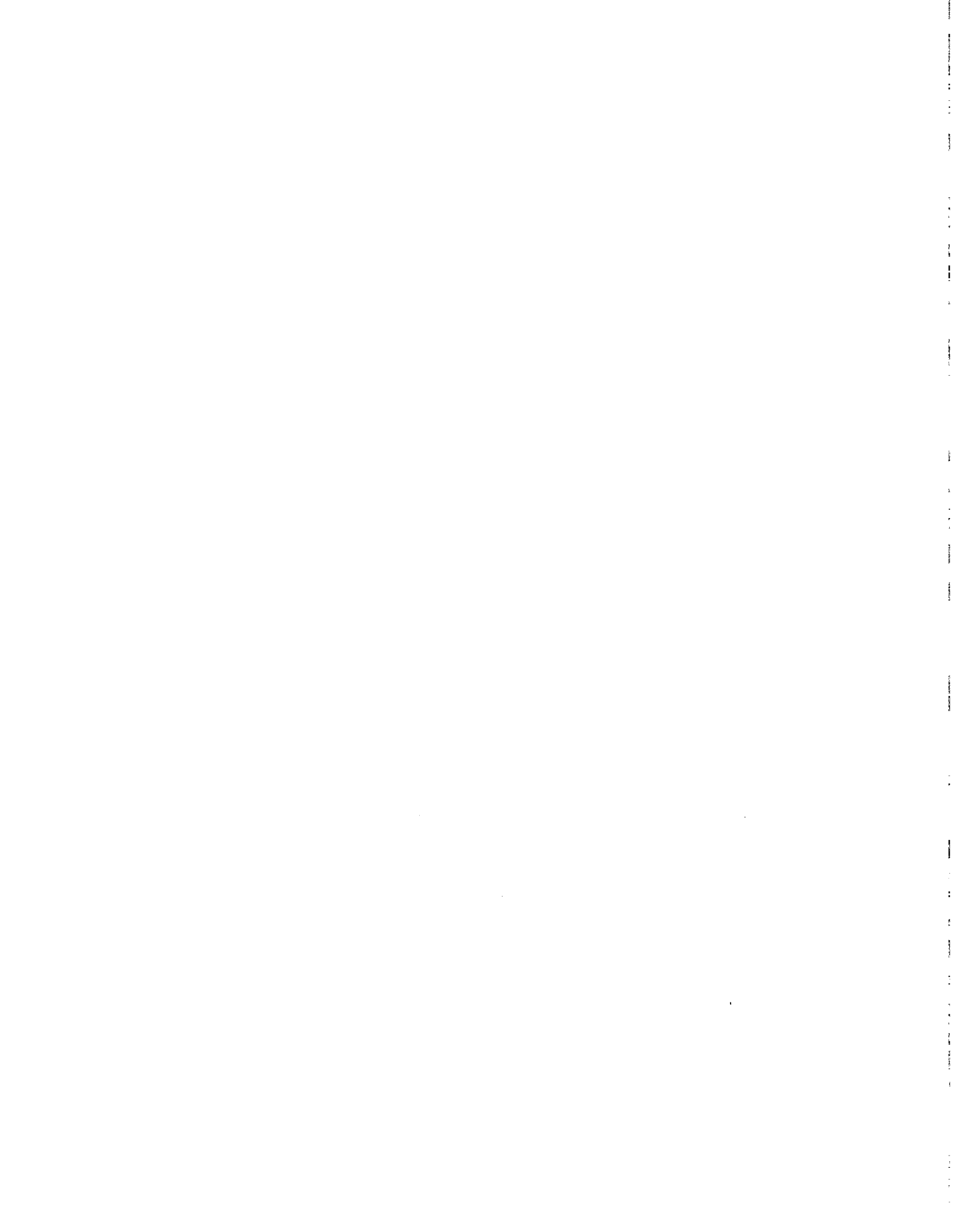
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