2010 Idaho Highway Cost Allocation Study

Final Report

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Executive Summary

This final report of the 2010 Idaho Highway Cost Allocation Study (HCAS) examines the equity of Idaho's highway user tax structure. An HCAS is a study that is designed to determine the fair share of costs that each road user class should pay through highway user taxes and fees for the construction, maintenance, operations, and related costs of highways, roads, and bridges in a state. By comparing highway user payments to cost responsibilities estimated within the HCAS, this study examines the equity of Idaho's highway user tax system. Thus, the 2010 Idaho HCAS seeks to answer such questions as:

- Do highway users as a whole pay the full cost of highways or are they subsidized by non-users? Or do they subsidize non-users and if so, how much subsidy occurs?
- How do broad highway user classes, differentiated based on vehicle class and weight, compare with each other in terms of paying their share of highway costs? How much is each class under- or overpaying?

In addition to addressing these questions, the Federal Highway Administration (FHWA) State HCAS Model, which was refined for this study, was used to examine the impacts on equity of making adjustments to the current tax and fee structure in Idaho and of implementing a vehicle miles traveled (VMT) fee.

Findings are expressed in terms of equity ratios. An unadjusted equity ratio is defined and calculated by dividing attributed revenues by cost responsibility for each vehicle class. The adjusted equity ratio is the share of total user revenues divided by the share of total cost responsibility for each vehicle class. This adjusted ratio accounts for differences between revenues attributed and costs allocated to all vehicle classes. If total highway user payments exceed total cost responsibility, the unadjusted equity ratio for each vehicle class would be adjusted downward so that the total shares of allocated costs equal total shares of revenues and the overall equity ratio for all vehicles as a whole equals 1.0. For example, if total highway user revenues exceeded total cost responsibilities by 50 percent, each unadjusted equity ratio would be divided by 1.5. This procedure is necessary for examining equity in tax structures when either highway user revenues are spent for non-road purposes or non-user sources (e.g., general fund revenues) are used to pay for part of the highway program.

Key findings of the 2010 Idaho HCAS include:

- Highway user payments in Idaho fall short of expenditures or cost responsibility by 20 percent ($139.5 million annually) for state and federal programs combined because, as a matter of national policy and in recognition of Idaho's status as a bridge state with heavy volumes of through traffic, Idaho receives more funds from the federal highway trust fund (HTF) than it pays into it. In addition, Idaho has issued Grant Anticipation Revenue Vehicle (GARVEE) bonds backed by future Federal-aid highway funds to advance its construction program.
- When state and federal programs are combined, collections from automobiles now exceed cost responsibility by 47 percent, while payments from combination trucks now fall 33 percent short of cost responsibility.
- At the state level, automobiles are overpaying by 26 percent while payments from combination trucks fall 27 percent short of cost responsibility.

- Equity ratios in this study between vehicle classes are influenced by the repeal of the weight-distance tax and the types of projects funded by the GARVEE bond program. To measure the impact of the GARVEE program on study findings, a sensitivity analysis was performed in which expenditures were set equal to debt service payments during the time period considered in this study (state fiscal years 2007-2012). Adjusted equity ratios in this study using the reduced GARVEE program scenario indicate that autos are overpaying by 38 percent while combination trucks are underpaying by 28 percent (federal and state programs combined). At the state level, automobiles are overpaying by 8 percent while combination trucks underpay by 14 percent (reduced GARVEE program scenario).
- Adjusted equity ratios were estimated to be as low as .36 among heavy vehicle classes (0.39 for the reduced GARVEE scenario) for the federal and state programs combined.
- The adjusted equity ratio for the most common heavy truck class – i.e., the 80,000-pound truck registered gross weight (RGW) class – is 0.77 (0.72 reduced GARVEE scenario) for federal and state combined programs.
- The adjusted equity ratio for the under 8,000 pounds RGW class (autos, pickups, sport utility vehicles, and small vans) is 1.32 (1.25 reduced GARVEE scenario) for federal and state programs combined.
- The equity findings in this report are also influenced by the repeal of the weight-distance tax, which has reduced revenues attributed to heavy trucks by an estimated $11.6 million annually.

Table S.1 compares the results of the 2010 Idaho HCAS to those presented for the 1994 and 2002 Idaho HCASs. The results show a trend toward higher equity ratios for automobiles and pickups. In 1994, state and federal revenues attributed to automobiles fell short of cost responsibility by 16 percent. By 2002, the underpayment for automobiles had fallen to 6 percent. The findings of the 2010 Idaho HCAS show that payments attributed to automobiles now exceed cost responsibility when state and federal programs are combined by 47 percent (38 percent reduced GARVEE program scenario), while payments from combination trucks fall 33 percent short of cost responsibility (28 percent reduced GARVEE program scenario).

Table S.1. Highway User Fee Contributions vs. Responsibility in Idaho (1994, 2002, and 2010 HCASs)

Study Year	Vehicle Class	Revenue ($Millions)	Percent Contribution	Cost Responsibility ($Millions)	Percent Responsibility	Adjusted Equity Ratio
1994 (State)	Autos	$71.6	33.9%	$94.3	44.7%	0.76
	Pickups	$59.7	28.3%	$58.2	27.6%	1.03
	Buses	$0.6	0.3%	$0.7	0.3%	0.79
	SU Trucks	$22.5	10.7%	$17.8	8.4%	1.27
	Combinations	$56.6	26.8%	$40.1	19.0%	1.41
1994 (State + Federal)	Autos	$104.2	32.9%	$143.8	39.1%	0.84
	Pickups	$90.1	28.4%	$87.8	23.9%	1.19
	Buses	$1.3	0.4%	$1.4	0.4%	1.08
	SU Trucks	$37.8	11.9%	$36.6	10.0%	1.20
	Combinations	$83.3	26.3%	$98.0	26.7%	0.99
2002 (State)	Autos	$99.0	32.8%	$116.0	37.3%	0.88
	Pickups	$75.0	24.8%	$77.0	24.8%	1.01
	Buses	$2.0	0.7%	$2.0	0.6%	0.86
	SU Trucks	$35.0	11.6%	$31.0	10.0%	1.18
	Combinations	$91.0	30.1%	$86.0	27.7%	1.10
2002 (State + Federal)	Autos	$160.0	31.5%	$202.0	33.4%	0.94
	Pickups	$123.0	24.2%	$131.0	21.7%	1.11
	Buses	$3.0	0.6%	$4.0	0.7%	0.77
	SU Trucks	$58.0	11.4%	$59.0	9.8%	1.17
	Combinations	$165.0	32.5%	$208.0	34.4%	0.95
2010 (State, Full GARVEE)	Autos	$118.4	32.9%	$101.5	26.2%	1.26
	Pickups	$92.5	25.7%	$94.9	24.5%	1.05
	Buses	$2.4	0.7%	$1.9	0.5%	1.39
	SU Trucks	$40.3	11.2%	$32.0	8.3%	1.36
	Combinations	$106.3	29.5%	$157.1	40.6%	0.73
2010 (State + Federal, Full GARVEE)	Autos	$183.0	32.9%	$155.6	22.4%	1.47
	Pickups	$143.3	25.8%	$152.3	21.9%	1.18
	Buses	$3.7	0.7%	$4.4	0.6%	1.06
	SU Trucks	$62.9	11.3%	$80.6	11.6%	0.98
	Combinations	$163.1	29.3%	$302.6	43.5%	0.67
2010 (State, Reduced GARVEE Exp.)	Autos	$118.4	32.9%	$88,364	30.4%	1.08
	Pickups	$92.5	25.7%	$78,885	27.2%	0.95
	Buses	$2.4	0.7%	$1,259	0.4%	1.53
	SU Trucks	$40.3	11.2%	$22,783	7.8%	1.43
	Combinations	$106.3	29.5%	$99,178	34.1%	0.86
2010 (State + Federal, Reduced GARVEE Exp.)	Autos	$183.0	32.9%	$142,467	23.8%	1.38
	Pickups	$143.3	25.8%	$136,357	22.8%	1.13
	Buses	$3.7	0.7%	$3,811	0.6%	1.05
	SU Trucks	$62.9	11.3%	$71,341	11.9%	0.95
	Combinations	$163.1	29.3%	$244,620	40.9%	0.72

Acronyms and Abbreviations

ADT	Average Daily Traffic
AMT	Axle Miles of Travel
DMV	Department of Motor Vehicles
DOT	Department of Transportation
DPS	Department of Public Safety
ESAL	Equivalent Single Axle Load
FHWA	Federal Highway Administration
FY	Fiscal Year
GARVEE	Grant Anticipation Revenue Vehicle
GVW	Gross Vehicle Weight
HCAS	Highway Cost Allocation Study
HPMS	Highway Performance Monitoring System
HTF	Highway Trust Fund
HVUT	Heavy Vehicle Use Tax
ITD	Idaho Transportation Department
LEF	Load Equivalency Factor
LOS	Level of Service
MPG	Miles per Gallon
NAPCOM	National Pavement Cost Model
NCHRP	National Cooperative Highway Research Program
NHS	National Highway System
PCE	Passenger Car Equivalent
RGW	Registered Gross Weight
SFY	State Fiscal Year
STIP	Statewide Transportation Improvement Program
TIUS	Truck Inventory and Use Survey
TRB	Transportation Research Board
US	United States
US DOT	United States Department of Transportation
VIUS	Vehicle Inventory and Use Survey
VMT	Vehicle Miles of Travel or Vehicle Miles Traveled
WIM	Weigh in Motion

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1.0 Introduction

This final report of the 2010 Idaho Highway Cost Allocation Study (HCAS) examines the equity of Idaho's highway user tax structure. It compares federal, state, and local revenues to cost responsibilities for a number of vehicle classes differentiated based on vehicle configuration (e.g., passenger vehicle, single-unit truck, bus) and registered gross weight (RGW). The main body of this report contains the following sections:

- 1.0 Introduction. This section presents an overview of the purpose and scope of this study, and a review of previous Idaho HCASs and HCASs conducted in other states.
- 2.0 Data Elements. This section documents the revenue, expenditure, and travel data used to support the analyses presented in this report.
- 3.0 Cost Allocation. This section presents cost allocation procedures and the estimated cost responsibilities by detailed vehicle classes.
- 4.0 Revenue Attribution. This section provides an overview of the procedures used in attributing highway user payments to vehicle classes and presents revenue attribution results.
- 5.0 Equity Analysis. This section compares the revenues paid to cost responsibility and in so doing develops equity ratios for each vehicle class.
- 6.0 Policy Analyses. This section presents revenue estimates and equity findings for seven policy options.

This report also contains a list of references, acronyms, and a glossary.

1.1 Purpose and Scope

An HCAS is a study that is designed to determine the fair share of costs that each road user class should pay for the construction, maintenance, operations, and related costs of highways, roads, and bridges in a state. By comparing highway user payments to cost responsibilities estimated within the HCAS, the 2010 Idaho HCAS examines the equity of Idaho's highway user tax system. Thus, the 2010 Idaho HCAS seeks to answer such questions as:

- Do highway users as a whole pay the full cost of highways or are they subsidized by non-users? Or do they subsidize non-users and if so, how much subsidy occurs?
- How do broad highway user classes, differentiated based on vehicle class and weight, compare with each other in terms of paying their share of highway costs? How much is each class under- or overpaying?

In addition to addressing these questions, the 2010 Idaho HCAS and the Federal Highway Administration (FHWA) State HCAS Model, which was refined for this study, were used to examine the impacts on equity of making adjustments to the current tax and fee structure in Idaho and of implementing a vehicle miles traveled (VMT) fee. A number of policy options were examined in Section 6.0.

The 2010 Idaho HCAS uses a small number of key parameters. These key parameters include the definition of vehicle classes, functional class of road system, study time period, and level of government highway program examined. The remainder of this section defines the parameters used in this study.

Definition of vehicle classes. This study uses 20 vehicle classes, as identified in Table 1.1. These vehicle classes range from automobiles to tractor-triple semitrailer or tractor-double trailer combinations. Vehicle classes are further differentiated based on weight up to 130,000 pounds RGW in 2,000-pound increments above 8,000 pounds.

Table 1.1. 2010 Idaho HCAS Vehicle Types

Vehicle Class	Acronym	Description
1	Auto	Automobiles and motorcycles
2	LT4	Pickups, vans, and other light 2-axle, 4-tire vehicles
3	SU2	Single unit 2-axle, 6-tire trucks
4	SU3	Single unit 3-axle trucks
5	SU4+	Single unit trucks with 4 or more axles
6	CS3	Tractor-semitrailer combinations with 3 axles
7	CS4	Tractor-semitrailer combinations with 4 axles
8	CS5T	Tractor-semitrailer combinations with 5 axles, two rear tandem axles
9	CS5S	Tractor-semitrailer combinations with 5 axles, two split (>8feet) rear axles
10	CS6	Tractor-semitrailer combinations with 6 axles
11	CS7+	Tractor-semitrailer combinations with 7 or more axles
12	CT34	Truck-trailer combinations with 3 or 4 axles
13	CT5	Truck-trailer combinations with 5 axles
14	CT6+	Truck-trailer combinations with 6 or more axles
15	DS5	Tractor-double semitrailer combinations with 5 axles
16	DS6	Tractor-double semitrailer combinations with 6 axles
17	DS7	Tractor-double semitrailer combinations with 7 axles
18	DS8+	Tractor-double semitrailer combinations with 8 or more axles
19	TRPL	Tractor-triple semitrailer or truck-double semitrailer combinations
20	Bus	Buses (all types)

Functional class of road system. Travel and expenditures data are broken down according to the following standard highway functional classes:

- Rural
  - Interstate
  - Other Principal Arterials

    - Minor Arterials
    - Major Collectors
    - Minor Collectors
    - Local
- Urban
    - Interstate
    - Other Principal Arterials
    - Minor Arterials
    - Collectors
    - Local.

Study time period. This study uses the six-year time period beginning in state fiscal year (SFY) 2007 and ending in SFY 2012.

Levels of government examined. The analysis presented in this report includes state, federal, and local revenues and expenditures.

1.2 Previous Idaho Highway Cost Allocation Studies

Idaho HCASs were completed in 1994 and 2002. Table 1.2 presents the findings of the past two Idaho HCASs as they relate to highway user fee contributions vs. cost responsibility for five vehicle classes and state vs. state plus federal levels of government examined. In each of the previous Idaho HCASs, autos and buses were shown to be underpaying regardless of the level of government examined while pickup trucks and single unit trucks were overpaying. Large combination trucks were shown to be overpaying in both studies when only state programs were considered but slightly underpaying when both state and federal programs were included.

Table 1.2. History of Highway User Fee Contributions vs. Responsibility in Idaho

Study Year	Vehicle Class	Revenue ($Millions)	Percent Contribution	Cost Responsibility ($Millions)	Percent Responsibility	Equity Ratio
1994 (State)	Autos	$71.6	33.9%	$94.3	44.7%	0.76
	Pickups	$59.7	28.3%	$58.2	27.6%	1.03
	Buses	$0.6	0.3%	$0.7	0.3%	0.79
	SU Trucks	$22.5	10.7%	$17.8	8.4%	1.27
	Combinations	$56.6	26.8%	$40.1	19.0%	1.41
1994 (State + Federal)	Autos	$104.2	32.9%	$143.8	39.1%	0.84
	Pickups	$90.1	28.4%	$87.8	23.9%	1.19
	Buses	$1.3	0.4%	$1.4	0.4%	1.08
	SU Trucks	$37.8	11.9%	$36.6	10.0%	1.20
	Combinations	$83.3	26.3%	$98.0	26.7%	0.99
2002 (State)	Autos	$99.0	32.8%	$116.0	37.3%	0.88
	Pickups	$75.0	24.8%	$77.0	24.8%	1.01
	Buses	$2.0	0.7%	$2.0	0.6%	0.86
	SU Trucks	$35.0	11.6%	$31.0	10.0%	1.18
	Combinations	$91.0	30.1%	$86.0	27.7%	1.10
2002 (State + Federal)	Autos	$160.0	31.5%	$202.0	33.4%	0.94
	Pickups	$123.0	24.2%	$131.0	21.7%	1.11
	Buses	$3.0	0.6%	$4.0	0.7%	0.77
	SU Trucks	$58.0	11.4%	$59.0	9.8%	1.17
	Combinations	$165.0	32.5%	$208.0	34.4%	0.95

Source: Sydec, Inc. (1994 and 2002)

1.3 Results in Other States

The first HCAS was performed in Oregon in 1937. Since that time, at least 85 additional HCASs have been performed in 30 states. The results and basic methods used in these states are summarized in Table 1.3. The data were originally based on information presented in the *2005 Oregon Highway Cost Allocation Study* (EcoNW 2005) but were updated in the National Cooperative Highway Research Program (NCHRP) Synthesis Report #378, *State Highway Cost Allocation Studies* (Balducci and Stowers 2008). In total, 86 HCASs are known to have been performed in the United States.

Table 1.3 identifies each state that has performed an HCAS (Column 1) and the years in which the studies were completed (Column 2). Based on the data presented in Column 3, the incremental and federal methods have been the principal methods used historically in the United States. These methods collectively fall under the umbrella of the cost-occasioned approach, which determines cost responsibility based on the costs occasioned by various highway user classes. The cost-occasioned approach attempts to allocate cost responsibility based on the costs imposed on the highway network by each class of highway users, as opposed to allocating costs simply based on relative use.

In Table 1.3, Column 4 presents the heavy truck responsibility found in each study. Historically, HCAS results have varied widely with heavy truck responsibility reaching as low as 18.9 percent in the 1987 California HCAS and as high as 64.5 percent in the 1979 Florida HCAS. The heavy truck share varies due to a number of factors, including the scope and type of expenditures included in the HCAS, the

definition of the heavy truck class (the heavy truck class is generally defined by some weight threshold or vehicle configuration), the methods used in the study, and the types of expenditures examined.

The fifth column in Table 1.3 identifies the key allocators used in the state HCASs conducted to date. The allocator, or measure used to allocate costs to highway user classes, is generally tied to either travel (e.g., VMT), the space vehicles take up on roads (e.g., passenger car equivalents [PCEs]), vehicle loads (e.g., equivalent single axle loads [ESALs]) or a combination of these measures (e.g., ESAL-miles, ton-miles, axle-miles, and PCE-VMT).

Table 1.3. State Highway Cost Allocation Study Methods and Results

State	HCAS Years Completed	Method	% Heavy Vehicle Cost Responsibility	Key Allocators	Types of Revenues Examined
Arizona	1993, 1999, 2000, 2001, 2002, 2005	Federal	31.4% (1999)	VMT, Axle-Load, Gross weight	State, federal and local funds combined
Arkansas	1978	Incremental / Cost Function			
California	1987, 1997	Federal and Incremental	18.9%	ESAL-Miles	State, federal and local funds analyzed separately
Colorado	1981, 1988	Federal	37%	VMT, Truck-VMT, ESALs, Ton-Miles	
Delaware	1992, 1993	Federal and Incremental	20.33%	VMT, PCE-miles, ESALs, Axle-Miles, Registrations	State and federal funds combined only
Florida	1979	Incremental	64.5%	VMT, ESALs, Axle-Miles, Registrations	State and federal
Georgia	1979, 1982	Incremental	51.2% (1979)	VMT, GVW, ESALs, Axle Miles Traveled (AMT)	State and federal
Idaho	1994, 2002	Prospective Cost-Occasioned	37.29%	VMT	State, federal and local funds combined
Indiana	1984, 1988, 1989, 2000	Incremental / Consumption	53.2%	ESAL	State, federal and local
Iowa	1983, 1984	Federal	48.94%	ESAL, Ton-miles, AMT, PCE, VMT	
Kansas	1978, 1985	Hybrid	41.85%	Number of vehicles, VMT, AMT, Ton-miles, PCE-VMT, ESAL-miles	State funds
Kentucky	1992, 1994, 1996, 1998, 2000	Federal	54.92%	VMT, ESAL-VMT, PCE-VMT, Axle-Miles	State and federal funds combined
Maine	1956, 1961, 1982, 1989	Hybrid / Expenditure Allocation	35.6%	VMT, ESALs, PCE, Delphi, TMT, Standard Vehicle Equivalent	State and federal funds

Table 1.3. (cont.)

State	HCAS Years Completed	Method	% Heavy Vehicle Cost Responsibility	Key Allocators	Types of Revenues Examined
Maryland	1989				State and local funds
Minnesota	1990	Federal and incremental	19.2%	VMT, Truck-VMT	
Mississippi	1980	Incremental	36%	VMT, Truck-VMT	
Missouri	1984, 1987, 1990	Federal		Vehicle size, Vehicle weight, VMT	
Montana	1992, 1999	Federal	33%	VMT, ESAL-MT, AMT	
Nevada	1984, 1985, 1988, 1990, 1992, 1994, 1999, 2009	Cost occasioned with NAPCOM for pavement costs	45.5%	LEFs, VMT, PCE-miles, Axle-miles	State, federal and local separately and combined
New Mexico	1972				
North Carolina	1983	Federal		PCE, ESALs, VMT, Weight axle-miles	State and federal funds
Ohio	1982	Federal / Incremental		VMT	
Oregon	1937, 1947, 1963, 1974 1980, 1984, 1986, 1990 1992, 1994, 1999, 2001 2003, 2005, 2007, 2009	Cost occasioned with NAPCOM for pavement costs (since 1999)	34.1%	Congested PCE, VMT, Uphill PCE, Truck-VMT, Basic Vehicle VMT	State, federal and local combined for cost allocation purposes; state only for revenue attribution purposes
Pennsylvania	1989, 1990	Federal / Cost Occasioned			
Texas	1984, 1985, 1994, 2002				
Vermont	1990, 1993, 2006	Federal	25.7%	VMT, ADT, ESAL	State and federal funds
Virginia	1991, 1992	Federal	21.7%	ESALs, VMT, ADT	State and federal funds combined
Washington	1977	Incremental			
Wisconsin	1982, 1992	Federal (1982)	31.7%	ESAL, VMT, PCE, Ton-miles	State and federal funds combined
Wyoming	1981, 1999	FHWA State HCAS model	55.8%	VMT, Vehicle size, Horsepower, Weight	
Source: Balducci and Stowers (2008)					

Table 1.4 presents the results of 22 HCASs conducted from 1982 to 2009 with respect to the equity ratios for the heavy truck class. As noted previously, the definition of the heavy truck class is differentiated among states but generally includes all vehicles weighing in excess of a certain weight threshold (e.g., 10,000 pounds) or is identified based on vehicle characteristics (e.g., all vehicles with more than two axles). The heavy vehicle class typically includes buses, single-unit trucks, and combination trucks. The equity ratio is measured as the revenues attributed to the highway user class divided by its cost responsibility. An equity ratio of less than 1.0 would indicate that payments from the highway user class have fallen short of its cost responsibility, while an equity ratio in excess of 1.0 would indicate that tax payments exceed cost responsibility. The research team did not determine whether the referenced studies presented adjusted or unadjusted equity ratios.

Of the 22 studies referenced in Table 1.4, 19 found that payments from the heavy truck class fell short of cost responsibility. In three states (Delaware, Montana, and Oregon), heavy truck payments were equal to or greater than their cost responsibilities. A large part of the explanation of the results is tied to the differences in the state tax structures. Note, for example, that one of the three states (Oregon) in the over 1.0 equity ratio category had weight-distance taxes at the time of the study, and another (Delaware) collected a high proportion of its heavy truck revenues from out-of-state based trailers.

Table 1.4. State HCAS Findings on Equity of Tax Structure for Heavy Vehicles (1982-2009)

Equity Ratio for Heavy Vehicles	State and Year of Study
<0.60	Maryland (1982), Colorado (1988), Georgia (1991), Texas (1994), Nevada (2009), Vermont (2006)
0.60-0.80	Connecticut (1982), Missouri (1984), Indiana (1988), Minnesota (1990)
0.80-1.00	Wisconsin (1982), North Carolina (1983), Kansas (1985), California (1987), Maine (1989), Pennsylvania (1990), Arizona (1999), Kentucky (2000), Idaho (2002)
>1.00	Delaware (1992), Montana (1992), Oregon (2009)
Source: Balducci and Stowers (2008)	

2.0 Data Elements

This section presents an overview of the data used within the 2010 Idaho HCAS. To conduct the cost allocation and revenue attribution analyses, the study relies on forecasts of three major types of data:

- Revenue Data. Receipts from highway users from Idaho's tax and fee structure principally comprised of registration fees, motor fuel taxes, and driver's license fees.
- Expenditure Data. Expenditure data for the construction, preservation, maintenance, and administration of highway programs in Idaho.
- Travel Data. Total VMT and VMT distributions by 20 vehicle classes and 11 functional road classifications.

This section presents forecasts developed for this study. With the exception of the travel forecasts, the data presented covers the average of the six-year (SFY 2007-2012) study time horizon.

2.1 Revenue Data

The research team received detailed revenue data from the Idaho Transportation Department (ITD) for the SFY 2007-2009 time period and revenue forecasts for all highway fund revenues through 2015. The revenues analyzed in this study include all highway user taxes and fees collected at the federal, state, and local levels in Idaho. In Idaho, highway user fees are principally comprised of registration fees, motor fuel taxes, driver's license fees, permit fees, and title fees. Rates for these taxes are presented in Table 2.1.

Table 2.1. Transportation Tax Rates in Idaho

Federal			
Federal Gasoline Tax	18.4 cents per gallon		
Federal Special Fuels Tax	24.4 cents per gallon		
Heavy Vehicle Use Tax	Below 55,000 lbs., no tax. From 55,000-75,000 lbs. $100 plus $22 per 1,000 lbs. over 55,000 lbs. Over 75,000 lbs., $550.		
Trucks and Trailer Sales Tax	12 percent of a retailer's sales price for tractors and trucks over 33,000 lbs. GVW and trailers over 26,000 lbs. GVW.		
Tire Tax	0-40 pounds	No Tax	
	Over 40 pounds to 70 pounds	15¢ per pound in excess of 40	
	Over 70 pounds to 90 pounds	$4.50 plus 30¢ per pound in excess of 70	
	Over 90 pounds	$10.50 plus 50¢ per pound in excess of 90	
State			
State Gasoline Tax	26 cents per gallon (includes 1 cent per gallon transfer fee)		
State Special Fuel Tax	26 cents per gallon (includes 1 cent per gallon transfer fee)		
State Registration Fee (Annual Fee)	0-8,000 pounds		
	$ 48.00 Vehicles one and two years old		
	$ 36.00 Vehicles three through six years old		
	$ 24.00 Vehicles over 6 years old		
	8,000-60,000 pounds		
	Maximum Gross Weight	*Non-Commercial and Farm*	*Commercial and Wreckers*
	8,000-16,000	$ 48.00	$ 48.00
	16,001-26,000	$ 61.08	$ 143.40
	26,001-30,000	$ 91.68	$ 223.80
	30,001-40,000	$ 130.08	$ 291.60
	40,001-50,000	$ 188.28	$ 360.00
	50,001-60,000	$ 311.88	$ 515.40
	Over 60,000 pounds		
	Varies based on weight and annual miles driven		
	Other Special Vehicle Registration Fees		
	$ 24.00 School buses		
	$ 12.00 Off highway vehicles		
	Motor homes - base registration fee ($24-$48) plus $8.50 for first $1,000 of market value + $5 for each additional $1,000 of market value		
	Camping trailers, tent trailers, and fifth wheels - $4 + $8.50 for first $1,000 of market value + $5 for each additional $1,000 of market value		
	Trailer registration fees		
	$ 5.00 Utility trailer		
	$ 8.00 Rental utility trailer with gross weight of 2,000 pounds or less		
	$ 15.00 Rental utility trailer with gross weight in excess of 2,000 pounds		
	$ 15.00 Trailer or semitrailer		
Overweight Fees	Varies based on weight and number of axles		
Title Fees	$ 14.00 All vehicles		
Oversize Fees	$ 28.00 Oversize only (single trip)		
	$ 33.00 Oversize only (2 trips)		
	$ 43.00 Oversize only (annual)		
	$ 53.00 Oversize exceeding 16 feet wide or 16 feet high or 110 feet long (single trip)		
	$ 71.00 Oversize exceeding 16 feet wide or 16 feet high or 110 feet long (2 trips within 7 days)		
	$ 43.00 Authority to exceed 80,000 lbs. on reducible loads up to 105,500 lbs. (annual fee)		
	$ 53.00 Extra length / excess weight (annual)		
	$ 33.00 Overweight/oversize or overweight only (non-reducible) plus road use fees (single trip)		
	$ 42.00 Overweight/oversize or overweight only (non-reducible) plus road use fees (2 trips)		
	$ 58.00 Overweight/oversize or overweight only (non-reducible) plus road use fees (annual)		
	$ 53.00 Overweight/oversize (non-reducible) exceeding 16 feet wide, 16 feet high, or 110 feet long plus road use fees (single trip)		
	$ 71.00 Overweight/oversize (non-reducible) exceeding 16 feet wide, 16 feet high, or 110 feet long plus road use fees (2 trips within 7 days)		
Driver's License Fees (renewed every 4 years)	$ 40.00 Commercial driver's license (Class A, B, and C)		
	$ 29.00 CDL instruction permit		
	$ 30.00 Passenger car driver's license (Class D)		
	$ 15.00 Passenger car instruction permit		
	$ 15.00 One time M endorsement for motorcycle operation		
Title Fees	$ 14.00 for all vehicles		
Local			
Local option registration fee	Ranges by county		
Local license administrative fee	Ranges by county from $1-$5 per license		

Source: Idaho Transportation Department (2010) and Federal Highway Administration (2007).

ITD long-range forecasts of state highway funds were used to project the SFY 2007-2009 revenue data out to the end of the study time period (SFY 2012). Estimated revenues for the average of the SFY 2007-2012 time period are presented in Tables 2.2-2.4.

Table 2.2 presents estimated average annual federal revenues attributable to highway users in Idaho. Estimates for 2008 and 2009 are based on data prepared by FHWA and presented in its annual publication, *Highway Statistics* (FHWA 2009). Estimates prepared by FHWA were forecast forward to 2012 based on revenue forecasts prepared by ITD. Thus, the values presented in Table 2.2 represent estimated average annual revenues during the six year HCAS time horizon (SFY 2007-2012) based on historic data through 2008 and forecast data out to 2012. This same procedure of combining actual revenue estimates with forecast values and calculating average annual revenues over the SFY 2007-2012 time period was used for each level of government.

Motor fuel taxes comprise the vast majority of the federal highway user taxes collected in Idaho ($173.4 million or 88.4 percent). The heavy vehicle use tax (HVUT), trucks and trailers tax, and tire tax, which collectively comprise $22.7 million or 11.6 percent of total federal highway user revenues, are all paid by heavy vehicles in Idaho. It is important to reiterate that these estimates reflect not what Idaho receives from the federal government in terms of apportionments but rather what Idahoans pay into the Federal Highway Trust Fund (HTF). This forecast includes highway user fees deposited in the Mass Transit Account of the Federal HTF.

Table 2.2. Federal Highway User Revenues in Idaho (Average Annual, SFYs 2007-2012 Period)

User Fee	Revenues ($)
Gasoline Tax	110,513,290
Special Fuels Tax	62,868,557
Heavy Vehicle Use Tax	7,230,191
Trucks and Trailers Tax	12,667,236
Tire Tax	2,776,322
Total Federal	**196,055,596**

Table 2.3 presents forecasts of state revenues attributable to highway users in Idaho. In total, average annual state revenues are estimated at $359.9 million. The largest revenue sources are the gasoline tax ($160.1 million), special fuels tax ($65.9 million), truck and bus registration fees ($54.0 million), and passenger vehicle registration fees ($51.8 million). Revenue estimates during the SFY 2007-2012 time-frame reflect recent declines in revenue (from $359.3 million in SFY 2007 to $340.4 million in SFY 2009) with a reversal in the recent trend forecast by ITD with growing future revenues reaching $377.5 million in 2012.

Table 2.3. State Highway User Revenues in Idaho (Average Annual, SFYs 2007-2012 Time Period)

User Fee	Revenues ($)
Gasoline Tax	160,136,408
Special Fuels Tax	65,898,469
Passenger Vehicle Registration Fees	51,750,702
Truck and Bus Registration Fees	53,993,433
96-Hour, Single Trip, and Oversize Permits	5,935,462
Driver's License Fees	7,496,147
Title Fees	4,731,849
Misc. Plate Fees and Penalties	9,966,388
Total State	**359,908,857**

Local revenues attributable to highway users in Idaho are presented in Table 2.4. These revenues include the county option registration fee, which is forecast to average $6.3 million annually during the 2007-2012 study time horizon.

Table 2.4. Forecast Local Highway User Revenues in Idaho (Average Annual, SFYs 2007-2012 Period)

User Fee	Revenues ($)
Local Option Registration Fees	6,304,362
Total Local	**6,304,362**

2.2 Expenditure Data

Expenditure data were obtained and examined according to the following cost categories:

- New Pavements
- Rehabilitated Pavements
- New Bridge
- Replacement Bridge
- Repair Bridge
- Grading
- Other Construction
- Maintenance
- Administration and Other Expenditures.

With respect to capital expenditures, the basic data used in our analysis were provided by ITD. The data included all federal, state, and local expenditures for capital improvements during the SFY 2007-2012 analysis period. Total state construction expenditures were estimated at $196.3 million (average annual expenditures during SFY 2007-2012 time period). See Table 3.1 for a detailed breakdown of state construction expenditures by cost category.

A basic special analysis performed by ITD was a set of tabulations used to translate construction work performed as part of each of Idaho's program categories into estimates of expenditures for basic types of construction elements used in the FHWA State HCAS model. This conversion matrix is presented in Table 2.5.

Application of this refined conversion matrix resulted in detailed breakdowns of types and amounts of construction by functional class and program category for each level of government expenditures – basically a fairly straight-forward set of factoring procedures.

Table 2.5. Conversion of Idaho Capital Highway Expenditure Categories to HCAS Model Inputs

Idaho Program Categories	New Pavement	Pavement Rehab.	New Bridges	Bridge Replac.	Bridge Repair	Grading & Drainage	Other	Total
01 Pavement Maintenance		100%						100%
02 Pavement Rehabilitation		100%						100%
03 Pavement Restoration		100%						100%
04 Bridge Repair					100%			100%
05 Bridge Rehabilitation					100%			100%
06 Bridge Replacement	5%	5%		90%				100%
07 Safety							100%	100%
08 Environment							100%	100%
09 Other							100%	100%
GARVEE	15%	21%	10%	20%		25%	9%	100%*
10 Expansion	31%	18%	11%	16%		25%		100%*

*Row does not add to 100 percent due to rounding of percentages shown in the rows.

Another major step in the process leading to the model inputs on several detailed arrays of capital expenditure breakdowns was breaking out pavement improvements by different types of pavements – flexible or asphalt, rigid or concrete, or composites of concrete with asphalt overlays.

Average annual non-capital expenditures are summarized in Table 2.6. Major non-capital expenditure categories examined in the 2010 Idaho HCAS include Idaho Division of Motor Vehicles (DMV), administration, capital facilities (i.e., construction and maintenance of ITD buildings), highway operations and maintenance, public transportation, Idaho State Police, and planning. With the exception of the Idaho State Police Budget, all non-capital expenditure data were provided by ITD. Table 2.6 presents greater detail for the DMV, administration, and highway operations and maintenance categories. As shown, average annual expenditures over the SFY 2007-2012 time period were estimated at $221.5 million and $24.4 million from state and federal sources, respectively. The majority of these expenditures are tied to highway operations and maintenance, with state expenditures estimated at $138.7 million and federal $11.7 million annually.

Table 2.6. Average Annual Non-Capital Expenditures (State and Federal)

Expenditure Category	State	Federal	Total
Motor Vehicle Administration	2,211,322	39	2,211,361
Vehicle Services	3,660,108		3,660,108
County System	3,784,349	189,524	3,973,873
Driver Services	2,998,128		2,998,128
Commercial Vehicle Services	7,612,429	539,027	8,151,456
DMV Subtotal	20,266,336	728,590	20,994,926
ITD Board	88,799		88,799
Director	614,646	382	615,028
Internal Review	481,011		481,011
Budget, Policy & Intergovernmental Relations	1,022,156		1,022,156
Public Affairs	610,602	127	610,729
Legal	976,024	20,968	996,992
Administration Miscellaneous	426,047		426,047
Business and Support Management	3,582,986	46	3,583,032
Information Services	8,889,977	21,377	8,911,354
Financial Services	3,522,691		3,522,691
Human Resources	1,305,486		1,305,486
Civil Rights	274,903	80,259	355,162
Risk Management	134,940		134,940
Administration Subtotal	21,930,267	123,158	22,053,425
Capital Facilities Fund 0260	2,858,076		2,858,076
Capital Facilities Fund 0221	52,025		52,025
Capital Facilities Fund Subtotal	2,910,102		2,910,102
District Operations and Maintenance	97,803,137	7,217,534	105,020,671
HQ Highway Operations and Maintenance	28,232,188	50,658	28,282,846
Highway Engineering	6,111,226	1,476,922	7,588,148
Highway Operations Administration	6,539,365	2,995,150	9,534,516
Highway Operations and Maintenance Subtotal	138,685,916	11,740,265	150,426,181

Table 2.6. Average Annual Non-Capital Expenditures (State and Federal) (Cont.)

Expenditure Category	State	Federal	Total
Public Transportation	663,597	7,856,674	8,520,270
Public Transportation Subtotal	663,597	7,856,674	8,520,270
Planning TRFB	1,976,698	3,976,792	5,953,490
Planning TRFB Subtotal	1,976,698	3,976,792	5,953,490
Idaho State Police	35,079,200		35,079,200
Idaho State Police Subtotal	35,079,200		35,079,200
Total Non-Capital Expenditures	221,512,115	24,425,479	245,937,594

Local expenditures were provided by ITD, as reported by local agencies. For the SFY 2007-2012 time period, local expenditures were estimated at $330.9 million annually, with $35.5 million tied to administrative expenses, $97.8 million to construction activities, $110.0 million on maintenance, $49.5 million on equipment, and $38.2 million on other expenses.

2.3 Travel Data

The research team derived tables of VMT broken down by functional road class and vehicle class based on analysis of 2004 through 2008 vehicle classification data, 2008 and 2009 breakdowns of VMT by functional class, and 2008 and 2009 weigh-in-motion (WIM) data provided by ITD. In order to lessen the influence of random year-to-year sampling errors, the research team used multiple years of data for each step in the analysis. The functional class VMT proportions from ITD's 2008 and 2009 estimates were averaged, then these averages were applied to the 2009 total VMT estimates to derive the breakdown of VMT by functional road class for all vehicle classes.

The research team also considered all five years (2004 to 2008) of classification counts on each functional class to derive estimates of travel shares for each of the 12 Highway Performance Monitoring System (HPMS) vehicle classes. Finally, both years of WIM data (2008 and 2009) were used to split the 12 HPMS vehicle classes into the 20 study vehicle classes. Because ITD provided WIM data from only three functional classes (Rural Interstate, Rural Principal Arterial, and Rural Minor Arterial), some assumptions were made about how to apply these splits to other road systems. With that noted, the 12 to 20 vehicle class split proportions appear to be less variable by functional road class than the overall variation in the 12 vehicle class proportions.

Table 2.7 presents (a) a VMT distribution summary of the data provided for 2008-2009, and (b) how the distributions based on classifications counts differ somewhat from the 1994 HCAS report distribution of VMT by functional class, with a marked trend toward proportionally more travel in urban areas. Estimating VMT by functional class accurately is an important part of HCASs because the mix of traffic differs widely among these classes, as do the types and amounts of construction and operating conditions.

Table 2.7. Distribution of Vehicle Miles of Travel on Idaho's Highways and Streets

Functional Class	2008	2009	Average	1994 HCAS
Interstate – U	8.2%	8.1%	8.1%	5.8%
Other Principal Arterials – U	13.9%	14.3%	14.1%	8.9%
Minor Arterials – U	9.7%	9.1%	9.4%	8.6%
Collectors – U	4.1%	4.0%	4.1%	3.5%
Local Roads – U	5.8%	6.1%	5.9%	4.2%
Total Urban	41.6%	41.7%	41.6%	31.1%
Interstate – R	13.7%	14.2%	13.9%	15.0%
Other Principal Arterials – R	14.1%	13.3%	13.7%	14.7%
Minor Arterials – R	6.2%	5.9%	6.1%	5.9%
Major Collectors – R	8.4%	8.1%	8.2%	12.0%
Minor Collectors – R	1.5%	1.6%	1.6%	2.2%
Local Roads – R	14.5%	15.2%	14.8%	19.1%
Total Rural	58.4%	58.3%	58.4%	68.9%

Table 2.8 displays the breakdown of VMT by functional road class and vehicle class resulting from the research team's analysis of ITD data.

Table 2.8. VMT (Millions) by Functional Road Class and Vehicle Class

	Rur Int	Rur OPA	Rur MA	Rur MajC	Rur MnC	Rur Loc	Urb Int	Urb OPA	Urb MA	Urb Coll	Urb Loc	All Hwys
Auto	896.34	1,024.78	433.83	619.06	121.92	1,056.94	404.41	1,115.39	807.25	365.06	570.73	7,415.72
LT4	648.84	803.18	378.75	508.33	93.66	935.68	395.20	854.06	552.93	228.70	308.54	5,707.88
SU2	93.15	110.94	58.21	67.22	12.26	115.88	49.68	102.48	60.43	22.03	25.35	717.62
SU3	27.72	25.97	12.51	16.72	2.46	41.28	6.02	28.50	7.79	3.77	0.95	173.69
SU4+	1.09	1.13	0.43	0.92	0.09	1.40	0.29	1.32	0.46	0.35	0.48	7.98
CS3	28.27	8.28	5.85	5.62	0.93	6.91	14.75	6.46	2.46	0.93	1.36	81.82
CS4	35.31	14.98	4.40	4.22	0.70	5.19	22.42	9.82	3.74	1.42	2.07	104.27
CS5T	270.55	58.36	22.43	26.93	5.04	66.25	233.31	20.72	6.81	1.48	1.81	713.69
CS5S	25.10	9.88	0.62	0.74	0.14	1.83	28.08	2.49	0.82	0.18	0.22	70.11
CS6	25.06	13.36	7.85	6.81	0.55	14.49	29.40	11.30	2.35	0.33	0.38	111.87
CS7+	26.97	13.09	3.83	3.32	0.27	7.06	13.50	5.19	1.08	0.15	0.18	74.62
CT34	1.27	0.75	0.08	0.16	0.06	0.72	1.72	0.28	0.07	0.22	0.27	5.58
CT5	0.26	0.18	0.22	0.43	0.16	1.96	0.65	0.11	0.03	0.08	0.10	4.18
CT6+	0.05	0.47	0.09	0.10	0.01	0.37	0.47	0.09	0.02	0.00	0.01	1.69
DS5	4.98	0.77	0.01	0.01	0.00	0.05	3.30	0.53	0.13	0.42	0.51	10.72
DS6	7.62	1.15	0.17	0.39	0.05	1.05	6.19	0.33	0.24	0.14	0.22	17.55
DS7	27.24	10.36	6.78	7.73	1.11	29.37	28.20	5.13	1.14	0.15	0.31	117.50
DS8+	10.89	2.97	0.17	0.19	0.03	0.72	5.53	1.00	0.22	0.03	0.06	21.81
TRPL	15.51	2.83	0.03	0.03	0.00	0.12	6.60	1.20	0.27	0.04	0.07	26.70
Bus	6.11	6.46	3.14	3.61	0.41	2.73	4.45	12.18	3.24	1.87	0.42	44.63
Total	2,152.33	2,109.90	939.38	1,272.55	239.84	2,290.01	1,254.18	2,178.58	1,451.47	627.36	914.04	15,429.65

3.0 Cost Allocation

This section documents the allocation of construction, maintenance, and other expenditures by level of government to the various vehicle classes. Section 3.1 presents an overview of the procedures used in the cost allocation process. Section 3.2 presents the final results of the cost allocation analysis.

3.1 Cost Allocation Procedures

The cost responsibility for each vehicle class was estimated using the FHWA State HCAS Model as a framework, updated to reflect Idaho's highway system and the vehicles using the system.

3.1.1 Pavements

The most important update of the FHWA State HCAS Model in Idaho to date has focused on vehicle characteristics. The research team used WIM data collected by ITD during 2008-2009. The WIM data contained 871,000 truck and bus observations. The research team subjected each of these observations to our updated evaluation and editing algorithm and found that slightly over 9 percent failed to pass the edit tests, leaving approximately 792,000 observations judged valid. This set of edited WIM data was used to refine weight-related HCAS model inputs. The weight observations provided distributions of vehicle operating weights for 18 truck and bus classes, as well as detailed information on axle weights and simple span bridge moments—three vital components needed for accurate allocation of pavement, bridge, and other highway costs. Like most states, Idaho filters out light vehicles when compiling WIM data. Thus, the research team supplemented the Idaho truck and bus data with national auto and light truck data.

These results make use of a recent FHWA run of the old version of the National Pavement Cost Model (NAPCOM) using 2007 highway section data reported by ITD to FHWA under HPMS. NAPCOM, one of the most important HCAS innovations developed by FHWA, estimates how much pavement deterioration in a given state results from each type and weight of axle.

3.1.2 Bridges

The bridge cost allocation procedures used in this study are based on research and methods developed by FHWA for the 1982 and 1997 Federal HCASs. Three types of bridge expenditures were considered: new bridges, bridge replacement, and bridge rehabilitation.

New bridge costs are allocated based on an incremental analysis of the costs of constructing bridges using different design loadings. These loadings are based on hypothetical vehicles for which stresses in the load-bearing members of bridges are calculated and compared with permissible stress levels. As loadings become heavier, the size of bridge members (and, consequently, bridge costs) must be increased to remain within permissible stress levels. All vehicles share the cost of the first increment (i.e., that associated with the lightest design loadings). Only heavier vehicles share the cost of subsequent increments. The determination of which vehicles share the costs of which increments depends upon a comparison of the stresses produced by the vehicles with those produced by the design loadings used in the incremental analysis.

Bridge replacement costs are allocated based on estimates of the percentage of these costs that are incurred because the load-bearing capacity of existing bridges are deficient. Those costs due to deficient load-bearing capacity are allocated to vehicles that operate at weights over the load-bearing capacities of the replaced bridges. The percentage of bridge replacement costs that are incurred as a result of deficient load-bearing capacities was estimated using FHWA's Bridge Sufficiency Rating Formula.[1] Under the Bridge Sufficiency Rating Formula, bridges lose points if their load-bearing capacity is inadequate or if they have other non-load-related problems such as scouring around piers or being too narrow for current traffic levels. For bridges to be replaced, points lost due to inadequate load-bearing capacity are expressed as a fraction of total points lost to determine the share of bridge replacement costs to be allocated to vehicles that operate at weights over the load-bearing capacities of the bridges to be replaced.

Bridge rehabilitation costs are allocated based on estimates of the fraction of these costs associated with different types of bridge rehabilitation projects and the extent to which expenditures for each type of project are load-related. The allocation was based on information from FHWA's Bridge Needs and Investment Process and an analysis of a representative sample of bridge repair projects to determine the percentage of costs that are expected to be load-related as opposed to non-load-related. This split, broken down by functional class of street and highway, is then used to determine the split between costs that should be allocated by vehicle mile of travel broken down by weight category and the costs that should be allocated only by vehicle miles of travel for each vehicle class.

3.1.3 Non-Capital Expenditures

There are elements of any transportation agency budget that have less obvious relationships to specific vehicle characteristics. As noted in Section 2.2, this study considers numerous non-capital expenditure categories including DMV, administration, capital facilities, highway operations and maintenance, public transportation, and planning expenditures.

All non-capital costs that are directly associated with highway construction, maintenance, operations, and other expenditure categories are treated as overhead costs on those highway program categories. All planning expenditures are treated as overhead costs on construction programs. DMV programs are divided between basic and heavy vehicles and allocated to each based on VMT. The motor vehicle administration component of DMV costs are allocated to all vehicles based on VMT shares. Costs associated with administrative functions that do not directly serve specific highway program functions (e.g., all administration, public transportation, and capital facilities costs) were allocated as common costs based on VMT.

Highway operations and maintenance (O&M) expenditures were allocated based on very specific analyses of the associated sub-categories of expenditures. Each sub-category has been assigned an activity code by ITD designating the expenditure type. All expenditures with an activity code beginning with 'c' for construction were allocated as overhead on construction activities. Design expenditures (activity code-d) were also allocated as overhead on construction, as were lab-related expenses (activity code-l). All equipment-related expenses (activity code-e) were allocated based on VMT shares. All general administrative costs associated with highway O&M (activity code-g) were allocated as overhead

[1] This formula is described in Appendix A of FHWA's *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges.*

on highway O&M activities. Highway safety expenditures (activity code-h) were allocated based on passenger car equivalent-miles (PCE-miles), as were all traffic control (activity code-t) expenditures.

The final highway O&M category (activity code-m) is the most complex and was allocated using different methods based on the specific expenditure type. Maintenance expenditures associated with pavements and bridges were allocated using the methods presented in Sections 3.1.1 and 3.1.2. Other highway O&M expenditures were allocated using other methods, including VMT (e.g., roadside mowing), axle-mile of travel (e.g., line markings), PCE-miles (e.g., guardrail maintenance), or overhead on all maintenance activities (e.g., ITD maintenance building operations).

The portion of the Idaho State Police budget tied to highway patrol ($35.1 million, average of SFYs 2009-2010) was allocated to all vehicles based on relative shares of statewide VMT (State of Idaho Legislative Services Office 2009).

3.2 Cost Allocation Results

Table 3.1 summarizes the result of the allocation of all costs by vehicle class, taking into account all the factors affecting cost responsibility, such as those listed in the preceding sections. Vehicle classes are defined in Section 1.1 of this report. As shown, the cost allocation methods used in the 2010 Idaho HCAS resulted in $101.5 million of all state highway expenditures being allocated to automobiles, with an additional $94.9 million allocated to LT4s. The CS5T vehicle class represents the heavy truck group with the largest share of cost responsibility, estimated at $82.9 million.

Table 3.1. Summary of State Highway Cost Allocation Results ($Thousands Annually)

Vehicle Class	New Pavements	Rehab Pavements	New Bridge	Replacement Bridge	Repair Bridge	Grading	Other Construction	Total Construction	Maintenance	Admin & Other[(a)]	Total
Auto	1,381	1,666	3,693	7,152	770	7,885	7,192	29,740	28,843	42,941	101,525
LT4	2,155	2,340	3,728	7,249	758	12,841	6,334	35,406	25,493	33,959	94,858
SU2	2,085	1,943	1,392	2,746	231	3,510	1,355	13,262	5,073	4,987	23,322
SU3	781	1,308	477	1,117	69	931	328	5,010	1,532	1,678	8,220
SU4+	44	73	32	92	4	55	16	316	80	62	459
CS3	321	359	259	530	42	653	242	2,406	941	857	4,204
CS4	605	655	456	941	74	1,120	383	4,233	1,527	951	6,711
CS5T	8,978	14,090	5,415	12,629	807	12,322	3,916	58,158	18,377	6,327	82,862
CS5S	1,479	1,753	717	1,695	105	1,633	501	7,882	2,289	621	10,792
CS6	1,079	1,747	810	1,899	120	1,846	548	8,049	2,525	1,083	11,657
CS7+	1,121	1,864	737	2,043	96	1,838	394	8,094	2,032	701	10,827
CT34	34	47	28	60	4	68	26	267	106	52	424
CT5	30	36	16	39	2	37	11	171	51	38	259
CT6+	71	77	23	64	3	60	13	311	71	17	399
DS5	99	115	70	154	11	155	52	656	215	95	965
DS6	115	191	143	315	22	299	96	1,181	399	159	1,739
DS7	3,560	4,164	1,143	2,888	160	2,380	614	14,909	3,563	1,079	19,551
DS8+	462	723	268	681	37	554	139	2,863	735	198	3,796
TRPL	317	371	231	533	34	481	136	2,104	593	240	2,937
Bus	160	191	139	283	22	308	107	1,210	414	226	1,850
Total	24,877	33,712	19,777	43,110	3,372	48,976	22,404	196,228	94,860	96,271	387,358

(a) “Administrative & Other” category includes DMV, administration, capital facilities, public transportation, planning, highway operations, and other expenditures.

Table 3.2 breaks down the findings of the cost allocation analysis by vehicle class and level of government. The level of government tied to each expenditure was established not based on where revenues were raised but rather where control rested in managing the program. Thus, federal expenditures include federal expenditures on Federal-aid transportation projects but do not include GARVEE bond expenditures, which are tied to state-issued and managed bond proceeds. The state program includes GARVEE bond proceeds and expenditures of state highway user funds but does not include funds passed through to local governments when the state has no oversight role in the funded projects. Local expenditures include those tied to all pass-through funds and highway user and non-highway user funds raised at the local level.

As shown, $101.5 million and $54.1 million of all state and federal expenditures were allocated to automobiles, respectively. The passenger vehicle cost responsibility is proportionally lower on the federal system due to the emphasis of the federal program on construction and rehabilitation activities that fall, from a cost allocation perspective, more heavily on heavy trucks. In total, more than $1.0 billion in annual costs were allocated to vehicle classes at the state, federal, and local level.

Table 3.2. Cost Responsibility by Vehicle Class and Level of Government ($Thousands)

Vehicle Class	State	Federal	Local	Total
Auto	101,525	54,103	129,775	285,403
LT4	94,858	57,472	114,532	266,863
SU2	23,322	27,342	23,865	74,530
SU3	8,220	20,064	10,452	38,735
SU4+	459	1,152	697	2,308
CS3	4,204	3,227	2,052	9,483
CS4	6,711	5,044	1,955	13,710
CS5T	82,862	69,403	24,184	176,449
CS5S	10,792	7,116	1,070	18,978
CS6	11,657	11,903	4,753	28,313
CS7+	10,827	13,545	3,490	27,862
CT34	424	247	198	869
CT5	259	279	585	1,123
CT6+	399	413	159	970
DS5	965	548	136	1,649
DS6	1,739	805	389	2,932
DS7	19,551	26,671	10,907	57,129
DS8+	3,796	4,171	460	8,427
TRPL	2,937	2,073	236	5,246
Bus	1,850	2,552	1,009	5,410
Total	387,358	308,127	330,904	1,026,390

4.0 Revenue Attribution

The revenue attribution process involves the splitting of revenues forecast for a specific time period, in this case the average of SFYs 2007-2012, among vehicle classes and weight groups. In this process, revenues are attributed to vehicle classes separately for each tax and fee. Section 4.1 presents an overview of the procedures used in the revenue attribution process. Section 4.2 presents the results of the revenue attribution analysis.

The output of the revenue attribution process, which is an assignment of revenues collected by vehicle class, serves as the numerator in the equity ratio calculation. The equity ratio is the share of revenues paid by a highway user group to the share of costs imposed by that group. A user group that meets 110 percent of its cost responsibility would be assigned an equity ratio of 1.1. Equity ratios above 1.0 are assigned to user groups who are paying more than their cost responsible share while payments from user groups assigned equity ratios of less than 1.0 fall short of the costs imposed by the group.

4.1 Revenue Attribution Procedures

The revenue attribution procedures assigned federal, state, and local user revenues to the vehicle classes detailed in Table 1.1 and to RGW classes in 2,000-pound increments above 8,000 pounds. In conducting the revenue attribution process, the research team supplemented ITD travel and miles per gallon (MPG) data with data collected from other states and national databases, such as the vehicle inventory and use survey (VIUS). With assistance from representatives of ITD, the research team also replaced several elements of the default data contained within the FHWA State HCAS model with Idaho-specific inputs. The various sources of data examined for this study, combined with the default data already contained within the HCAS model, enabled the estimation of numerous vehicle characteristics for each detailed vehicle class, including:

- Vehicle miles of travel
- Percentage of mileage outside of Idaho
- Annual mileage per vehicle
- Miles per gallon
- Number of vehicles registered.

The travel, MPG, registration, and other data were input into the HCAS model, thus enabling the attribution of each tax to each vehicle class. The following procedures were used when developing estimates of revenues for the primary taxes from each vehicle class:

- Fuel tax revenues (gasoline and special fuels) were attributed based on estimates of VMT on Idaho highways and miles per gallon for each vehicle class
- Registration fees were attributed based on a breakdown of fees between passenger vehicles, trucks, and buses by ITD and an estimation of the number of full fee equivalent vehicles registered in each RGW class based on total VMT and average per-vehicle VMT estimates prepared by the research team.

Total collections for the average of SFYs 2007 through 2012 were then applied as controls to the estimates derived from the revenue attribution procedures. This step ensured that total revenues attributed to all vehicle classes were equal to the forecast revenue totals for each level of government.

4.2 Revenue Attribution Results

This section summarizes the output of the revenue attribution process. Tables appearing in this section present total and per-mile state, federal, and local revenues paid by each vehicle and RGW class considered in this study.

Table 4.1 presents the total and per-mile state, federal, and local revenues attributed to each vehicle class considered within this study. When only state highway user fees are included, automobile operators are paying 1.6 cents per mile. When all levels of government are considered, the per-mile fee for automobiles rises to 2.5 cents. Per-mile state user fees increase gradually, reaching 9.1 cents per mile for tractor-triple semitrailer or truck-double semitrailer combinations (TRPL). When taxes paid to all levels of government are considered, per-mile payments for the TRPL vehicle category reaches 13.7 cents.

Table 4.2 presents highway user revenues attributed to basic and heavy vehicles for all levels of government. Of the $562.3 million in revenues collected from highway users in Idaho, $181.5 million or 32.3 percent were attributed to vehicles with RGWs in excess of 26,000 pounds. At the state level, 33.0 percent of all revenues were attributed to vehicles with RGWs in excess of 26,000 pounds. At the federal level, vehicles with RGWs in excess of 26,000 pounds accounted for 31.9 percent ($62.6 million) of total attributed revenues.

Table 4.1. Total and Per-Mile State and Federal Revenues Attributed to Each Vehicle Class (Average Annual, SFYs 2007-2012)

Vehicle Configuration	Vehicle Miles (Millions)	State		Federal		Local		Total	
		Revenue ($Thousands)	Per Mile (Cents)	Revenue ($Thousands)	Per Mile (Cents)	Revenue ($Thousands)	Per Mile (Cents)	Revenue ($Thousands)	Per Mile (Cents)
Auto	7,416	118,406	1.6	64,639	0.9	3,621	0.0	186,665	2.5
LT4	5,708	92,510	1.6	50,773	0.9	2,683	0.0	145,967	2.6
SU2	718	25,500	3.6	15,504	2.2	0.0	0.0	41,004	5.7
SU3	174	13,999	8.1	6,601	3.8	0.0	0.0	20,600	11.9
SU4+	8	818	10.2	437	5.5	0.0	0.0	1,255	15.7
CS3	82	3,397	4.2	2,269	2.8	0.0	0.0	5,666	6.9
CS4	104	5,039	4.8	3,543	3.4	0.0	0.0	8,581	8.2
CS5T	714	57,031	8.0	30,115	4.2	0.0	0.0	87,146	12.2
CS5S	70	5,603	8.0	2,959	4.2	0.0	0.0	8,561	12.2
CS6	112	9,952	8.9	5,046	4.5	0.0	0.0	14,997	13.4
CS7+	75	6,833	9.2	3,468	4.6	0.0	0.0	10,301	13.8
CT34	6	286	5.1	191	3.4	0.0	0.0	476	8.5
CT5	4	332	7.9	176	4.2	0.0	0.0	507	12.1
CT6+	2	153	9.1	77	4.6	0.0	0.0	231	13.7
DS5	11	858	8.0	453	4.2	0.0	0.0	1,310	12.2
DS6	18	1,516	8.6	778	4.4	0.0	0.0	2,294	13.1
DS7	118	10,736	9.1	5,437	4.6	0.0	0.0	16,174	13.8
DS8+	22	2,131	9.8	1,013	4.6	0.0	0.0	3,144	14.4
TRPL	27	2,430	9.1	1,231	4.6	0.0	0.0	3,661	13.7
Bus	45	2,381	5.3	1,346	3.0	0.0	0.0	3,727	8.4
Total	15,430	359,909	2.3	196,056	1.3	6,304	0.0	562,269	3.6

Table 4.2. Highway User Fee Payments by Vehicle Class and Level of Government, Average of SFYs 2007-2012 ($Thousands)

	State Revenues	(%)	Federal Revenues	(%)	Local Revenues	(%)	Total Revenues	(%)
Vehicles with RGW of 26,000 pounds or less	240,965	67.0	133,472	68.1	6,304	100.0	380,741	67.7
Vehicles with RGW of more than 26,000 pounds	118,944	33.0	62,583	31.9	0.0	0.0	181,527	32.3
Total	359,909		196,056		6,304		562,269	

5.0 Equity Analysis

Tables 5.1-5.5 present the results of the equity analysis, which compares cost responsibilities estimated for each vehicle class to attributed revenues. An unadjusted equity ratio is calculated by dividing attributed revenues by cost responsibility for each vehicle class. The adjusted equity ratio accounts for differences between revenues attributed and costs allocated to all vehicle classes. If total highway user payments exceed total cost responsibility, the equity ratios for each vehicle class would be adjusted downward so that the total shares of allocated costs equal total shares of revenues and the overall equity ratio equals 1.0. For example, if highway user revenues exceeded cost responsibilities by 50 percent, each unadjusted equity ratio would be divided by 1.5. Adjusted equity ratios can also be constructed by expressing each ratio as the percent of total user revenue paid divided by the percent of total cost responsibility. This procedure is necessary for examining equity in tax structures with highway user revenues collected for non-road purposes and when non-user sources (e.g., general fund revenues) are used to pay for part of the highway program.

Tables 5.1 and 5.2 present the results of the equity analysis comparing cost responsibilities computed for each vehicle class to attributed revenues. The vehicle classes examined in this report are presented in Table 1.1. Tables 5.3 and 5.4 present the results of the equity analysis for each RGW class in 2,000-pound increments above 8,000 pounds. Tables 5.1 through 5.4 present study findings based on planned expenditures during the SFY 2007 through 2012 time period, including those funded with GARVEE bond proceeds. Tables 5.5 and 5.6 additionally present the results of an alternative GARVEE funding scenario where expenditures are equal to the debt service payments over the six-year HCAS time horizon (SFY 2007-2012).

Table 5.1 presents vehicle miles, state revenue, and state cost responsibility for each vehicle class considered in this study. Based on the findings presented in Table 5.1, state revenues from automobiles exceed the cost responsibility estimated for that class by 17 percent. State revenues attributed to the LT4 vehicle class, however, fall short of cost responsibility by 2 percent. The adjusted equity ratio for automobiles is 1.26. With the exception of the CT5 class, the larger vehicle classes are not meeting their cost responsibility at the state level, with adjusted equity ratios ranging from 0.92 for CB6s to 0.41 for the CT6+ class.

Table 5.2 presents vehicle miles, revenue, and cost responsibility for the federal and state combined analysis. When all federal and state revenues and expenditures are considered, the automobile and LT4 adjusted equity ratios shift to 1.47 and 1.18, respectively. The shift is due to the focus of federal expenditures on Interstate and other higher-order systems where heavy trucks do most of their miles and the emphasis of federal programs on capital programs. When state and federal programs are combined, revenues attributed to all vehicle classes fall short of cost responsibility by 20 percent. When federal and state programs are included in the analysis, the adjusted equity ratios for several heavy truck classes fall, reaching as low as 0.36 for the CT6+ class.

Table 5.3 presents vehicle miles, state revenue, and state cost responsibility by RGW class. Table 5.4 presents vehicle miles, state and federal revenue combined, and state and federal combined cost responsibility by RGW class. For vehicles with RGWs of 8,000 pounds or less, the adjusted equity ratio under the state program is 1.15. When federal and state programs are combined, equity ratios for light

vehicles with RGWs of 8,000 pounds or less rises to 1.32. Equity ratios drop as RGWs increase. For the 80,000-pound weight group, which is the most significant heavy truck weight category, the equity ratio is 0.72 (federal and state combined), representing a 28 percent underpayment.

Table 5.1. Annual Vehicle Miles, State Revenue, and State Cost Responsibility by Vehicle Class (Full GARVEE Bond Program Expenditures)

Vehicle Class	Vehicle Miles (Millions)	State User Revenue (Thousands)	State Cost Responsibilities (Thousands)	Equity Ratios	
				Unadjusted	Adjusted
Auto	7,416	118,406	101,525	1.17	1.26
LT4	5,708	92,510	94,858	0.98	1.05
SU2	718	25,500	23,322	1.09	1.18
SU3	174	13,999	8,220	1.70	1.83
SU4+	8	818	459	1.78	1.92
CS3	82	3,397	4,204	0.81	0.87
CS4	104	5,039	6,711	0.75	0.81
CS5T	714	57,031	82,862	0.69	0.74
CS5S	70	5,603	10,792	0.52	0.56
CS6	112	9,952	11,657	0.85	0.92
CS7+	75	6,833	10,827	0.63	0.68
CT34	6	286	424	0.67	0.72
CT5	4	332	259	1.28	1.38
CT6+	2	153	399	0.38	0.41
DS5	11	858	965	0.89	0.96
DS6	18	1,516	1,739	0.87	0.94
DS7	118	10,736	19,551	0.55	0.59
DS8+	22	2,131	3,796	0.56	0.60
TRPL	27	2,430	2,937	0.83	0.89
Bus	45	2,381	1,850	1.29	1.39
Total	15,430	359,909	387,358	0.93	1.00

Table 5.2. Annual Vehicle Miles, All Federal and State Revenue, and All Federal and State Cost Responsibility by Vehicle Class (Full GARVEE Bond Program Expenditures)

Vehicle Class	Vehicle Miles (Millions)	Federal + State User Revenue (Thousands)	Federal + State Cost Responsibilities (Thousands)	Equity Ratios	
				Unadjusted	Adjusted
Auto	7,416	183,045	155,628	1.18	1.47
LT4	5,708	143,283	152,330	0.94	1.18
SU2	718	41,004	50,665	0.81	1.01
SU3	174	20,600	28,283	0.73	0.91
SU4+	8	1,255	1,611	0.78	0.97
CS3	82	5,666	7,431	0.76	0.95
CS4	104	8,581	11,755	0.73	0.91
CS5T	714	87,146	152,265	0.57	0.72
CS5S	70	8,561	17,908	0.48	0.60
CS6	112	14,997	23,560	0.64	0.80
CS7+	75	10,301	24,372	0.42	0.53
CT34	6	476	671	0.71	0.89
CT5	4	507	538	0.94	1.18
CT6+	2	231	812	0.28	0.36
DS5	11	1,310	1,513	0.87	1.08
DS6	18	2,294	2,544	0.90	1.13
DS7	118	16,174	46,222	0.35	0.44
DS8+	22	3,144	7,967	0.39	0.49
TRPL	27	3,661	5,010	0.73	0.91
Bus	45	3,727	4,401	0.85	1.06
Total	15,430	555,964	695,486	0.80	1.00

Table 5.3. Annual Vehicle Miles, State Revenue, and State Cost Responsibility by Registered Gross Weight (RGW) Class (Full GARVEE Bond Program Expenditures)

RGW Class	Vehicle Miles (Millions)	State User Revenue ($Thousands)	State Cost Responsibilities ($Thousands)	Equity Ratios Unadjusted	Equity Ratios Adjusted
0-8,000	12,912	206,157	192,684	1.07	1.15
8,001-16,000	749	20,954	19,270	1.09	1.17
16,001-26,000	278	13,854	11,565	1.20	1.29
26,001-40,000	89	4,869	4,010	1.21	1.31
40,001-55,000	173	13,097	10,157	1.29	1.39
55,001-75,000	81	4,817	6,153	0.78	0.84
75,001-80,000	797	63,755	93,731	0.68	0.73
80,001-90,000	102	9,457	11,675	0.81	0.87
90,001-100,000	67	6,189	8,946	0.69	0.74
100,001-105,500	165	15,006	26,001	0.58	0.62
105,501-150,000	17	1,754	3,167	0.55	0.60
Total	15,430	359,909	387,358	0.93	1.00

Table 5.4. Annual Vehicle Miles, Federal and State Revenue, and Federal and State Cost Responsibility by Registered Gross Weight Class (Full GARVEE Bond Program Expenditures)

RGW Class	Vehicle Miles (Millions)	Federal + State User Revenue ($Thousands)	Federal + State Cost Responsibilities ($Thousands)	Equity Ratios Unadjusted	Equity Ratios Adjusted
0-8,000	12,912	318,700	301,970	1.06	1.32
8,001-16,000	749	34,772	36,588	0.95	1.19
16,001-26,000	278	20,965	27,446	0.76	0.96
26,001-40,000	89	7,573	8,469	0.89	1.12
40,001-55,000	173	19,972	30,265	0.66	0.83
55,001-75,000	81	7,882	11,861	0.66	0.83
75,001-80,000	797	97,407	170,089	0.57	0.72
80,001-90,000	102	14,195	23,184	0.61	0.77
90,001-100,000	67	9,340	19,119	0.49	0.61
100,001-105,500	165	22,612	59,143	0.38	0.48
105,501-150,000	17	2,546	7,352	0.35	0.43
Total	15,430	555,964	695,486	0.80	1.00

Table 5.5 compares the results of the 2010 Idaho HCAS to those presented for the 1994 and 2002 Idaho HCASs. The results show a trend toward higher equity ratios for vehicles weighing less than 8,000

pounds. In 1994, state and federal revenues attributed to automobiles fell short of cost responsibility by 16 percent. By 2002, the underpayment had fallen to 6 percent. The findings of the 2010 Idaho HCAS suggests that collections from automobiles now exceed cost responsibility for the combined state and federal programs by 47 percent, while payments from combination trucks now fall 33 percent short of cost responsibility. The adjusted equity ratio for all vehicles with RGWs of less than 26,000 pounds is 1.28 (federal and state combined). The adjusted equity ratio for vehicles with RGWs in excess of 26,000 pounds is 0.69 (federal and state combined).

From a cost responsibility perspective, there are two significant factors that appear to have influenced the results of the 2010 Idaho HCAS, leading to lower equity ratios for heavy trucks when compared to the 1994 and 2002 studies: the presence of the GARVEE bond program and the repeal of the weight-distance tax.

With the implementation of the GARVEE program, Idaho is now using bond money to substantially increase its amount of new construction and major capacity improvements on congested highways and urban freeways. Almost 80 percent of all state funds for construction and other capital improvements during SFYs 2007-2012 are forecast to come from bond proceeds – specifically, proceeds from "GARVEE" bonds, which allow Idaho to borrow funds based on future Federal-aid authorizations to pay for debt service.

The most important impact of the GARVEE bond program from a cost allocation perspective is that a much higher proportion of highway funds are now paying for large increases in pavement expenditures, as opposed to funding bridge, grading and drainage, and other construction categories. Because the majority of pavement costs are due to the impacts of heavy axle loads, the large bond program is substantially increasing the cost responsibility of heavy trucks, particularly those with axle loads in the top portion of allowable weights – 12 to 18 thousand pounds per single axle and 28 to 34 thousand pounds per pair of tandem axles. By comparison, the smaller non-bond financed portion of state funded construction is used more heavily to fund such activities as grading and drainage, safety improvements, traffic control, and environmental improvements. Almost all of these costs are the cost responsibility of all highway users, and are allocated largely based on VMT or PCE-miles. Almost half of total non-bond-financed expenditures compared to only one-third of bond-financed expenditures are for these largely non-load-related costs of construction.

To gauge the impact of the GARVEE bond program on study findings, the research team performed a sensitivity analysis that considered a significant reduction in GARVEE bond expenditures. In the reduced GARVEE bond scenario, expenditures are set based on annual debt service payments during the six-year (SFY 2007-2012) time horizon, an amount equal to roughly 26 percent of total GARVEE bond expenditures over the same time period. The reduced GARVEE bond expenditures scenario eliminates $96.9 million in construction expenditures.

Table 5.5. Highway User Fee Contributions vs. Responsibility in Idaho (1994, 2002, and 2010 HCASs)

Study Year	Vehicle Class	Revenue ($Millions)	Percent Contribution	Cost Responsibility ($Millions)	Percent Responsibility	Adjusted Equity Ratio
1994 (State)	Autos	$71.6	33.9%	$94.3	44.7%	0.76
	Pickups	$59.7	28.3%	$58.2	27.6%	1.03
	Buses	$0.6	0.3%	$0.7	0.3%	0.79
	SU Trucks	$22.5	10.7%	$17.8	8.4%	1.27
	Combinations	$56.6	26.8%	$40.1	19.0%	1.41
1994 (State + Federal)	Autos	$104.2	32.9%	$143.8	39.1%	0.84
	Pickups	$90.1	28.4%	$87.8	23.9%	1.19
	Buses	$1.3	0.4%	$1.4	0.4%	1.08
	SU Trucks	$37.8	11.9%	$36.6	10.0%	1.20
	Combinations	$83.3	26.3%	$98.0	26.7%	0.99
2002 (State)	Autos	$99.0	32.8%	$116.0	37.3%	0.88
	Pickups	$75.0	24.8%	$77.0	24.8%	1.01
	Buses	$2.0	0.7%	$2.0	0.6%	0.86
	SU Trucks	$35.0	11.6%	$31.0	10.0%	1.18
	Combinations	$91.0	30.1%	$86.0	27.7%	1.10
2002 (State + Federal)	Autos	$160.0	31.5%	$202.0	33.4%	0.94
	Pickups	$123.0	24.2%	$131.0	21.7%	1.11
	Buses	$3.0	0.6%	$4.0	0.7%	0.77
	SU Trucks	$58.0	11.4%	$59.0	9.8%	1.17
	Combinations	$165.0	32.5%	$208.0	34.4%	0.95
2010 (State)	Autos	$118.4	32.9%	$101.5	26.2%	1.26
	Pickups	$92.5	25.7%	$94.9	24.5%	1.05
	Buses	$2.4	0.7%	$1.9	0.5%	1.39
	SU Trucks	$40.3	11.2%	$32.0	8.3%	1.36
	Combinations	$106.3	29.5%	$157.1	40.6%	0.73
2010 (State + Federal)	Autos	$183.0	32.9%	$155.6	22.4%	1.47
	Pickups	$143.3	25.8%	$152.3	21.9%	1.18
	Buses	$3.7	0.7%	$4.4	0.6%	1.06
	SU Trucks	$62.9	11.3%	$80.6	11.6%	0.98
	Combinations	$163.1	29.3%	$302.6	43.5%	0.67
2010 (State, Reduced GARVEE Exp.)	Autos	$118.4	32.9%	$88,364	30.4%	1.08
	Pickups	$92.5	25.7%	$78,885	27.2%	0.95
	Buses	$2.4	0.7%	$1,259	0.4%	1.53
	SU Trucks	$40.3	11.2%	$22,783	7.8%	1.43
	Combinations	$106.3	29.5%	$99,178	34.1%	0.86
2010 (State + Federal, Reduced GARVEE Exp.)	Autos	$183.0	32.9%	$142,467	23.8%	1.38
	Pickups	$143.3	25.8%	$136,357	22.8%	1.13
	Buses	$3.7	0.7%	$3,811	0.6%	1.05
	SU Trucks	$62.9	11.3%	$71,341	11.9%	0.95
	Combinations	$163.1	29.3%	$244,620	40.9%	0.72

The GARVEE bond program does impact the results, with combination truck adjusted equity ratios under the reduced GARVEE bond scenario increasing across the board and the automobile adjusted equity ratio falling from 1.47 to 1.38 (federal and state programs combined). Under the reduced GARVEE bond scenario, the adjusted equity ratio for combination trucks increases from 0.67 to 0.72

(federal and state programs combined). For the state program, the impact is more significant with the adjusted automobile equity ratio dropping from 1.26 to 1.08 and the combination trucks adjusted equity ratio growing from 0.73 to 0.86 (Table 5.5). Table 5.6 compares the adjusted equity ratios under the full GARVEE bond scenario to those under the reduced GARVEE bond scenario for all 20 vehicle classes.

The findings of this sensitivity analysis suggest that although the six-year program considered in this study is somewhat more focused on construction expenditures than would be the case in the absence of the GARVEE bond program, it is important to note that: a) the findings presented throughout this report do address a six-year time horizon, which is a significant period of time, b) the GARVEE bond program represents an acceleration in the completion of projects that would otherwise be completed in future years, and c) the sensitivity analysis results do not deviate enough from those for the base case to undermine the findings of this study.

Table 5.6. Adjusted Equity Ratios by Vehicle Class for Full GARVEE Bond Scenario and Reduced GARVEE Bond Scenario (Federal plus State Combined).

Vehicle Class	Full GARVEE Bond Program	Reduced GARVEE Bond Program (26% of Total Expenditures)
Auto	1.47	1.38
LT4	1.18	1.13
SU2	1.01	1.00
SU3	0.91	0.86
SU4+	0.97	0.93
CS3	0.95	0.98
CS4	0.91	0.96
CS5T	0.72	0.77
CS5S	0.60	0.67
CS6	0.80	0.83
CS7+	0.53	0.55
CT34	0.89	0.95
CT5	1.18	1.21
CT6+	0.36	0.39
DS5	1.08	1.19
DS6	1.13	1.26
DS7	0.44	0.46
DS8+	0.49	0.52
TRPL	0.91	1.00
Bus	1.06	1.05
Total	1.00	1.00

This HCAS was also influenced by the repeal of the weight-distance tax on heavy trucks. In 1999, the American Trucking Association (ATA) filed suit against Idaho's two-tiered weight-distance tax structure, which imposed a separate mileage fee schedule for vehicles hauling selected commodities (e.g., logs, pulp wood, ores, livestock, sand and gravel). The Limited Commodity Rate schedule was found unconstitutional by the Fourth Judicial District Court of Idaho and the alternative fee schedule was ordered to be discontinued as of April 1, 2000. In 2001, the weight-distance tax in Idaho was replaced entirely by a mileage-based registration fee system.

Figure 5.1 demonstrates the revenue impact of the weight-distance tax by comparing combined annual registration fee and weight-distance tax revenue collected from heavy vehicles over the 1991 to 2009 time period. As shown, revenues grew from $29.0 million in 1991 to $45.5 million in 2000. Had the weight-distance tax not been repealed, revenues were forecast to grow to $60.4 million based on analysis of historical trends. Following an initial surge in revenues in 2001, revenues declined. In 2008, registration fees were $48.8 million, approximately $11.6 million less than what ITD forecasts would have been collected had the weight-distance tax not been repealed.

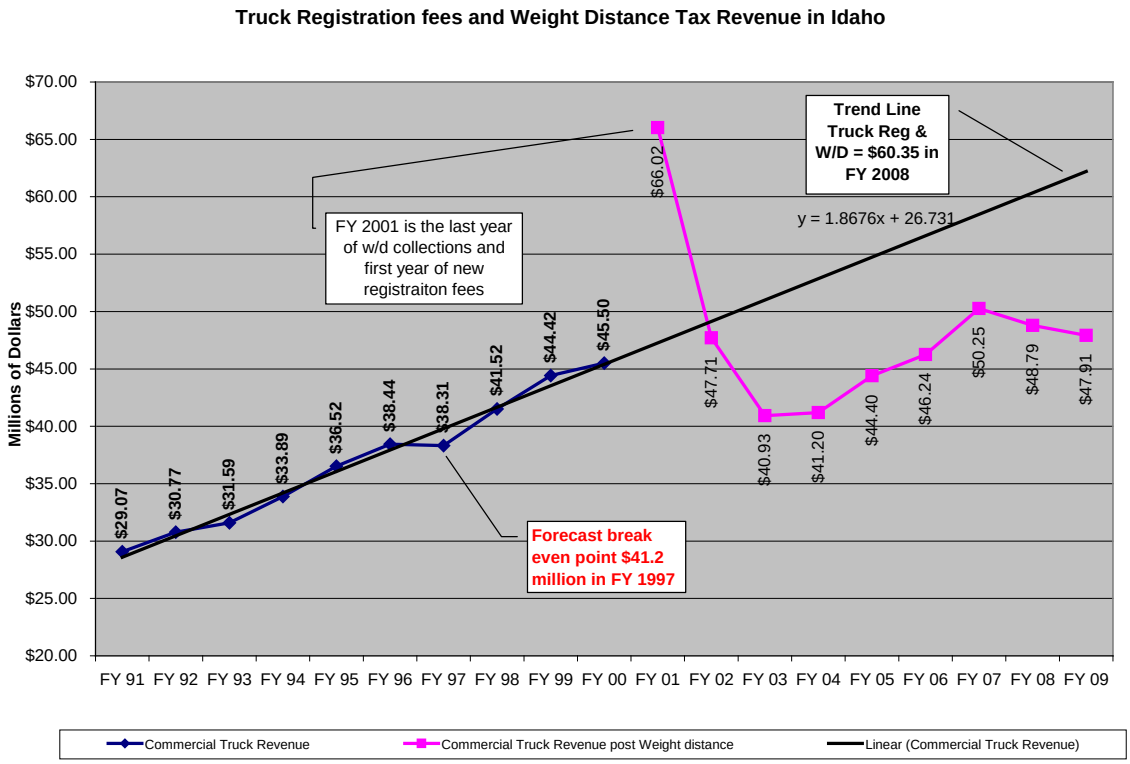

Figure 5.1. Combined Truck Registration Fees and Weight Distance Tax Revenue in Idaho (1991-2009)

6.0 Policy Analyses

The Gubernatorial Task Force on Modernizing Transportation Funding recently examined several new sources of transportation funding in the State of Idaho and evaluated each using eight criteria: fairness, public acceptance, trend (up or down), revenue predictability, cost effectiveness of implementation, readiness, competitiveness, and out-of-state equity. Each assessment criteria was used to rate each potential revenue source on a 5-point scale, with 1 being a low rating and 5 being the highest rating. A total of 19 revenue sources were evaluated. The top ten rated revenue sources based on the application of the eight aforementioned criteria are presented below (presented from highest to lowest):

- Fuel Tax (5-cents per gallon)
- Fuel Sales Tax
- Index Fuel Tax
- State Truck Registration Fee
- Index Passenger Vehicle Registration Fee
- County Vehicle Registration Fee
- Sales Tax on Auto Sales, Parts, Tires & Accessories
- Weight Distance Tax
- Electric Vehicles
- Alternative Fuels Tax

While the various structures of the fuel tax were rated highest, from a modeling perspective fuel tax increases, fuel sales taxes, and the indexing of the fuel tax would be treated in an identical manner. Each would be considered within the model as an increase in fuel taxes paid by highway users. The mechanism used to raise the fuel taxes and generate revenue would be, from a modeling perspective, irrelevant.

In careful consultation with ITD and the HCAS Sub-committee of the Gubernatorial Task Force on Modernizing Transportation Funding, a number of policy analyses were identified and examined from an equity perspective. With the exception of the VMT fee, all represent adjustments to current tax rates. More specifically, this policy analysis examines the equity impacts caused by the following adjustments to the transportation tax structure in Idaho:

- Policy Option 1: Increase both the gasoline and special fuel tax rates by 5 cents per gallon
- Policy Option 2: Increase the gasoline tax rate by 5 cents per gallon. Determine the increased revenues and rates required to bring the adjusted equity ratio for vehicles with RGWs of more than 26,000 pounds to 1.0 by adjusting the special fuel tax rate and measure the equity impact of implementing the increases in gasoline and special fuel tax rates
- Policy Option 3: Increase the special fuel tax by 5 cents per gallon and adjust the gasoline tax rate to the level required to achieve equity

- Policy Option 4: Increase all vehicle registration fees by 10 percent
- Policy Option 5: Increase passenger car vehicle registration fees by 10 percent and heavy truck registration fees to achieve equity
- Policy Option 6: Increase heavy truck registration fees by 10 percent and passenger car registration fees to achieve equity
- Policy Option 7: Institute a VMT tax for all vehicles over 26,000 pounds RGW.

The findings for each scenario are presented in Tables 6.1-6.3. In each case, equity is considered from the perspective of federal and state programs combined. Under the existing tax structure, the unadjusted equity ratio for automobiles is 1.18 while the adjusted equity ratio is 1.47. Adjusted equity ratios fall in the heavy truck classes reaching as low as 0.36 for the CT6+ class.

Policy Option 1, the 5-cent increase in the fuel tax, is forecast to generate an additional $46.2 million annually. Because the motor fuel taxes fall on both passenger vehicles and heavy trucks equally, Policy Option 1 would have almost no effect on equity with adjusted equity ratios changing only slightly when compared to the current tax structure.

Policy Option 2 would increase the gasoline tax by 5 cents per gallon and would increase the special fuel tax to $1.30 per gallon, the amount required to achieve equity between passenger vehicles and trucks weighing in excess of 26,000 pounds. Policy Option 2 would generate $307.6 million annually in Idaho. This option would achieve equity between vehicles with RGWs above and below 26,000 pounds with both groups' adjusted equity ratios equaling 1.0.

Policy Option 3 would increase the special fuel tax to $0.30 per gallon and would eliminate the gasoline tax. Under this option, revenues would drop by $147.0 million annually. Under Policy Option 3, equity is nearly achieved between the broad vehicle classes (vehicles with RGWs equal to or less than 26,000 pounds vs. vehicles with RGWs that exceed 26,000 pounds).

Policy Option 4 is applied evenly to all vehicle classes. Increasing the state's registration fees for both passenger cars and heavy trucks by 10 percent would generate $11.6 million annually to Idaho but would have almost no effect on equity. When compared to the adjusted equity ratios estimated for the existing tax structure, those produced under Policy Option 4 are within .02 (Table 6.2).

Policy Option 5 would generate $165.8 million annually to Idaho. Policy Option 5 would increase registration fees by 10 percent for light vehicles (RGW of 8,000 pounds or less) and would increase heavy vehicle registration fees by a factor of 4.07. This shift in tax policy would achieve equity between the light and heavy vehicle classes with adjusted equity ratios equaling 1.0 for the federal and state combined programs. While equity would be reached between the light and heavy classes, payments from the heaviest vehicles would continue to fall short of cost responsibility by as much as 45 percent.

Policy Option 6 would increase state registration fees by 10 percent for heavy vehicles and would eliminate state registration fees for light vehicles. This policy option would reduce highway user revenues by $47.7 million annually in Idaho but would improve equity, reducing the automobile overpayment from 47 to 38 percent (federal and state combined).

Table 6.1. Equity Ratios by Vehicle Class for Current Idaho Highway User Tax System and Policy Options 1-3 (Federal plus State Combined).

Vehicle Class	Current System		Policy Option 1		Policy Option 2		Policy Option 3	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Auto	1.18	1.47	1.28	1.49	1.32	1.06	0.65	1.10
LT4	0.94	1.18	1.03	1.19	1.08	0.87	0.52	0.89
SU2	0.81	1.01	0.88	1.02	1.42	1.15	0.61	1.04
SU3	0.73	0.91	0.78	0.90	1.58	1.27	0.73	1.25
SU4+	0.78	0.97	0.83	0.96	1.75	1.41	0.82	1.40
CS3	0.76	0.95	0.83	0.96	1.75	1.41	0.71	1.21
CS4	0.73	0.91	0.79	0.91	1.93	1.55	0.78	1.33
CS5T	0.57	0.72	0.61	0.70	1.29	1.04	0.61	1.03
CS5S	0.48	0.60	0.51	0.59	1.08	0.87	0.51	0.86
CS6	0.64	0.80	0.67	0.78	1.39	1.12	0.67	1.14
CS7+	0.42	0.53	0.45	0.52	0.92	0.74	0.45	0.76
CT34	0.71	0.89	0.76	0.88	1.79	1.44	0.75	1.28
CT5	0.94	1.18	1.00	1.16	2.13	1.72	1.00	1.70
CT6+	0.28	0.36	0.30	0.35	0.62	0.50	0.30	0.51
DS5	0.87	1.08	0.92	1.06	1.95	1.57	0.92	1.56
DS6	0.90	1.13	0.95	1.10	1.99	1.60	0.95	1.62
DS7	0.35	0.44	0.37	0.43	0.76	0.61	0.37	0.63
DS8+	0.39	0.49	0.42	0.48	0.84	0.67	0.42	0.71
TRPL	0.73	0.91	0.77	0.89	1.59	1.28	0.77	1.31
Bus	0.85	1.06	0.92	1.06	1.64	1.32	0.72	1.22
Total	0.80	1.00	0.86	1.00	1.24	1.00	0.59	1.00

Table 6.2. Equity Ratios by Vehicle Class for Current Idaho Highway User Tax System and Policy Options 4-6 (Federal plus State Combined).

Vehicle Class	Current System		Policy Option 4		Policy Option 5		Policy Option 6	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Auto	1.18	1.47	1.19	1.46	1.19	1.15	1.01	1.38
LT4	0.94	1.18	0.95	1.17	0.95	0.92	0.81	1.11
SU2	0.81	1.01	0.82	1.01	0.83	0.80	0.69	0.95
SU3	0.73	0.91	0.75	0.92	1.34	1.29	0.72	0.99
SU4+	0.78	0.97	0.80	0.99	1.55	1.50	0.80	1.10
CS3	0.76	0.95	0.77	0.95	0.95	0.92	0.73	1.00
CS4	0.73	0.91	0.74	0.91	1.06	1.02	0.74	1.02
CS5T	0.57	0.72	0.59	0.72	1.07	1.03	0.59	0.81
CS5S	0.48	0.60	0.49	0.60	0.90	0.86	0.49	0.67
CS6	0.64	0.80	0.66	0.81	1.26	1.21	0.66	0.90
CS7+	0.42	0.53	0.44	0.54	0.84	0.81	0.44	0.60
CT34	0.71	0.89	0.72	0.89	1.11	1.07	0.72	0.99
CT5	0.94	1.18	0.97	1.19	1.76	1.70	0.97	1.33
CT6+	0.28	0.36	0.29	0.36	0.57	0.55	0.29	0.40
DS5	0.87	1.08	0.89	1.09	1.62	1.56	0.89	1.22
DS6	0.90	1.13	0.93	1.14	1.76	1.69	0.93	1.27
DS7	0.35	0.44	0.36	0.44	0.70	0.67	0.36	0.50
DS8+	0.39	0.49	0.41	0.50	0.82	0.79	0.41	0.56
TRPL	0.73	0.91	0.75	0.93	1.45	1.40	0.75	1.03
Bus	0.85	1.06	0.86	1.06	0.99	0.95	0.72	0.99
Total	0.80	1.00	0.81	1.00	1.04	1.00	0.73	1.00

Policy Option 7 considers the impact on equity of a VMT fee beginning at 26,000 pounds RGW, reaching 5.3 cents per mile at 80,000 pounds RGW and 11.1 cents per mile at 105,500 pounds RGW. The VMT fee considered in Policy Option 7 would generate $81.9 million from heavy vehicles and would increase associated equity ratios significantly. For the DS8+ class, the adjusted equity ratio grows from 0.49 to 0.85. The adjusted equity ratio for the LT4 vehicle class would drop from 1.18 to 1.03.

Table 6.3. Equity Ratios by Vehicle Class for Current Idaho Highway User Tax System and Policy Option 7 (Federal plus State Combined).

Vehicle Class	Current System		Policy Option 7	
	Unadjusted	**Adjusted**	**Unadjusted**	**Adjusted**
Auto	1.18	1.47	1.18	1.28
LT4	0.94	1.18	0.94	1.03
SU2	0.81	1.01	0.81	0.88
SU3	0.73	0.91	0.80	0.88
SU4+	0.78	0.97	0.91	0.99
CS3	0.76	0.95	0.85	0.92
CS4	0.73	0.91	0.93	1.02
CS5T	0.57	0.72	0.82	0.89
CS5S	0.48	0.60	0.68	0.75
CS6	0.64	0.80	0.94	1.02
CS7+	0.42	0.53	0.73	0.79
CT34	0.71	0.89	0.92	1.01
CT5	0.94	1.18	1.35	1.47
CT6+	0.28	0.36	0.44	0.48
DS5	0.87	1.08	1.24	1.35
DS6	0.90	1.13	1.33	1.45
DS7	0.35	0.44	0.62	0.68
DS8+	0.39	0.49	0.78	0.85
TRPL	0.73	0.91	1.31	1.43
Bus	0.85	1.06	0.87	0.95
Total	0.80	1.00	0.92	1.00

Table 6.4 presents the equity findings for all seven policy analyses using the reduced level of GARVEE bond expenditures. Adjusted equity ratios are presented in Table 6.4. Reducing GARVEE bond expenditure levels results in higher equity ratios among combination vehicles. The remainder of this section of the report examines each policy option under the reduced GARVEE bond scenario.

Policy Option 1, the 5-cent increase in the fuel tax, is forecast to generate an additional $46.2 million annually. As was the case in the full GARVEE bond scenario, this option would have nearly no impact on equity because it falls on both passenger vehicles and heavy trucks equally.

Policy Option 2 would increase the gasoline tax by 5 cents per gallon and would increase the special fuel tax to $1.08 per gallon, the amount required to achieve equity between passenger vehicles and trucks weighing in excess of 26,000 pounds. Policy Option 2 under the reduced GARVEE bond scenario would generate $253.5 million annually in Idaho. This option would achieve equity between vehicles with RGWs above and below 26,000 pounds with both groups' adjusted equity ratios equaling 1.0.

Policy Option 3 would increase the special fuel tax to $0.30 per gallon and would reduce the gasoline tax to 3 cents per gallon. Under this option, revenues would drop by $129.1 million annually. Under Policy Option 3, equity is achieved between the broad vehicle classes (vehicles with RGWs equal to or less than 26,000 pounds vs. vehicles with RGWs that exceed 26,000 pounds).

Policy Option 4, the 10 percent increase in registration fees, is applied evenly to all vehicle classes. Increasing the state's registration fees for both passenger cars and heavy trucks by 10 percent would generate $11.6 million annually to Idaho but would have almost no effect on equity.

Policy Option 5 would generate $135.4 million annually to Idaho under the reduced GARVEE bond scenario. Policy Option 5 would increase registration fees by 10 percent for light vehicles and would increase heavy vehicle registration fees by a factor of 3.5. This shift in tax policy would achieve equity between the light and heavy vehicle classes with adjusted equity ratios equaling 1.0 for the federal and state combined programs. While equity would be reached between the light and heavy classes, payments from the heaviest vehicles would continue to fall short of cost responsibility by as much as 44 percent.

Policy Option 6 would increase state registration fees by 10 percent for heavy vehicles and would eliminate state registration fees for light vehicles. This policy option would reduce highway user revenues by $47.7 million annually in Idaho but would improve equity, reducing the automobile overpayment from 38 to 30 percent (federal and state combined).

Policy Option 7 considers the impact on equity of a VMT fee beginning at 26,000 pounds RGW, reaching 4.7 cents per mile at 80,000 pounds RGW and 10.5 cents per mile at 105,500 pounds RGW. The VMT fee considered in Policy Option 7 would generate $70.7 million from heavy vehicles and would increase associated equity ratios significantly. For the DS8+ class, the adjusted equity ratio grows from 0.52 to 0.91. The adjusted equity ratio for the LT4 vehicle class would drop from 1.13 to 1.01.

Table 6.4. Adjusted Equity Ratios by Vehicle Class for Current Idaho Highway User Tax System and Policy Options 1-7 for Federal plus State Combined (Reduced GARVEE Bond Expenditures).

Vehicle Class	Current System	Policy Option 1	Policy Option 2	Policy Option 3	Policy Option 4	Policy Option 5	Policy Option 6	Policy Option 7
Auto	1.38	1.40	1.06	1.08	1.38	1.13	1.30	1.23
LT4	1.13	1.14	0.88	0.89	1.13	0.92	1.06	1.01
SU2	1.00	1.01	1.11	1.03	1.00	0.82	0.94	0.89
SU3	0.86	0.85	1.15	1.14	0.87	1.16	0.93	0.82
SU4+	0.93	0.91	1.28	1.28	0.94	1.35	1.05	0.92
CS3	0.98	0.98	1.37	1.20	0.97	0.94	1.03	0.94
CS4	0.96	0.95	1.52	1.34	0.95	1.05	1.06	1.00
CS5T	0.77	0.75	1.06	1.06	0.78	1.05	0.87	0.93
CS5S	0.67	0.66	0.92	0.93	0.68	0.92	0.75	0.80
CS6	0.83	0.81	1.11	1.14	0.84	1.19	0.94	1.04
CS7+	0.55	0.54	0.73	0.76	0.56	0.79	0.62	0.81
CT34	0.95	0.95	1.46	1.32	0.95	1.12	1.06	1.02
CT5	1.21	1.19	1.67	1.68	1.22	1.66	1.37	1.46
CT6+	0.39	0.38	0.51	0.53	0.39	0.56	0.44	0.51
DS5	1.19	1.17	1.65	1.65	1.21	1.64	1.35	1.44
DS6	1.26	1.23	1.70	1.74	1.27	1.78	1.42	1.57
DS7	0.46	0.45	0.61	0.63	0.46	0.66	0.52	0.70
DS8+	0.52	0.51	0.68	0.72	0.53	0.79	0.59	0.91
TRPL	1.00	0.97	1.33	1.38	1.01	1.44	1.13	1.55
Bus	1.05	1.05	1.27	1.19	1.05	0.96	0.98	0.96
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

7.0 References

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8.0 Glossary

Ad Valorem Tax. A tax based on the assessed value of real or personal property.

Arterial. A road or highway used primarily for through traffic.

Attributable Costs. Costs that are a function of vehicle size, weight, or other operating characteristics and therefore can be attributed to vehicle classes based on those characteristics.

Average Daily Traffic. The average number of vehicles passing a given point or using a given highway per day.

Average Daily Truck Traffic. The average number of trucks passing a given point or using a given highway per day.

Axle Miles of Travel. Vehicle miles of travel multiplied by number of axles. Since trucks, on average, have roughly twice as many axles as cars (i.e., four versus two), their share of the total axle miles of travel on any given highway system will be about double their share of the vehicle miles of travel on that system.

Axle Weight or Axle Load. The gross load carried by an axle.

Collector. A road that connects local roads with arterial roads.

Common Costs. Expenditures that are independent of vehicle size, weight, or other operating characteristics and so cannot be attributed to any specific class of vehicles. These expenditures must therefore be treated as a common responsibility of all vehicle classes and are most typically assigned to all classes on the basis of a relative measure of use such as VMT.

Cost Allocation. The analytical process of determining the cost responsibility of highway system users.

Cost Occasioned Approach. An approach that determines responsibility for highway expenditures/costs based on the costs occasioned or caused by each vehicle class. Such an approach is not based solely on relative use, nor does it attempt to quantify the benefits received by different classes of road users.

Cost Responsibility. The principle that those who use the public roads should pay for them and, more specifically, that payments from road users should be in proportion to the road costs for which they are responsible. The proportionate share of highway costs legitimately assignable to a given vehicle class user group.

Cost-Based Approach. An approach in which the dollars allocated to the vehicle classes are measures of the costs imposed during the study period, rather than expenditures made during the study period. The difference between the cost-based and expenditure-based approaches is most evident when considering large investments in long-lived structures and when deferred maintenance moves the costs associated with one period's use into another period.

Dead Load. The load on a bridge when it is empty.

Debt Financing. Funding current activities by issuing debt to be repaid in the future.

Debt Service. Funds used for the repayment of previously incurred debt (both principal and interest).

Deck. The roadway or surface of a bridge.

Depreciation. The amount of decrease in value of a physical asset due to ageing in a time period.

Efficiency. The degree to which potential benefits are realized for a given expenditure.

Efficient Pricing. Setting prices for the use of highway facilities so that each vehicle pays the costs it imposes at the time and place it is traveling. Efficient pricing promotes the most efficient use of existing facilities and generates the right amount of revenue to build the most efficient system and perform the optimal amount of maintenance.

Equity. Generally interpreted as the state of being just, impartial, or fair. Horizontal equity refers to the fair treatment of individuals with similar circumstances. Vertical equity refers to the fair treatment of individuals in different circumstances.

Equity Ratio. The ratio of the share of revenues paid by a highway user group to the share of costs imposed by that group. A user group that meets 110 percent of its cost responsibility would be assigned an equity ratio of 1.1. Equity ratios above 1.0 are assigned to user groups who are paying more than their cost responsible share while payments from user groups assigned equity ratios of less than 1.0 fall short of the costs imposed by the group.

Equivalent Single Axle Load. The pavement stress imposed by a single axle with an 18,000-pound axle load. ESAL-Miles are equivalent single-axle loads times miles traveled. Research has concluded that the relationship between axle weight and ESALs is an approximate third or fourth-power exponential relationship; ESALs therefore rise rapidly with increases in axle weight.

Excise Tax. A tax levied on the production or sale of a specific item such as gasoline, diesel fuel, or vehicles.

Federal Highway Funds. Funds collected from federal highway user fees and distributed to states by FHWA for spending on transportation projects by state and local governments.

Functional Classification. The classification of roads according to their general use, character, or relative importance. Definitions are provided by FHWA for Rural Interstate, Rural Other Principal Arterial, Rural Minor Arterial, Rural Major Collector, Rural Minor Collector, Rural Local, Urban Interstate, Urban Other Expressway, Urban Other Principal Arterial, Urban Minor Arterial, Urban Collector, and Urban Local.

Grant Anticipation Revenue Vehicle (GARVEE) Bonds. Financial instruments that are secured through a pledge of future federal appropriations for Federal-aid transportation projects.

Gross Vehicle Weight. The loaded weight for a vehicle.

Highway Cost Allocation Study. A study that estimates and compares the costs imposed and the revenues paid by different classes of vehicles over some time period.

Highway Performance Monitoring System. FHWA collects and reports data about a sample of road segments in every state in a common format.

Highway User. A person responsible for the operation of a motor vehicle in use on highways, roads, and streets. In the case of passenger vehicles, the users are the people in the vehicles. In the case of goods-transporting trucks, the user is the entity transporting the goods.

Incremental Cost. The additional costs associated with building a facility to handle an additional, heavier (or larger) class of vehicle.

Incremental Method. A method of assigning responsibility for highway costs by comparing the costs of constructing and maintaining facilities for the lightest class of vehicles only and for each increment of larger and heavier vehicles. Under this method, vehicles share the incremental cost of a facility designed to accommodate that class as well as the cost of each lower increment.

Light (or Basic) Vehicles. The lightest vehicle class, usually including passenger cars, vans, and pickups.

Live Load. The additional load on a structure by traffic (beyond the dead load imposed by holding itself up).

Load-Related Costs. Costs that vary with the load imposed by traffic on a facility.

Marginal Cost. The increase in total cost that results from producing one additional unit of output. With respect to highway use, the marginal cost is the increase in total highway costs that results from one additional vehicle trip. Economic efficiency is achieved when the price charged to the user is equal to the marginal cost.

National Highway System. A set of highways throughout the United States that have been designated as National Highways by the federal government. FHWA sets design and maintenance standards and provides funding for national highways, but the highways are owned by the states.

National Pavement Cost Model. A model of pavement costs that incorporates the wear-and-tear costs imposed by vehicle traffic of different weights and configurations as well as deterioration from age and environmental factors, taking into account the soil type, road base depth, pavement material, pavement thickness, and climate zone.

Non-Divisible Load. Non-divisible loads are large pieces of equipment or materials that cannot be feasibly divided into smaller individual shipments. All states issue special permits for nondivisible loads that would otherwise violate state and federal gross vehicle weight, axle weight, and bridge formula limits.

Operating Weight. The actual weight of a vehicle at a particular time.

Overhead Costs. Costs that vary in proportion to the overall level of construction and maintenance activities but are not directly associated with specific projects.

Passenger Car Equivalent. A measure of road space effectively occupied by a vehicle of a given type under given terrain, vehicle mix, road type, and congestion conditions. The reference unit is the standard passenger car operating under the conditions on the road category in question.

Registered Weight. The weight that determines the registration fee paid by a single-unit truck or a tractor. For a tractor, it is typically the highest of that vehicle's operating weights.

Revenue Attribution. The process of associating revenue amounts with the classes of vehicles that produce the revenues.

Right of Way. The strip of land, property, or interest therein, over which a highway or roadway is built.

Seismic Retrofit. Work on an existing structure intended to increase its resistance to earthquakes.

Social (or Indirect) Costs. Costs that highway users impose on other users or on non-users. Costs typically included in this category are those associated with noise, air and water pollution, traffic congestion, and injury and property damage due to traffic accidents.

Span. A section of a bridge.

State Highway System. Roads under the jurisdiction of state agencies.

Statewide Transportation Improvement Program. Each state, following guidelines in federal law, produces and regularly updates a list of intended future transportation improvements.

Truck. A general term denoting a motor vehicle designed for the transportation of goods. The term includes single-unit trucks and truck combinations.

User Charge. A fee, tax, or charge that is imposed on facility users as a condition of usage.

User Revenues. Highway revenues raised through the imposition of user charges or fees.

Vehicle Class. Any grouping of vehicles having similar characteristics for cost allocation, taxation, or other purposes. The number of vehicle classes used in a cost allocation study will depend on the needs, purpose, and resources of the study. Potential distinguishing characteristics include weight, size, number of axles, type of fuel, time of operation, and place of operation.

Vehicle Miles of Travel. The total number of miles traveled in a given period of time (e.g., day, year) by a given vehicle or fleet of vehicles.

Vehicle Registration Fees. Fees charged for being allowed to operate a vehicle on public roads.

Weight-Distance Tax. A graduated fee based on the weight of a vehicle and the miles it travels.