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Estimating Public Uses of Motor Fuel: Phase II

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MANAGED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

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July 1994

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EXECUTIVE SUMMARY

The objective of this project was to develop and implement methodologies to estimate the use of motor fuel by Federal, State, county, and municipal (FSCM) governments. The project was planned by the Federal Highway Administration (FHWA) to be conducted in two phases. Phase I was to gain a better understanding of the availability and quality of the existing motor fuel use data for FSCM governments, and to propose methodologies to better estimate the FSCM government use of motor fuel. Phase II was to implement one or more of the estimation methodologies recommended in Phase I.

Phase I study results were summarized in a memorandum prepared by the Oak Ridge National Laboratory (ORNL) for FHWA [Miaou et al., 1992]. After reviewing the current FHWA estimation procedure and existing fuel use data, four different approaches were proposed. The strengths and limitations, as well as cost requirements, of each approach were also analyzed. The "sampling-and-regression" approach was selected by FHWA for implementation in Phase II based on both cost and statistical considerations. The aim of this approach was to better estimate the motor fuel use by State, county, and municipal (SCM) governments. The proposed method uses sampling techniques in the first year to collect base-year data from SCM governments and to develop statistical models from the data for each Census Division. In order to contain the cost, it was proposed that the data collection effort be reduced by making maximal use of existing predictors, such as number of publicly-owned vehicles and land area, to help predict fuel uses. An important incentive of this method was that the uncertainties of the estimates due to sampling errors could, to a certain extent, be statistically quantified. It was also suggested that the data collection be conducted every 5 years, as in other nationwide surveys.

Because this approach required data collection, it was recognized that the cooperation from SCM governments was absolutely essential to implement this approach successfully. Good questionnaire design, finding the right persons to answer the questions, a rigorous pretest and pilot study, and persistent follow-up work after the questionnaires were sent out would all be of importance. Phase II work began with a pilot study which was conducted between June and November of 1992. Census Division 8, the Mountain Division, was selected for the pilot study. The results of the pilot study were reported in a memorandum entitled "Estimating Public Uses of Motor Fuel: Pilot Study Results" [Miaou et al., 1992]. Key findings from the pilot study included: (1) The questionnaire response rate was very low (about 50 percent); (2) Some respondents reported information on only one department within the government (typically, highway departments); and (3) Some governments, especially State governments, had no central contact which could provide the fuel use information for the entire government. These findings

suggested the need to put greater emphasis on establishing the initial contact and on placing reminder calls and follow-up calls after the questionnaire was sent out.

After assessing the quality of the estimates, it was determined that, given the response rate and the quality of data, the sample size required to reach a "good" statistical precision level would not be economically feasible at the time. It was suggested, however, that the full-scale data collection should still be carried out using the same sampling plan as in the pilot study. The main reasons for this recommendation were that the full-scale data collection effort could be used to gain better understanding of how States in other Census Divisions maintain their fuel use data, and to achieve a better fuel use estimate than that obtained from the pilot study because data from a larger sample would be available for regression analysis. After reviewing the pilot study results, it was determined by FHWA to proceed with the full-scale data collection as recommended. The data collection took place from mid-April to mid-September of 1993. The overall response rate was about 44 percent.

The objective of this memorandum is to summarize the Phase II study with emphasis on reporting the results of the full-scale data collection and presenting the fuel use estimates based on the sample data collected from both the pilot and full-scale data collections.

After reviewing the availability and quality of several potential predictors, two methods were considered to estimate SCM government fuel uses by State, by highway use and nonhighway use, and by fuel type. Method 1 used number of government-owned vehicles as the predictor for estimating SCM government fuel use, while Method 2 used population as the predictor. The first method was more in line with FHWA's current estimation procedure. However, the quality of the existing data on the number of SCM government-owned vehicles was questionable. Data on population were, on the other hand, believed to be quite accurate.

The main idea of the first method was to estimate average motor fuel use per vehicle per year from the data provided by the sample governments. When appropriate, the average fuel use was estimated by vehicle type and by government type. In conjunction with the number of SCM government-owned vehicles, these estimates were then used to develop State estimates of highway fuel use.

The main idea of the second method was to develop statistical models from the sample data to describe relationships between total fuel use and population. The developed statistical models were then used to estimate and predict fuel use for each government given its population. Note that land areas were also considered in developing the models, but were found to have a weak relationship with fuel use according to the sample data.

In developing the models, only those sample data that were considered reliable were used. Estimates obtained from the two methods were compared with FHWA's current estimates, as reported in *Highway Statistics* [FHWA, annual]. Sampling and potential nonsampling errors associated with the estimates were discussed and assessed. Based on the information available to

the study team, the nonsampling errors were adjusted from the estimates. The final adjusted estimates from the population-based method were found to be about 36 percent lower than those from the vehicle-based method. The final estimates for the total SCM government fuel use under the population-based method were 2.92, 2.97, and 3.05 billion gallons in 1992, 1995, and 2000, respectively.

Both methods showed lower estimates of nonhighway fuel use than those published in *Highway Statistics*. The sampling errors for nonhighway use were, however, very high, indicating that nonhighway use was highly variable from government to government and that the current sample size was too small to estimate such uses with reasonable accuracy. The uncertainty of the estimates were even higher when broken down by fuel type. Estimates of gasohol use had the largest sampling errors.

The final recommendation was to use the estimates from the population-based method since population could be estimated with relatively good accuracy. These estimates of SCM government fuel use, however, needed to be adjusted for nonsampling errors due, mainly, to the underreporting of fuels used by school systems and fuels purchased at noncontract gasoline stations. The adjusted State-by-State estimates for years 1992, 1995, and 2000 were those estimates presented in Tables 19, 20, and 21 multiplied by a factor of 1.50.

Our main suggestions for future data collections are as follows:

1. In view of the low response rate (about 44 percent) and the nonsampling errors found in this study, the next few studies should be carried out every 3 years (instead of 5 years as originally planned) with emphasis on correcting nonsampling errors and improving response rate.

2. In future data collection, school districts and county- and city-dependent school systems should be sampled separately.

3. The questionnaire should allow respondents to report other fuel types such as propane, natural gas, and methanol.

4. In order to get a better estimate on fuels purchased at noncontract gasoline stations, we need to ask the respondents to distinguish fuels pumped from the following three types of fueling facilities: government-operated on-site fueling facilities, contract local gasoline stations, and noncontract gasoline stations.

1. INTRODUCTION

1.1 BACKGROUND

The objective of this project was to develop and implement methodologies to estimate the use of motor fuel by Federal, State, county, and municipal (FSCM) governments. The project was planned by the Federal Highway Administration (FHWA) to be conducted in two phases. Phase I was to gain a better understanding of the availability and quality of the existing motor fuel use data for FSCM governments, and to propose methodologies to better estimate the FSCM government use of motor fuel. Phase II was to implement one or more of the estimation methodologies recommended in Phase I.

Phase I study results were summarized in a memorandum prepared by the Oak Ridge National Laboratory (ORNL) for FHWA [Miaou et al., 1992]. In that study, three main tasks were performed: (1) review the current methodology used by FHWA to estimate public use of motor fuel; (2) search for available data sources; and (3) recommend methodologies to better estimate the public use of motor fuel. Four different approaches were proposed: (1) developing ad hoc methods to improve FSCM fuel use estimates using only existing data, (2) collecting better data from State taxation departments and the U.S. General Service Administration (GSA) by modifying current motor fuel tax reporting and data collection procedures and formats, (3) sampling-and-regression approach, and (4) stratified random sampling approach. The strengths and limitations of each approach were analyzed in the memorandum. Based on both cost and statistical considerations, the third approach, sampling-and-regression approach, was recommended by ORNL for use in Phase II.

After reviewing ORNL's study, the sampling-and-regression approach was selected by the FHWA for implementation in Phase II as ORNL recommended. The aim of this approach was to better estimate the motor fuel used by State, county, and municipal (SCM) governments. The proposed method uses sampling techniques in the first year to collect base-year data from SCM governments and to develop statistical models from the data for each Census Division. In order to contain the cost, it was proposed that the data collection effort be reduced by making maximal use of existing auxiliary variables or predictors, such as number of publicly-owned vehicles, number of government employees, and land area, to help predict fuel uses. These auxiliary variables were expected to be correlated with the fuel use of SCM governments. The initial plan was to collect vehicle and fuel use data from 40 to 50 SCM governments in each of the 9 Census Divisions. In each Division, regression models relating motor fuel use to auxiliary variables were to be constructed using the collected data and, if necessary, the model was to be developed for different fuel types and for highway use and nonhighway use, respectively. The developed regression models would then be applied to each State within the Division to develop State estimates. The

stratification by Census Division was to ensure that regional differences in demographic, geographic, climatic, and highway conditions, if they exist, would be reflected in the collected data and, therefore, would be captured by the regression models. An important incentive of this approach was that, unlike the first two approaches proposed (i.e., using existing data only and improving reporting procedures), the uncertainties of the estimates due to sampling errors could, to a certain extent, be statistically quantified.

It was also suggested that the same sampling technique be used again every 5 years, as in other nationwide surveys. Information from a new sampling study would reflect changes that have occurred in the target population since the previous sampling effort. Note that a more precise description of the parameters of interest will be given in the next chapter. Basically, the parameters of interest were the amount of motor fuel used by SCM governments, categorized by fuel type and usage type (highway use versus nonhighway use). For the years between two samples, estimates would be derived using the models established from the sample data. Because this approach required data collection, it was recognized that the cooperation from SCM governments was absolutely essential to implement this approach successfully. Good questionnaire design, finding the right persons to answer the questions, a rigorous pretest and pilot study, and persistent follow-up work after the questionnaires were sent out would all be of importance.

To implement the proposed sampling-and-regression method, Phase II work began with a pilot study which was conducted between June and November of 1992. Census Division 8, the Mountain Division, was selected for the pilot study. The selection of this particular Division was based on the results of the Phase I study [Miaou et al., 1992], in which it was suggested that more States in this Division were likely to keep nonhighway motor fuel use data than other Divisions because many States in Division 8 refund taxes collected from the sales of motor fuels which were used for nonhighway purposes. This Division includes 8 States: Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, and Wyoming. The purposes of this pilot study were to (1) test the proposed sampling plan; (2) develop, test, and improve the questionnaire (which was used as a data collection instrument); (3) become more acquainted with how SCM governments maintained their motor fuel data; (4) develop preliminary regression models to estimate the amount of fuel used by SCM governments; and (5) reevaluate the proposed sample size requirement based on the uncertainty of the estimates derived from the regression models.

The results of the pilot study were reported in a memorandum entitled "Estimating Public Uses of Motor Fuel: Pilot Study Results" [Miaou et al., 1992]. This memorandum (1) reported the pilot data collection plan and lessons learned from the process, (2) suggested ways to collect the data more effectively in the full-scale data collection, (3) developed preliminary statistical models to generate State-by-State estimates of motor fuel use within the Division by fuel type and by highway use and nonhighway use, (4) assessed the statistical uncertainties of the estimates, and (5) reevaluated the sample size requirements for the full-scale data collection.

Key findings from the pilot data collection effort included: (1) The questionnaire response rate was very low (about 50 percent); (2) Some respondents reported information on only one department within the government (typically, highway departments); and (3) Some governments, especially State governments, had no central contact which could provide the fuel use information for the entire government. These findings suggested the need to put greater emphasis on establishing the initial contact and on placing reminder calls and follow-up calls after the questionnaire was sent out. The lessons learned from the pilot data collection process also led to a better designed questionnaire.

When the preliminary models were used to assess the quality of the estimates, an important finding was obtained: Given the response rate and quality of the data, the statistical uncertainty of the estimated fuel use was quite high, and the sample size required to reach a "good" statistical precision level would not be economically feasible at the time.

Although the overall results from the pilot study were not particularly encouraging, it was suggested in the memorandum that the full-scale data collection should still be carried out using the same sampling plan as in the pilot study. The reasons for this recommendation were that the full-scale data collection effort could (1) be used to understand how States in other Census Divisions maintain their fuel use data, (2) be used to achieve a better fuel use estimate than that obtained from the pilot study because sample data from neighboring Divisions can most likely be used as supplemental data to better estimate the fuel use of any Division under consideration, and (3) utilize the experiences learned from the pilot data collection to improve the response rate and obtain better quality data. Also, in light of the quality of the available data it was recommended that instead of conducting the data collection every 5 years as originally planned, the FHWA might want to consider repeating the study every 3 years. After reviewing the pilot study results, it was determined by FHWA to proceed with the full-scale data collection as recommended in the memorandum.

1.2 OBJECTIVE

The objective of this memorandum is to summarize the Phase II study with emphasis on reporting the results of the full-scale data collection and presenting the fuel use estimates based on the sample data collected from both the pilot and full-scale data collections. Two methods were considered to estimate SCM government fuel uses by State, by highway use and nonhighway use, and by fuel type. Method 1 used number of government-owned vehicles as the predictor for estimating SCM government fuel use, while Method 2 used population as the predictor. Estimates obtained from the two methods were compared with FHWA's current estimates, as reported in *Highway Statistics*. Sampling and nonsampling errors associated with the estimates were also assessed. Recommendations were made as to which estimates to choose and how the future data collection might be better conducted. To make the estimation of government motor fuel use

complete, motor fuel used by Federal government (civilian departments only) was also estimated. A microcomputer program has been developed to implement the two estimation methodologies using the Lotus 1-2-3 software, and was documented in a technical memorandum submitted to FHWA in March 1994 entitled "Public Motor Fuel Use Estimator: User's Guide" (Revised in June 1994).

1.3 MEMORANDUM ORGANIZATION

Chapter 2 defines the parameters of interest and discusses FHWA's current estimates. Chapter 3 reports the full-scale data collection results. Potential nonsampling errors associated with the collected data are also discussed. Chapter 4 reviews potential predictors of government fuel use and discusses data availability and quality. Based on the review, two possible methods are proposed. Chapter 5 describes the proposed Method 1 - a vehicle-based method. State-by-State estimates of motor fuel uses based on Method 1 are presented, and their quality are assessed. Chapter 6 describes the proposed Method 2 - a population-based method. State-by-State estimates of motor fuel uses are presented and quality of the estimates are discussed. Chapter 7 compares the fuel use estimates from the two methods and those published in *Highway Statistics*, and recommends which estimates to use and possible ways to improve future data collection. In addition, Federal government use of motor fuel is presented.

2. PARAMETERS OF INTEREST AND CURRENT ESTIMATES

2.1 PARAMETERS OF INTEREST

The sampling-and-regression approach was developed to provide fuel use estimates for State, county, and municipal (SCM) governments. The specific parameters of interest are presented in Table 1. The parameter $Y_{s,uf}$ represents the number of gallons of type f motor fuel used in State s for highway use ($u=1$) or nonhighway use ($u=2$) in a particular calendar year, say 1992, with $s=1,2,..,51$ representing the 50 States in the U.S. and the District of Columbia, and $f=1,2,3$ denoting the three fuel types of interest: gasoline ($f=1$), gasohol ($f=2$), and diesel ($f=3$).

As noted in the Phase I study, a precise definition of public use of motor fuel could not be determined. As recommended by the FHWA after reviewing the Phase I memorandum, the working definition for this study would be those motor fuels that are purchased directly by government, usually in bulk, and used by government-owned or -leased vehicles and equipment. Note that this is not suggesting that fuels purchased by individual vehicles at gasoline stations which have no contract with the government are not of interest to this study; it merely recognizes the fact that such data, which are usually reported as part of the travel expenses, would be extremely difficult to retrieve. It was also determined by FHWA that, to the extent possible, associated governmental units, such as safety departments (fire and police departments), public educational institutions, public transit authorities, and public utilities (or public works), should be included, and National Guard and Coast Guard should be excluded.

2.2 CURRENT ESTIMATES

The current procedure used by the FHWA to estimate SCM government use of gasoline and gasohol can be outlined as follows:

1. Compute gallons per vehicle per year (gpv) for Federal civilian agencies by three vehicle types: cars, buses, and trucks, based on GSA motor fuel consumption and vehicle stock data [GSA, various issues]. Table 2 shows the GSA data for fiscal years (FY) 1988, 1990, and 1991. For example, cars were estimated to consume 650 gpv in FY 1988, buses 1,789 gpv, and trucks 718 gpv. The table also shows a significant decrease in gpv between FY 1988 and FY 1990 (7.5 percent decrease for cars, 20.2 percent decrease for buses, and 20.5 percent decrease for trucks). It should be noted that GSA fuel use data are not available by fuel type. These gpv estimates actually include all fuel types, not just gasoline and gasohol.
2. Apply gpv estimates from Federal civilian agencies to the numbers of SCM government-owned vehicles published in *Highway Statistics* [Table MV-7, annual] to estimate highway gasoline use (including gasohol use) by State. This procedure assumes that vehicles owned

by SCM governments consume the same amount of fuel per vehicle as those owned by Federal civilian agencies.

3. Estimate the SCM government nonhighway use of gasoline and gasohol as 1/3 of its highway use in each State.

Note that several States do provide some fuel use information to FHWA. For these States, the above procedures are usually modified by FHWA to make the best use of the available fuel use information.

In general, FHWA's current estimation procedures rely on several unverified assumptions: (1) For the same type of vehicles, those owned by SCM governments consume the same amount of fuel per vehicle per year as those owned by Federal civilian agencies; (2) The number of SCM government-owned vehicles published in *Highway Statistics* is accurate; and (3) The SCM government nonhighway use of gasoline and gasohol is 1/3 of its highway use in each State. As will be discussed in the following chapters, none of these assumptions are accurate based on the sample data collected in this study.

FHWA's estimates of SCM government gasoline and gasohol use in 1990 and 1991, as published in Table MF-21A of *Highway Statistics*, are given in Table 3. The percentage changes in estimates for highway and nonhighway uses are also presented in the table. Overall, there was a 27 percent decrease in the estimate. In part, these percentage changes are due to the changes in FHWA's estimation procedure.

Table 1. Parameters of interest, $Y_{s,uf}$, total motor fuel in gallons used by State, county and municipal governments for a particular calendar year

State (s)[1]	State, County, and Municipal Governments					
	Highway Use (u=1)			Nonhighway Use (u=2)		
	Gasoline (f=1)	Gasohol (f=2)	Diesel (f=3)	Gasoline (f=1)	Gasohol (f=2)	Diesel (f=3)
Alabama (1)	$Y_{1,11}$	$Y_{1,12}$	$Y_{1,13}$	$Y_{1,21}$	$Y_{1,22}$	$Y_{1,23}$
Alaska (2)	$Y_{2,11}$	$Y_{2,12}$	$Y_{2,13}$	$Y_{2,21}$	$Y_{2,22}$	$Y_{2,23}$
Arizona (3)	$Y_{3,11}$	$Y_{3,12}$	$Y_{3,13}$	$Y_{3,21}$	$Y_{3,22}$	$Y_{3,23}$
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
Wisconsin (50)	$Y_{50,11}$	$Y_{50,12}$	$Y_{50,13}$	$Y_{50,21}$	$Y_{50,22}$	$Y_{50,23}$
Wyoming (51)	$Y_{51,11}$	$Y_{51,12}$	$Y_{51,13}$	$Y_{51,21}$	$Y_{51,22}$	$Y_{51,23}$

[1] Includes the District of Columbia.

Table 2. GSA estimates of gallons-per-vehicle per year for Federal civilian agencies

	FY 1988			FY 1990			FY 1991		
	Cars	Buses	Trucks	Cars	Buses	Trucks	Cars	Buses	Trucks
Gallons of Fuel Consumed (millions)	54.6	3.5	164.8	64.3	8.9	202.5	67.2	10.0	230.4
Number of Vehicles in Use	84,061	1,975	229,666	107,054	6,232	354,392	111,968	6,113	366,471
Gallons per Vehicle	650	1,789	718	601	1,428	571	600	1,636	629

Note: From "Federal Motor Vehicle Fleet Report," U.S. General Services Administration, various issues.

**Table 3. State, county and municipal gasoline use reported in FHWA's Highway Statistics*
(thousands of gallons)**

	1990			1991			Percent Change 1991/1990		
STATE	Highway	Non-Highway	Total	Highway	Non-Highway	Total	Highway	Non-Highway	Total
AL	33,169	11,056	44,225	20,441	6,814	27,255	-38.4	-38.4	-38.4
AK	5,235	1,745	6,980	4,044	2,653	6,697	-22.8	52.0	-4.1
AZ	18,766	6,255	25,021	13,539	4,513	18,052	-27.9	-27.8	-27.9
AR	18,310	6,103	24,413	10,330	3,443	13,773	-43.6	-43.6	-43.6
CA	245,204	81,735	326,939	207,147	69,049	276,196	-15.5	-15.5	-15.5
CO	29,421	9,807	39,228	30,850	9,726	40,576	4.9	-0.8	3.4
CT	20,400	6,800	27,200	18,462	6,154	24,616	-9.5	-9.5	-9.5
DE	4,026	1,342	5,368	4,350	1,450	5,800	8.0	8.0	8.0
DC	4,887	1,629	6,516	2,445	815	3,260	-50.0	-50.0	-50.0
FL	181,685	60,562	242,247	118,663	39,554	158,217	-34.7	-34.7	-34.7
GA	62,422	20,807	83,229	39,673	13,224	52,897	-36.4	-36.4	-36.4
HI	7,593	2,531	10,124	6,241	2,080	8,321	-17.8	-17.8	-17.8
ID	19,076	6,359	25,435	13,474	4,491	17,965	-29.4	-29.4	-29.4
IL	55,333	18,444	73,777	47,225	15,742	62,967	-14.7	-14.6	-14.7
IN	52,913	17,638	70,551	29,792	9,931	39,723	-43.7	-43.7	-43.7
IA	16,843	5,614	22,457	23,036	7,678	30,714	36.8	36.8	36.8
KS	18,125	6,042	24,167	13,057	4,352	17,409	-28.0	-28.0	-28.0
KY	57,194	19,065	76,259	40,815	13,605	54,420	-28.6	-28.6	-28.6
LA	32,711	10,904	43,615	23,704	7,901	31,605	-27.5	-27.5	-27.5
ME	12,990	4,330	17,320	6,865	2,288	9,153	-47.2	-47.2	-47.2
MD	23,719	7,906	31,625	15,142	5,047	20,189	-36.2	-36.2	-36.2
MA	8,206	2,735	10,941	21,998	7,333	29,331	168.1	168.1	168.1
MI	93,622	31,207	124,829	64,352	21,451	85,803	-31.3	-31.3	-31.3
MN	29,411	9,804	39,215	17,154	5,718	22,872	-41.7	-41.7	-41.7
MS	21,277	7,092	28,369	10,407	3,469	13,876	-51.1	-51.1	-51.1
MO	24,449	8,150	32,599	9,688	3,229	12,917	-60.4	-60.4	-60.4
MT	10,765	3,588	14,353	8,032	2,677	10,709	-25.4	-25.4	-25.4

Table 3. State, county and municipal gasoline use reported in Highway Statistics (continued)
(thousands of gallons)

	1990			1991			Percent Change 1991/1990		
STATE	Highway	Non-Highway	Total	Highway	Non-Highway	Total	Highway	Non-Highway	Total
NE	19,991	6,664	26,655	12,842	4,281	17,123	-35.8	-35.8	-35.8
NV	10,817	3,606	14,423	9,995	3,332	13,327	-7.6	-7.6	-7.6
NH	9,503	3,168	12,671	7,063	2,354	9,417	-25.7	-25.7	-25.7
NJ	89,098	29,699	118,797	79,735	26,578	106,313	-10.5	-10.5	-10.5
NM	16,283	5,428	21,711	14,446	4,815	19,261	-11.3	-11.3	-11.3
NY	94,212	31,404	125,616	79,113	26,371	105,484	-16.0	-16.0	-16.0
NC	94,670	31,557	126,227	65,510	15,896	81,406	-30.8	-49.6	-35.5
ND	9,033	3,011	12,044	5,627	1,876	7,503	-37.7	-37.7	-37.7
OH	91,042	30,347	121,389	48,998	16,333	65,331	-46.2	-46.2	-46.2
OK	48,067	16,022	64,089	26,005	9,861	35,866	-45.9	-38.5	-44.0
OR	34,126	11,375	45,501	22,251	7,417	29,668	-34.8	-34.8	-34.8
PA	64,191	21,397	85,588	54,238	18,079	72,317	-15.5	-15.5	-15.5
RI	4,978	1,659	6,637	4,665	1,555	6,220	-6.3	-6.3	-6.3
SC	32,976	10,992	43,968	15,260	5,087	20,347	-53.7	-53.7	-53.7
SD	10,006	3,335	13,341	6,915	2,305	9,220	-30.9	-30.9	-30.9
TN	50,321	16,774	67,095	31,443	10,481	41,924	-37.5	-37.5	-37.5
TX	295,087	98,362	393,449	207,677	69,226	276,903	-29.6	-29.6	-29.6
UT	12,355	4,118	16,473	10,476	3,492	13,968	-15.2	-15.2	-15.2
VT	5,240	1,747	6,987	3,511	1,170	4,681	-33.0	-33.0	-33.0
VA	52,792	17,597	70,389	46,042	11,836	57,878	-12.8	-32.7	-17.8
WA	35,393	11,798	47,191	23,299	7,766	31,065	-34.2	-34.2	-34.2
WV	42,518	14,173	56,691	33,577	11,192	44,769	-21.0	-21.0	-21.0
WI	37,513	12,504	50,017	27,701	9,234	36,935	-26.2	-26.2	-26.2
WY	9,215	3,072	12,287	6,209	2,070	8,279	-32.6	-32.6	-32.6
TOTAL	2,277,179	759,059	3,036,238	1,663,524	546,994	2,210,518	-26.9	-27.9	-27.2

* Note: Gasohol is included.

3. FULL-SCALE DATA COLLECTION AND POTENTIAL NONSAMPLING ERRORS

3.1 INTRODUCTION

The sampling frame considered in this study includes all 50 State governments, 3141 counties, and 9874 municipalities. Table 4 shows the number of counties and municipalities included in this study by State. This frame includes all counties, regardless of population size. It includes only those municipalities with estimated population of 1000 or over in 1992. These municipalities, however, covered over 98 percent of the U.S. municipal population in 1992. The sampling frame was constructed from the government list of the "*Directory of Governments, 1988 File,*" compiled by the U.S. Bureau of the Census. Population data were obtained from the "*Key Indicators of County Growth 1970-2010,*" 1991 Edition, by the National Planning Association (NPA) Data Services, Inc. Population projections were made based on county data from the 1990 Census.

Generally speaking, municipalities include cities, towns, villages, and those boroughs in New Jersey. The "independent cities" in Virginia and a small number of municipalities which are consolidated with their county governments, or operate outside the geographic limits of any county, or for other reasons have no organized county government operations within their boundaries, are considered both as counties and cities. Those governments designated as "boroughs" in Alaska and "parishes" in Louisiana are considered as counties. Detailed explanations of government units and types of governments can be found in, e.g., "*Public Employment: 1990,*" published by the Bureau of the Census in 1991.

Section 3.2 describes the questions included in the questionnaire and the changes made from the experience learned in the pilot study. Section 3.3 presents questionnaire response rate. Section 3.4 summarizes the steps taken to improve the full-scale study based on findings from the pilot study. Section 3.5 discusses potential nonsampling errors in the collected data.

3.2 QUESTIONNAIRE

For the full-scale study, the questionnaire was changed slightly from the pilot study. The final questionnaire is presented in Appendix A. The target time period was changed from calendar year 1991 in the pilot study to calendar year 1992 for the full-scale study. The respondents were asked (in two places) to fill in all blanks completely, using zeros and N/A (for not available) when necessary. This way, the blanks would not be left open for interpretation, as with the pilot study. The questionnaire contained four questions to obtain general information: (1) number of publicly-owned or -leased vehicles by vehicle type; (2) annual vehicle miles of travel by vehicle type; (3) fuel economy by vehicle type; and (4) the beginning date of the Fiscal Year if the data were not available on a calendar year basis. One question from the pilot study was dropped from the

questionnaire; it inquired about the number of full-time government employees. This question was dropped because the data could be obtained by other sources. The types of vehicles considered in the questionnaire were: (1) cars; (2) vans/station wagons/jeep-like vehicles; (3) buses; (4) light trucks; (5) medium and heavy trucks; and (6) other on-road vehicles. A change to Question 1 was the inclusion of the numbers of diesel-powered buses and medium and heavy trucks. The respondent was also asked to identify the type of vehicle(s) which were included in the "other on-road vehicle" category.

The last page of the questionnaire asked about the amount of motor fuel used on-road and off-road by fuel type. It was determined from the pilot study that the terminology "highway" and "nonhighway" was not clear to some respondents, so these terms were changed to "on-road" and "off-road." Definitions of both terms were also included in footnotes at the bottom of the page. These changes indeed helped the respondents understand the questionnaire better. In some cases, respondents to the pilot study were able to give a percentage of the fuel that was used on-road and off-road, but not the absolute gallons of fuel. The full-scale study respondents were prompted to give percentages if the absolute numbers were unavailable.

3.3 RESPONSES AND RESPONSE RATES

The goal for the full-scale study was to collect data from 463 governments -- one municipality and one county in each of five population groups in each State, plus the State government. The District of Columbia was included, but the eight States in Division 8 (which were contacted during the pilot study) were excluded due to limited available resources. The population groups were: (1) 0-5,000, (2) 5,000-20,000, (3) 20,000-50,000, (4) 50,000-100,000, and (5) 100,000 and above. If a particular State had no county or municipality within the population range, then a county or a municipality in the next highest population group was substituted. If there were none in the next highest population group, then a substitute was selected from the nearest population group. Some of the governments contacted could not provide information on the majority of the government vehicles used by the government because there was not a single office that kept records of this type. Those governments were then resampled within the population group.

The full-scale data collection took place from mid-April to mid-September of 1993. Forty-two State governments, 228 municipal governments, 236 county governments and the District of Columbia were contacted by phone (i.e., 507 governments in total were contacted). Out of those contacted, 10 States, 32 municipalities, and 63 counties (i.e., 105 governments in total) indicated that they could not provide the information, and therefore were not sent a questionnaire. Note that a lot of these governments simply did not keep fuel use records. A total of 402 questionnaires were mailed or faxed to the contact persons who indicated that the data could be provided, and 178 of those were completed and returned to ORNL. For approximately one-half of the questionnaires that were returned a follow-up call was necessary to verify or clarify

responses. In some cases, no satisfactory solution was obtained through these calls. The detailed responses for each government are summarized in Appendix B. Table 5 shows the number of questionnaires sent and received by State and population size.

The response rate for the pilot study was 50 percent. Division 8 was used in the pilot study because more States in this Division were likely to keep nonhighway motor fuel use data than in other Divisions. The reason was that many States in Division 8 refund taxes collected from the sales of those motor fuels that were used for nonhighway purposes. In an attempt to increase the response rate for the full-scale study, a call was placed approximately two weeks after each questionnaire was sent. This call verified receipt of the questionnaire, answered any additional questions, and basically reminded the contact to complete the form. Some places were called twice for a reminder. Even with these reminder phone calls, the response rate for the full-scale study (excluding Division 8) was 44 percent. Table 6 shows the questionnaire response rate of the full-scale data collection by Census Division.

3.4 IMPROVEMENTS FROM THE PILOT STUDY

Several steps were taken to improve the full-scale study based on findings from the pilot study.

- Greater emphasis was placed in the initial call to determine if the contact could provide fuel use information for the majority of government vehicles. In the pilot study, although we believed the contact had **all** the data for the city/county, it was discovered when the questionnaire was returned that the information included fuel use data on only one department within the government. Although this still happened, it was less of a problem in the full-scale study due to greater initial efforts.
- In the pilot study there was little success in obtaining data from State governments because often the data received were only for one department within the State government. Many times each department keeps its own records, so every department has to be contacted individually in order to collect all necessary information. We needed to find a way to get all the information from one office. First, we tried contacting the Fuel Taxation offices in the State government. This was not very successful. There was greater success, however, contacting the State General Services Administration or a State Finance Office. These offices could usually provide the fuel use information, identify the appropriate offices to obtain such information, or indicate whether each department should be contacted individually.
- Reminder calls were made approximately two weeks after the questionnaire was sent. As a result of these reminder calls, new forms were sent out to several places where the questionnaire was never received, and additional questions were answered. Also at this time, some contacts indicated that they would not be able to provide any information from the questionnaire, allowing study team to resample.

- If responses need to be verified, the calls were made as soon as the questionable response was received. In the pilot study the respondent often could not recall the details of his/her responses when the follow-up call was made. This problem was eliminated in the full-scale study.
- Improvements were made to the questionnaire to clarify some of the terminology used.
  (1) Some of the respondents to the pilot study would try to separate the fuel used on State highways versus on other road types because they did not understand the terms "highway use" and "nonhighway use." These categories were changed to "on-road" and "off-road" to eliminate that confusion, and a footnote was added to further explain the definition of on-road fuel use. In the full-scale study, we found that this new terminology was indeed better understood by the respondents.
  (2) On the original questionnaire used in the pilot study, the respondent was asked in several places to provide information on "other on-road vehicles," such as motorcycles, but was not asked to specify vehicle types. In the full-scale study the respondent was also asked to provide information about the type of vehicle(s) which were included in the "other on-road vehicles" category. This was done so that it could be determined if the information which was provided was valid for this study. In the pilot study, some of the respondents included information about units which were not appropriate for this category, such as trailers, backhoes, and other machinery. Although some inappropriate units were included on the full-scale study responses, a determination could be made as to which units to include in the study.
  (3) When making follow-up calls in the pilot study it was discovered that the respondent often knew more information than was included in their response. Because several respondents were aware of the approximate percentages of fuel used for on- and off-road purposes, notes were added to prompt the respondent to include this information if the absolute data were unknown.
  (4) The respondent was encouraged in several places on the questionnaire to use zeros and N/A (for not available) so that blanks would not be left for subjective interpretation as did in the pilot study.

3.5 NONSAMPLING ERRORS

After reviewing the collected data and additional information obtained from call-backs, some potential deficiencies in the data were noticed. These deficiencies could cause under- or over-estimation of government fuel uses. This section discusses why these deficiencies occurred and how they can be eliminated in future data collection.

1. **The total fuel use was about 30 percent understated due to the underreporting of school systems (about 25 percent) and some departments (about 5 percent). To overcome this**

underreporting problem, we recommend that in future data collection school districts and county- and city-dependent school systems be sampled separately.

Although in the full-scale study greater emphasis was placed in the initial call to determine if the contact could provide fuel use information for the majority of the departments within the government, the fuel use data of some departments were rarely reported, e.g., school districts, county- and city-dependent school systems, and county and city hospitals. Also, the fuel use data of some departments were not always included, e.g., public transit and park and recreations departments. Except the fuel use data from central agencies (or administrative departments), the fuel use data of the following departments were almost always included in the response: police (or sheriff's) department, fire department, public works (or water and sewer) department, and highway (or road and bridge) department. The main reason that data on some of the departments were not reported was that the contact thought that these departments were under different organizations or under separate jurisdictions. For State governments, large cities, and large counties, different departments may have their own fueling facilities and record keeping system. For these governments, despite the effort made to obtain fuel use data from all departments, the underreporting still occurred.

The overall extent of underreporting is hard to quantify. For a small county or city without government-dependent school systems and public transit, fuels used by police, public works, and highway departments may indeed have covered the great majority of fuels used within the government. However, for a large city or county with government-dependent school systems and public transit, these three departments may only use a small portion of the total fuel use within the government.

The study team's assessment of the sample data suggested that the most serious underreporting came from the underreporting of school districts and county- and city-dependent school systems. This assessment was based on the following evidence. Only 6 county and 6 city governments reported some vehicle and fuel use information for schools. (Note that most of the State governments which responded to the questionnaire did report fuels used by State-dependent educational institutions such as State universities.) On average, the school systems in these 12 counties and cities used 20 percent of the total government fuel use. Also, the vehicle registration data obtained from the Nebraska Office of Highway Safety Department indicated that total number of vehicles registered under State, county, municipal, and school district plates were, respectively, 5463, 6414, 9422, and 4703 in 1992. Therefore, for this particular State, schools operated over 18 percent of the total government-owned vehicles. With limited data, the study team's estimate was that for those respondents which we selected for developing models their reported total fuel use was about 30 percent

understated due to the underreporting of school systems and some small governmental departments. This underreporting of fuel use was adjusted in the final estimates.

2. **Fuels purchased from noncontract gasoline stations were largely excluded from the fuel use report.**

   In general, government-owned vehicles and equipment may be fueled at one or more of the following three types of fueling facilities: government-operated on-site fueling facilities, contract local gasoline stations, and noncontract gasoline stations. Small governments are less likely to have on-site fueling facilities and are more likely to purchase fuel from the last two types of facilities. For example, two respondents had indicated in follow-up calls that they had to add all of the fuel receipts to estimate the total fuel use. One can expect that government vehicles when used on long business trips or operated in the field are more likely to be fueled in noncontract gasoline stations. For example, one county respondent indicated that vehicles operated by the Department of Correction to transport prisoners were on the road most of the time and were rarely fueled at the central fueling tank.

   The working definition of government use of motor fuel used in this study was "the motor fuels that are purchased directly by government, usually, in bulk, and used by government-owned or -leased vehicles and equipment." This definition discouraged the respondents to report fuels purchased from noncontract gasoline stations even if fuel receipts were indeed available. In the future data collection, there is a need to ask the respondents to report fuels purchased at the three types of fueling facilities indicated above.

   In order to obtain a crude estimate of the amount of fuels pumped from noncontract gasoline stations, data from a recent survey conducted by Runzheimer International [1991] were examined. According to Runzheimer's survey, about 89 percent of the gasoline and 76 percent of the diesel purchased by government fleets were in bulk. Of those respondents that purchased fuels in bulk, about 85 percent of fuels were pumped from company tanks. It was also suggested that an estimate of about 72 percent of the fuel used by the government was purchased in bulk and pumped from the company's own fuel tanks. As indicated earlier, some governments do have contracts with local gasoline stations and their vehicles are fueled at the gasoline stations. These fuels are considered as fuels "purchased in bulk," but these governments are not operating their own fuel tanks. On the basis of these limited data, the study team's crude estimate was that about 20 percent of the fuels used by the SCM governments and purchased at noncontract gasoline stations were unreported.

3. **It is possible that some respondents might have included alternative fuels, such as propane and methanol, in their report of gasoline, gasohol, and diesel fuel use. There is a need to add an "Other Fuel Types" category in the questionnaire when the amount of fuel use by fuel type was asked.**

Several municipal and county respondents have reported the amount of propane, natural gas, and methanol that they used. Also, one county respondent indicated that most of their vehicles ran on propane. For those respondents which did not indicate the use of alternative fuels, it is possible that some respondents might have included alternative fuels, such as propane and methanol, in their report of gasoline, gasohol, or diesel use. Although the amount of alternative fuels used by SCM governments is currently expected to be small, this can still create unnecessary bias. Especially, in light of the recent new Federal legislation, such as the Clean Air Act Amendments (CAAA) of 1990, the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), and the National Energy Policy Act (EPACT) of 1992, government uses of alternative fuels are expected to increase significantly in the near future. It is important to include other fuel types in the questionnaire in future data collection.

Although there were other limitations found in some of the sample data due to incomplete responses, it was judged by the study team that their effects on the regression analysis were quite small. It, however, reduced the number of usable data and limited the choice of regression models that could be used in this study. For example, because of small sample size we were unable to develop models for each Census Division. Some of the limitations found in the data were as follows: (1) Respondents could provide total fuel use, but were unable to break down the fuel use by highway and nonhighway use; (2) Respondents were able to provide highway fuel use data, but were unable to provide nonhighway use; (3) Respondents were able to provide highway use data, but were unable to break down the data by fuel type; (4) Respondents were able to provide vehicle information, but were unable to provide vehicle miles and/or fuel economy information; (5) Respondents were able to provide fuel use data for the entire government, but were only able to provide vehicle information on one department (which operated on-site fuel tanks); and (6) Respondents were able to provide all vehicle information, but were only able to provide part of the fuel use information (because some fuel tanks were not under their control).

Table 4. Number of counties and municipalities considered by this study in each state

State	Number of Counties	Number of Municipalities[1]
Alabama	67	221
Alaska	26	28
Arizona	15	81
Arkansas	75	176
California	58	437
Colorado	63	133
Connecticut	8	30
Delaware	3	26
D.C	1	1
Florida	67	308
Georgia	159	279
Hawaii	4	1
Idaho	44	77
Illinois	102	651
Indiana	92	295
Iowa	99	258
Kansas	105	199
Kentucky	120	211
Louisiana	64	171
Maine	16	22
Maryland	24	94
Massachusetts	14	39
Michigan	83	351
Minnesota	87	315
Mississippi	82	153
Missouri	115	330
Montana	57	62
Nebraska	93	111
Nevada	17	18
New Hampshire	10	13
New Jersey	21	297
New Mexico	33	59

Table 4. Number of counties and municipalities considered by this study in each state (continued)

State	Number of Counties	Number of Municipalities[1]
New York	62	452
North Carolina	100	279
North Dakota	53	55
Ohio	88	543
Oklahoma	77	225
Oregon	36	142
Pennsylvania	67	639
Rhode Island	5	8
South Carolina	46	150
South Dakota	66	57
Tennessee	95	208
Texas	254	732
Utah	29	120
Vermont	14	28
Virginia	136	136
Washington	39	173
West Virginia	55	117
Wisconsin	72	321
Wyoming	23	42
U.S. Total	3,141	9,874

[1]Only those with estimated 1992 population of 1,000 and over are included. These municipalities cover over 98% of the U.S. municipal population in 1992.

Table 5. Number of questionnaires sent and received by State and population size group

COUNTIES

Received/Sent	DIVISION 1					
Population	CT[1]	ME	MA	NH	RI[1]	VT
Over 100,000	0/0	1/1	1/3	1/1	0/0	0/1
50-100,000	0/0	1/1	1/1	1/1	0/0	0/1
20-50,000	0/0	2/2	0/0	2/3	0/0	0/1
5-20,000	0/0	1/1	0/0	0/0	0/0	1/2
1-5,000	0/0	0/0	0/0	0/0	0/0	0/0
All	0/0	5/5	2/4	4/5	0/0	1/5

Received/Sent	DIVISION 2		
Population	NJ	NY	PA
Over 100,000	0/1	0/1	0/1
50-100,000	1/2	0/1	1/1
20-50,000	0/0	2/2	0/1
5-20,000	0/0	0/0	1/1
1-5,000	0/0	0/1	1/1
All	1/3	2/5	3/5

Received/Sent	DIVISION 3				
Population	IL	IN	MI	OH	WI
Over 100,000	0/1	0/1	0/1	1/1	1/1
50-100,000	1/1	0/1	0/1	1/1	1/1
20-50,000	1/1	0/0	0/1	0/1	0/1
5-20,000	0/0	2/2	1/1	0/0	1/1
1-5,000	1/1	0/0	0/1	0/0	0/1
All	3/4	2/4	1/5	2/3	3/5

[1] The counties in this state have no governing bodies.

Table 5. Number of questionnaires sent and received by State and population size group (continued)

COUNTIES

Received/Sent	DIVISION 4						
Population	IA	KS	MN	MO	NB	ND	SD
Over 100,000	0/1	1/1	1/1	0/0	1/2	0/0	1/1
50-100,000	1/1	0/2	0/1	1/1	0/0	1/1	0/1
20-50,000	1/1	0/0	0/1	1/1	0/1	1/2	1/1
5-20,000	1/2	1/1	1/1	1/1	0/1	1/1	0/1
1-5,000	0/0	1/1	1/1	0/1	0/1	0/1	1/1
All	3/5	3/5	3/5	3/4	1/5	3/5	3/5

Received/Sent	DIVISION 5							
Population	DE	FL	GA	MD	NC	SC	VA	WV
Over 100,000	0/2	0/1	0/1	1/1	1/1	0/1	1/1	1/1
50-100,000	0/0	0/1	0/1	0/1	1/1	1/1	0/1	1/1
20-50,000	0/0	1/1	0/1	0/1	1/1	1/1	0/1	0/0
5-20,000	0/0	0/1	0/1	0/1	1/1	0/1	1/1	1/1
1-5,000	0/0	0/0	0/1	0/0	1/1	0/0	0/1	0/0
All	0/2	1/4	0/5	1/4	5/5	2/4	2/5	3/3

Received/Sent	DIVISION 6			
Population	AL	KY	MS	TN
Over 100,000	0/1	1/1	1/1	1/1
50-100,000	0/1	1/1	0/1	0/0
20-50,000	0/1	1/1	0/1	1/1
5-20,000	0/2	1/1	1/1	0/1
1-5,000	0/0	0/1	0/1	0/1
All	0/5	4/5	2/5	2/4

Table 5. **Number of questionnaires sent and received by State and population size group (continued)**

COUNTIES

Received/Sent	DIVISION 7			
Population	AR	LA	OK	TX
Over 100,000	0/1	0/0	0/1	0/1
50-100,000	0/1	1/1	0/0	0/1
20-50,000	0/1	1/1	0/0	1/1
5-20,000	0/2	0/2	0/1	0/1
1-5,000	0/0	0/0	0/1	0/1
All	0/5	2/4	0/3	1/5

Received/Sent	DIVISION 8							
Population	AZ	CO	UT	NM	ID	NV	MT	WY
Over 100,000	1/2	0/1	2/2	0/1	0/0	0/1	0/0	0/0
50,000-100,000	0/0	1/1	0/0	0/1	2/2	0/0	1/2	0/0
20,000-50,000	2/2	0/0	0/0	0/0	1/1	2/3	0/0	1/1
5,000-20,000	0/1	1/1	1/1	1/1	1/1	0/0	0/0	0/0
1-5,000	0/0	0/0	0/0	1/1	1/1	0/0	0/1	0/1
All	3/5	2/3	3/3	2/4	5/5	2/4	1/3	1/2

Received/Sent	DIVISION 9				
Population	AK	CA	HI	OR	WA
Over 100,000	0/0	1/1	0/1	0/1	0/1
50-100,000	1/1	0/1	0/1	0/1	0/1
20-50,000	2/2	0/1	1/1	1/1	1/1
5-20,000	1/1	1/1	0/0	0/1	1/1
1-5,000	0/0	0/1	0/0	1/1	0/1
All	4/4	2/5	1/3	2/5	2/5

Table 5. Number of questionnaires sent and received by State and population size group (continued)

MUNICIPALITIES

Received/Sent	DIVISION 1					
Population	CT	ME	MA	NH	RI	VT
Over 100,000	1/1	0/0	0/1	0/0	0/1	0/0
50-100,000	0/1	0/1	0/1	1/1	0/2	0/0
20-50,000	1/1	1/2	0/1	0/1	0/2	0/1
5-20,000	1/1	1/1	0/1	1/2	0/0	1/3
1-5,000	0/0	1/1	0/0	0/0	0/0	1/1
All	3/4	3/5	0/4	2/4	0/5	2/5

Received/Sent	DIVISION 2		
Population	NJ	NY	PA
Over 100,000	0/1	0/1	0/1
50-100,000	0/1	0/1	1/1
20-50,000	1/1	0/1	0/1
5-20,000	1/1	0/1	1/1
1-5,000	1/1	0/1	0/1
All	3/5	0/5	2/5

Received/Sent	DIVISION 3				
Population	IL	IN	MI	OH	WI
Over 100,000	0/1	0/1	0/1	0/1	0/1
50-100,000	1/1	1/1	0/1	1/1	1/1
20-50,000	0/1	1/1	0/1	1/1	0/1
5-20,000	1/1	0/1	1/1	0/1	1/1
1-5,000	0/1	1/1	0/1	0/1	0/1
All	2/5	3/5	1/5	2/5	2/5

Table 5. **Number of questionnaires sent and received by State and population size group (continued)**

MUNICIPALITIES

Received/Sent	DIVISION 4						
Population	IA	KS	MN	MO	NB	ND	SD
Over 100,000	0/1	0/1	0/1	1/1	0/2	0/0	0/0
50-100,000	0/1	0/1	1/1	0/1	0/0	1/2	0/1
20-50,000	1/1	0/1	0/1	1/1	1/1	1/1	0/0
5-20,000	0/1	1/1	1/1	1/1	0/0	1/1	0/1
1-5,000	1/1	1/1	1/1	1/1	0/1	0/1	0/1
All	2/5	2/5	3/5	4/5	1/4	3/5	0/3

Received/Sent	DIVISION 5								
Population	DE	DC	FL	GA	MD	NC	SC	VA	WV
Over 100,000	0/0	0/1	0/1	1/1	0/1	0/1	0/0	0/1	0/0
50-100,000	0/1		0/1	0/1	0/0	1/1	0/2	0/1	0/2
20-50,000	1/2		0/1	1/1	0/2	1/1	1/1	0/1	0/1
5-20,000	0/1		0/1	0/0	0/1	0/1	1/1	0/1	0/1
1-5,000	1/1		0/1	0/1	0/1	0/1	1/1	1/1	1/1
All	2/5	0/1	0/5	2/4	0/5	2/5	3/5	0/5	1/5

Received/Sent	DIVISION 6			
Population	AL	KY	MS	TN
Over 100,000	0/1	1/1	0/1	0/0
50-100,000	0/1	0/1	0/0	0/1
20-50,000	1/1	0/0	1/2	1/1
5-20,000	1/1	1/2	0/1	0/1
1-5,000	0/0	0/0	0/1	1/1
All	2/4	2/4	1/5	2/4

Table 5. **Number of questionnaires sent and received by State and population size group (continued)**

MUNICIPALITIES

Received/Sent	DIVISION 7			
Population	AR	LA	OK	TX
Over 100,000	0/1	0/1	0/1	1/1
50-100,000	1/1	1/1	2/2	0/1
20-50,000	0/1	0/1	0/1	1/1
5-20,000	1/1	0/1	0/0	1/1
1-5,000	1/1	0/1	0/1	0/1
All	3/5	1/5	2/5	3/5

Received/Sent	DIVISION 8							
Population	AZ	CO	UT	NM	ID	NV	MT	WY
Over 50,000	2/2	1/1	0/0	1/1	1/1	2/2	1/1	0/1
20,000-50,000	0/0	0/0	0/0	0/0	1/1	0/0	1/1	0/0
5,000-20,000	0/1	1/2	0/0	1/1	1/1	2/2	1/1	0/1
1-5,000	0/0	0/0	0/0	0/1	0/0	0/0	0/1	1/1
All	2/3	2/3	0/0	2/3	3/3	4/4	3/4	1/3

Received/Sent	DIVISION 9				
Population	AK	CA	HI	OR	WA
Over 100,000	0/0	0/1	0/1	0/1	0/1
50-100,000	0/0	0/1	0/0	1/1	1/1
20-50,000	1/2	1/1	0/0	1/1	0/1
5-20,000	0/1	0/1	0/0	1/1	1/1
1-5,000	0/1	0/1	0/0	0/1	1/1
All	1/4	1/5	0/1	3/5	3/5

Table 6. Questionnaire response rate of the full scale data collection

DIVISION	FORMS SENT	NO CENTRAL CONTACT	TOTAL CALLS MADE	FORMS RECEIVED			
				COUNTIES	MUNICIPALITIES	STATES	TOTAL
1	50	12	62	12	10	0	22
2	31	5	36	6	5	1	12
3	51	16	67	11	12	2	25
4	68	22	90	19	16	2	37
5	76	17	93	14	11	4	29
6	39	10	49	8	7	2	17
7	40	16	56	3	9	2	14
9	47	7	54	11	8	3	22
TOTAL	402	105	507	84	78	16	178
						RESPONSE RATE	44%

4. POTENTIAL PREDICTORS AND TWO ESTIMATION METHODS

4.1 INTRODUCTION

As indicated in Chapter 3, about 21 percent of the SCM governments contacted in the full-scale study said that they could not provide the requested data, and a lot of these governments simply did not keep fuel use records. This suggests that even if we can sample all SCM governments (and all departments) we still will need some statistical models to estimate the fuel uses of those governments for which fuel use records are not available. The sampling-and-regression method proposed in this study is a logical choice in such situations.

The proposed method requires the use of predictors to estimate government fuel use. Several predictors were initially considered: number of SCM government-owned vehicles, number of full-time SCM government employees, and land area. Number of SCM government-owned vehicles should be a good predictor for highway use of motor fuel, while number of full-time SCM government employees and land area are expected to be good indicators of the size of the government. During the search for these three predictors, it was recognized that population was also a potential predictor. The reason is that it reflects the amount of services that a government needs to provide to its people, and vehicles and motor fuels are tools used to accomplish these services.

Ideally, we would like to have data on these predictors for each State government, each county government, and each municipal government. This would allow us to estimate fuel use for each government unit. The parameters of interest are simply the sum of the estimated fuel uses over all SCM governments within a State. The quality of the fuel use estimate depends on how well the variations of fuel use can be explained by the variations of its predictors, as well as how well the predictors can be measured and predicted. This gives another good reason for considering population as a predictor since population can be predicted with relatively good accuracy. In the following section, the availability and quality of these predictors are discussed. Based on the availability and quality of these predictors, the last section suggests two possible methods to estimate SCM government fuel use.

4.2 AVAILABILITY AND QUALITY OF PREDICTORS

Number of Government-Owned Vehicles

The number of SCM government-owned vehicles should be a good predictor for highway use of motor fuel by SCM governments. The following three data sources have been considered and explored: *Highway Statistics* published by FHWA, R.L. Polk vehicle registration data, and State department of motor vehicles registration data. Our findings are as follows.

Highway Statistics data

Currently, *Highway Statistics* publishes the number of SCM government-owned vehicles annually by State and by four vehicle types [Table MV-7, annual]: (1) automobiles, including cars, vans, station wagons, and jeep-like vehicles; (2) buses, including transit and school buses; (3) trucks, including light, medium, and heavy trucks; and (4) motorcycles. These numbers are currently not broken down by government type (i.e., State government, county government, and municipal government). Without these numbers broken down by government type, to estimate the fuel use, one would have to assume that vehicles owned by State government, county government, and municipal government, on average, consumed the same amount of fuel per vehicle per year. As will be presented in the next chapter, this is not a good assumption according the data collected in this study.

The questionnaire used in this study separated vans/station wagons from other passenger cars and light trucks from medium/heavy trucks. These separations were based on a consideration that vehicle miles of travel and fuel economy were expected to be quite different between these vehicle types. In order to take full advantage of the information obtained from the returned questionnaires, we need the number of publicly-owned vehicles broken down by more detailed vehicle and government types than those presented in current *Highway Statistics*. A study was conducted to see if it was possible to obtain the data in such detail. The findings of the study are as follows.

The number of publicly-owned vehicles reported in *Highway Statistics* was based on annual submittal by the State through Form FHWA-561 [FHWA, 1991]. In this particular form, States were asked to break the passenger vehicles into automobiles and vans, buses into commercial buses and school buses, and trucks into light trucks, heavy single unit trucks, farm trucks, and truck tractors. Therefore, in theory, detailed breakdowns of publicly-owned vehicles by vehicle type for each State are available.

Several inquiries were made to the FHWA staff with regards to the availability and quality of the number of publicly-owned vehicles reported in *Highway Statistics*. Based on these inquiries, our current understanding of the conditions of the SCM government-owned vehicle data is summarized as follows.

1. The data can not be further broken down by government type, nor by more detailed vehicle types.
2. The data include vehicles owned by school districts.
3. The quality of data varies from State to State. Depending on States, the quality of the data can be rated from "fair" to "poor." For example, in 1992 only 12 States submitted complete (for each of the four vehicle types considered by FHWA) and usable data; 29 States either did not report the data or submitted questionable data to FHWA; three States provided total number of SCM government-owned vehicles, and the breakdowns

were made by FHWA; and the other States reported part of the data (e.g., State government-owned vehicles only).

4. Overall, it appears that FHWA had to make quite a few estimates based on data from prior years and other related information. Some States do update their numbers every 3 to 5 years, and the numbers for the intermittent years have to be estimated by FHWA.

R.L. Polk vehicle registration data

In an attempt to collect the number of vehicles owned by State, county, and municipal governments by State and vehicle type, several sources of information were contacted. It was suggested that the R. L. Polk and Company may have this data. The Volpe National Transportation Systems Center (VNTSC) receives the National Vehicle Population Profile database each year from the R. L. Polk and was contacted about the possibility of acquiring the necessary data from that database. VNTSC responded that it was not possible to use the database to tell whether a vehicle was owned by the public sector or not. The Statistical Services Department at the R. L. Polk was contacted next. ORNL was informed that R. L. Polk did not have records that distinguished which vehicles were publicly-owned vehicles in the vehicle population database. The Market Services Division of R.L. Polk confirmed that the information was not readily available.

State department of motor vehicles registration data

Another possible data source is the State department of motor vehicles (DMV). To understand whether it is feasible to obtain government-owned vehicles data from the State DMV, the project team members talked to our ORNL colleagues who are currently conducting a project for FHWA entitled "Design of a Highway Vehicle Travel Forecasting Model." In that project, extensive inquiries have been made to the State DMV attempting to obtain vehicle registration data with emphasis on truck data. These inquires were started in July 1993. Their findings as of October 29, 1993, were as follows:

1. Forty-seven States were contacted, and 3 other States could not be reached. In 4 of the 47 States contacted, the right person to request the data from was never found. Therefore, data were requested from 43 States.
2. Data from 25 States were received, but 15 States had incomplete data.
3. Eleven States had said they would send the data, but never did.
4. Seven States said they did not have the data.
5. Four States required service charges: 3 States asked for less than $25 and one State gave an estimate of $400-500.
6. None of the States contacted said the data were confidential.

Data received from Colorado and Nebraska contained some SCM government-owned vehicle data. For these two States, we found that the total number of SCM government-owned vehicles reported by State DMV were very close to the numbers reported in *Highway Statistics*.

Our overall impression is that it is indeed feasible to obtain SCM government-owned vehicle data from State DMV. However, our estimate is that in order to get good quality data it is at least a 6 person-month task.

In summary, even though the number of SCM government-owned vehicles published in *Highway Statistics* can not be broken down by government type or by detailed vehicle type, and is questionable in quality, it is the only data that is currently available for this study.

Number of Full-Time SCM Government Employees

Number of SCM full-time government employees are published by the Bureau of the Census in "*Public Employment: 1990,*" "*County Government Employment: 1990,*" and "*City Government Employment: 1990.*" These publications include employment data for all State governments, county governments with population of 100,000 or more in 1988, and municipal governments with population of 75,000 or more in 1988. Essentially, the data are only reported for large counties and cities in these publications, and are not useful for the analysis in this study.

The county and municipal government employment data are also available in the "*County and City Data Book: 1988,*" published by the Bureau of the Census. The data include all counties and "places" with a population of 2,500 or more. However, the data on county government employment include not only county government employees, but also employees of the municipal governments within the county. This makes the data difficult to use in this study.

Land Area

Land areas are available for State, county, and municipal governments from both "*County and City Data Book: 1988*" and "*Directory of Governments, 1988 File.*"

Population

The 1988 population data are available for each State, county, and municipal government in "*Directory of Governments, 1988 File.*" The latest population data are also available from the "*Key Indicators of County Growth 1970-2010,*" 1991 Edition, by the National Planning Association (NPA) Data Services, Inc. Population projections to year 2010 were made for each county and "independent cities" by NPA based on county data from the 1990 Census. In this study, population projections were made for each municipality using the NPA projected growth rate for the county to which the municipality belongs.

4.3 DATA SELECTION AND TWO ESTIMATION METHODS

Only those sample data that were considered reliable were selected for use in developing statistical models. For those responses that were incomplete or questionable, additional information obtained from follow-up calls was used to determine the usability of the data. Occasionally, questionable responses were removed from the analysis even though the respondents insisted in the follow-up calls that the information they provided was correct. For example, the data from one respondent government were not used because it operated over 100 vehicles, but indicated a total fuel use of only about 1300 gallons in 1992. To some extent, engineering judgements were exercised throughout the data selection process.

The predictors that were readily available for use in this study included: number of SCM government-owned vehicles by 3 vehicle types published in *Highway Statistics*; land area; and population. Data on the number of SCM government-owned vehicles were, as indicated earlier, questionable in terms of data quality. Data on population and land area were, on the other hand, believed to be quite accurate. Two methods were considered in this study. The first method used the number of SCM government-owned vehicles as the predictor, while the second method used population as the main predictor. The general concept behind and strengths and limitations of each method are described as follows. Detailed descriptions of these two methods are given in Chapters 5 and 6.

Method One: A Vehicle-Based Method

The first method used the number of SCM government-owned vehicles as the predictor. This method is more in line with FHWA's current estimation procedure as described in Chapter 2. The main idea was to estimate average motor fuel use per vehicle per year from the data provided by the selected sample governments, including number of vehicles, average annual mileage, and average fuel economy. The average fuel use estimates were made by vehicle type and, if necessary, by government type. In conjunction with the number of SCM government-owned vehicles, these estimates were then used to develop State estimates of highway fuel use.

As indicated earlier, the published data on the number of SCM government-owned vehicles are currently available only for three vehicle types - cars/vans, buses, and trucks, and are not available by government type. Given the condition of the current data, it was felt that it might not be worthwhile to attempt to separate these numbers into more detailed vehicle types. Besides, we were unable to find a good method to do so. Therefore, it was decided that this vehicle-based method would be limited to these 3 vehicle types.

Again, given the condition of the number of SCM government-owned vehicle data, it was not likely to be warranted to attempt to break the numbers down by government type. However, because the sample data did suggest significant differences between the fuel use of different government types, a method was devised to separate the number of vehicles into three government

types (see next chapter). By doing so, it also allowed us to make a point that in order for this method to perform well we need not only good data on total number of vehicles, but also detailed breakdowns of the data. Appendix D describes how these numbers were broken down by government type using the sample vehicle data and population data. It also describes how these numbers were projected for future years based on a regression model constructed from historical vehicle data and State population data.

Given the current quality of the predictor, we did not expect the vehicle-based method to make reliable estimates of fuel use on highways. In addition, the estimates would include some alternative fuels, such as propane, methanol, and natural gas, and some of the fuels could be used by vehicles for off-road travels. In the future, if we can collect better data on SCM government-owned vehicles, this method would be a good method to estimate total highway fuel use.

A detailed description of this vehicle-based method and estimation results are presented in Chapter 5.

Method Two: A Population-Based Method

The second method used population as the predictor. The main idea was to develop statistical models from the sample data to describe relationships between total government fuel use and population. The developed statistical models were then used to predict fuel use for each government given its population. Note that land areas were also considered in developing the models, but were found to have a weak relationship with fuel use according to the selected sample data.

The strength of this method is that population can be estimated and predicted with relatively good accuracy, while the limitation of this method was on the fuel use data. As indicated in Chapter 3, the sampled fuel use was about 50 percent understated due to the underreporting of fuels used by school systems and some departments and fuels purchased at noncontract gasoline stations. This underestimation, however, could be adjusted outside of the models. A detailed description of this population-based method and estimation results are given in Chapter 6.

5. ESTIMATION OF MOTOR FUEL USE: METHOD ONE - A VEHICLE-BASED METHOD

5.1 INTRODUCTION

This chapter describes the use of a vehicle-based method to estimate the SCM government motor fuel use by fuel type and by highway use and nonhighway use for each State. The estimates, however, have to be used with those limitations described earlier about the sample data and the predictors in mind. To the extent possible, this method attempted to make the best use of the available data. For example, in addition to the use of number of SCM government-owned vehicles, population data were also used to check if the nonhighway use and highway use ratio changes as population increases.

This chapter is organized as follows. Section 5.2 gives an outline of the estimation method. Section 5.3 presents the detailed estimation procedure, the sample data selected for the estimation, and the results from the estimation. The sampling errors of the estimates are also assessed using the methods described in Appendix E. The last section summarizes the chapter with a discussion on the quality of the estimates, with particular emphasis on the potential nonsampling errors associated with the estimates.

5.2 OUTLINE OF THE ESTIMATION METHOD

The vehicle-based method can be outlined as follows:

1. For those sample governments which provided information on number of vehicles, annual vehicle miles, and fuel economy (in miles per gallon), their fuel uses are computed for three different vehicle types (cars/vans, buses, and trucks). For example, given a particular government, fuel use by cars/vans is computed as (number of cars × average annual vehicle miles of travel by cars) ÷ fuel economy of cars + (number of vans × average annual vehicle miles of travel by vans) ÷ fuel economy of vans. Note that vans include station wagons and jeep-like vehicles. Most of these fuels are used on highways.
2. The relationships between the computed fuel uses and number of vehicles are developed using regression models. Whenever data permit, these regression models are developed for different government types and vehicle types. The details of the model development are given in the next section.
3. The regression models developed in the last step are then used in conjunction with the estimated numbers of vehicles owned by SCM governments to estimate the total highway fuel use by cars/vans, buses, and trucks. The relative shares of vehicles owned by State government, county government, and municipal government are estimated for each State using dummy variable regression models described in Appendix D.

4. Using the sample data, the fuel uses by other "highway" or "on-road" vehicles, such as motorcycles, are estimated as a percentage of the total fuel use obtained in the last step, i.e, the total fuel use by cars/vans, buses, and trucks. Total highway use is then estimated as the total fuel use of cars/vans, buses, trucks, and other highway vehicles. Note that to the extent possible those respondents which included highway machinery, such as motor graders, pavers, sweepers, and roadside mowers, as the main "other on-road vehicles" were excluded from the analysis.
5. Based on the sample data, the ratios of nonhighway use to highway use are computed by government type. One might expect the ratio to decrease as urban areas grow. To test if this relationship exists, the binomial logit models are used to study the relationship between these ratios and populations. The test results from the model suggest that the relations are extremely weak, both for county governments and municipal governments. This leads to the adoption of a simpler model which says that nonhighway use is a constant percentage of highway use.
6. The shares of fuel use by fuel type (i.e., gasoline, gasohol, and diesel) are estimated from sample data. These estimated shares are obtained separately for highway use and nonhighway use. The final estimates of fuel use by fuel type are obtained by multiplying the highway use and nonhighway use with the corresponding estimated shares.

5.3 ESTIMATION PROCEDURE

Step 1 Estimate total SCM motor fuel uses on highways.

Step 1.1 Establish statistical relationships between motor fuel uses and number of vehicles.

Table 7 shows the sample data selected to establish such relationships. Fuels consumed by each of the three vehicle types are computed based on the number of vehicles, average annual vehicle miles, and fuel economy information provided by the respondents. The fuel use is measured approximately for year 1992. Figure 1 shows that log-log linear regression models can depict the relationships quite well. Note that in this report "log" represents natural logarithms. The regression models have the following form:

$$\log(y_i) = \alpha + \beta \log(x_i) + \varepsilon_i \qquad i=1,2,\ldots,n \tag{1}$$

where y_i is the fuel use of the ith government by highway vehicles, x_i is the reported number of government-owned vehicles of the ith government, α and β are unknown regression parameters to be estimated from sample data, and ε_i, $i=1,2,\ldots,n$, are normal and independently distributed model residuals with zero mean and constant variance, σ^2. Other assumptions include: ε_i is independent of x_i, and x_i is measured without errors.

Depending on the sample size available for analysis, 7 regression models are developed by government type and vehicle type. Table 8 shows the regression results, which include the

estimated parameters and associated statistics. Both regression parameters are highly statistically significant, and the coefficients of determination, R^2, which range from 0.80 to 0.97, are quite high. This suggests that, in general, the relationships are quite well established from the sample data, and number of government-owned vehicles is indeed a good indicator of highway fuel use (provided the data can be collected with reasonable accuracy and that off-the-road uses of highway vehicles are rare). The regression parameter, β, which is called the elasticity of response of fuel use to number of government-owned vehicles, is close to 1 for all 7 models. This indicates that a 1 percent increase in the number of government-owned vehicles would be associated with about 1 percent increase in government vehicle fuel use. Because the sample sizes were small, further breakdowns of the models by State or by Census Division were not considered.

In order to use the 7 regression models to predict fuel uses for those governments for which fuel use records are not collected or not available, we need to know the number of vehicles by vehicle type owned by each SCM government. Vehicle data at this level is currently not available, and even if the data can be estimated using the existing vehicle and population data, the uncertainty of the estimates would be too high to be acceptable for predicting the fuel use. Thus, simpler models have to be developed.

Since all estimated β parameters are reasonably close to 1, a simplified model which constrained the β parameter to 1 is used to reestimate the fuel use-number of vehicles relationships. That is,

$$\log(y_i) = \alpha + \log(x_i) + \varepsilon_i \qquad i=1,2,\ldots,n \tag{2}$$

or

$$\log\left(\frac{y_i}{x_i}\right) = \alpha + \varepsilon_i \qquad i=1,2,\ldots,n \tag{3}$$

Table 9 gives the estimates of this simplified model. A good estimate of fuel use from the model is

$$\hat{y}_i = x_i \exp(\hat{\alpha} + \frac{1}{2}\hat{\sigma}^2) \quad \text{or} \quad \frac{\hat{y}_i}{x_i} = \exp(\hat{\alpha} + \frac{1}{2}\hat{\sigma}^2) \tag{4}$$

where $\hat{\alpha}$ and $\hat{\sigma}^2$ are sample estimates of α and σ^2, and $\hat{y}_i$ is the estimated vehicle fuel use of government i. Appendix E discusses the theory behind the estimate. Essentially, the model assumes that the estimated gallons of fuels consumed per vehicle per year, i.e., $\hat{y}_i/x_i$, is constant for each government type and vehicle type, and in addition it follows a lognormal distribution. Table 9 shows the estimated gallons per vehicle per year (gpv) from the model

by government type and vehicle type. State government-owned cars and vans have traveled less than county- and municipal-owned cars and vans (State: 702.48 gpv, county: 1284.05 gpv, municipal: 1202.11 gpv); and municipal-owned trucks have traveled less than State- and county-owned trucks (State: 1532.39 gpv, county: 1620.53 gpv, municipal: 1101.23 gpv). These gpv numbers are significantly higher than those reported for the Federal vehicle fleet (see Table 2).

There were some indications from additional regression analyses that there may be some regional differences in gpv. Because the sample size was quite small, to avoid over-interpreting the data, it was decided not to derive gpv by Census Division.

Step 1.2 Estimate SCM government fuel use by cars/vans, buses, and trucks for each State.

Even with the simplified models in Table 9, in order to predict the fuel use for each State, we still need to know the number of government-owned vehicles by vehicle type and government type. The current numbers published in *Highway Statistics* [Annual] are not broken down by government type. Using the sample data, Appendix D describes a simple method to break the number of government-owned vehicles into three government types. Projections for years 1992, 1995, and 2000 are also given in the Appendix based on a dummy variable regression model estimated from the historical data. The quality of these estimates can not be assessed, and we will proceed as if these estimates are correct. To illustrate, Alabama State, county, and municipal governments are estimated to have 4172, 3654, and 4687 cars/vans, respectively. The estimate of fuel use by cars/vans is computed as ($4172 \times 702.48 + 3654 \times 1284.05 + 4687 \times 1202.11 = 13.26$ million). The calculations are carried out for each vehicle type and summed to obtain a State estimate.

Step 1.3 Estimate SCM motor fuel use by other "on-road" vehicles for each State.

Table 10 shows the sample data used to estimate the fuel use of other on-road vehicles. The fuel use by other on-road vehicles is expressed as a percentage of the fuel consumed by cars/vans, buses, and trucks. These percentages vary significantly over different governments and have a mean value of 1.61 percent and standard deviation of 3.63 percent. The SCM motor fuel use by other on-road vehicles is therefore estimated as 1.61 percent of the estimated fuel use of cars/vans, buses, and trucks.

Step 1.4 Estimate SCM total highway vehicle fuel use.

Total SCM highway vehicle fuel use is estimated as the sum of fuel use by cars/vans, buses, trucks, and other on-road vehicles. That is, the highway vehicle fuel use estimate is obtained by adding the estimates obtained in Steps 1.2 and 1.3.

Step 1.5 Estimate SCM total highway fuel use.

The estimates obtained in Step 1.4 include fuels used by highway vehicles for off-the-road travels. No good estimate was found on the percentage of fuels used by SCM government-owned highway vehicles for off-the-road travels. However, we expect the percentage to be quite small. For the moment, we assume that total highway fuel use is the same as total highway vehicle fuel use. Corrections for off-the-road travels will be made at the last section of this chapter when nonsampling errors are discussed.

Step 2 Estimate the ratio of nonhighway use share over highway use share.

Table 11 shows the sample data used to compute the ratios of nonhighway use share to highway use share by government type. The following binomial logit models are used to study (1) the relationship between nonhighway use share and population size, (2) the relationship between highway use share and population size, and (3) the ratio of nonhighway use share to highway use share:

$$\text{Highway Use Share}_i = p_i = \frac{1}{1+\exp(\alpha+\beta\ POP_i)} \tag{5}$$

and

$$\text{Nonhighway Use Share}_i = q_i = \frac{\exp(\alpha+\beta\ POP_i)}{1+\exp(\alpha+\beta\ POP_i)} \tag{6}$$

and their ratio

$$f_i = \log\left(\frac{\text{Nonhighway Use Share}_i}{\text{Highway Use Share}_i}\right) = \alpha + \beta\ POP_i + e_i \tag{7}$$

where POP_i is the population of the *ith* government in the sample data, α and β are model parameters, and e_i is the model residual. Parameters α and β in Eq. (7) were estimated using a minimum chi-squared, generalized least squares estimation method. The computer program LIMDEP version 6.0 [Econometric Software, 1991] was used for estimation. Two estimations are performed, one for county governments and one for municipal governments. In both cases, the t-statistics value for the estimated β parameter is very close to zero, indicating extremely weak relationship between the fuel use shares and the population size of governments.

The test results above lead to the adoption of the following simple model for estimating nonhighway use: Nonhighway use is a constant percentage of highway use. Basically, this simple model uses the amount of highway use as a surrogate variable to indicate the size of the government; governments with a large amount of highway use are most likely to be large governments and are likely to use more nonhighway motor fuel. Table 11 shows the sample data

used to estimate the ratio. The mean ratio is 16.24 percent with a standard deviation of about 21 percent. The mean ratio was considerably lower than that currently used by FHWA -- 33.33 percent. Nonhighway use is thus estimated as 16.24 percent of the highway use which was estimated in Step 1. The nonhighway use estimate includes fuels used by nonhighway vehicles and machinery and fuels used by highway vehicles for off-the-road travels.

Step 3 Estimate the percentages of highway fuel use by fuel type.

Table 12 shows the sample data used to estimate the percentages of highway fuel uses by three fuel types: gasoline, gasohol, and diesel. The estimates of percentages of highway fuel use for the three fuel types are 66.87 percent, 2.75 percent, and 30.38 percent, respectively. The standard deviations of these estimates are respectively 27.69 percent, 11.89 percent, and 24.19 percent. These standard deviations are quite large when compared to their means, especially those estimates for gasohol and diesel. These percentages are applied to the total highway use estimate obtained in Step 1 to estimate highway use by fuel type.

Step 4 Estimate the percentages of nonhighway fuel use by fuel type.

Table 13 shows the sample data used to estimate the percentage breakdowns of nonhighway use by fuel type. The estimates are 26.61 percent, 0.52 percent, and 72.87 percent for gasoline, gasohol, and diesel, respectively. This suggests that a very high percentage (about 73 percent) of the fuel used for nonhighway purposes is diesel fuel. These percentages are applied to the total nonhighway use obtained in Step 2 to estimate nonhighway use by fuel type.

Step 5 Estimate the uncertainty of the estimates due to sampling errors.

The basic theories used in this report to quantify the sampling errors are described in Appendix E. As indicated in the appendix, "sampling errors" refer to the "variability" of estimates caused by the variation among different samples drawn from the same universe. This variability will exist even though the hypothesized model is correct and the sampling procedure has been carried out flawlessly. The way to reduce this variability is to increase the sample size and to better stratify the universe. Note that the effects of nonsampling errors on the estimates will be discussed in the last section.

5.4 ESTIMATION RESULTS

Following the procedure described above, the SCM government fuel uses were estimated by State, by usage type, and by fuel type for years 1992, 1995, and 2000, and are presented in Tables 14, 15, and 16. The sampling errors of the estimates are presented for 1992 using the so-called estimated relative standard errors (RSE), which are defined as the estimated standard error of estimates around their mean expressed as a percentage of the estimates (see Table 14). The following observations from these tables can be made:

1. The estimated total SCM government motor fuel uses in the U.S. are 5.11, 5.29, and 5.58 billion gallons in 1992, 1995, and 2000. These estimates amount to an average annual growth

rate of about 0.9 percent between 1992 and 2000. (Note that these estimates include alternative fuels and that fuels used by highway vehicles for off-the-road travels were counted twice - in Step 1.5 and Step 2.)

2. These estimates suggest that the breakdowns of highway and nonhighway use are 86 percent and 14 percent, respectively. In addition, it indicated that the following three fuel use categories have the largest shares: (1) highway gasoline use (about 58 percent); (2) highway diesel use (about 26 percent); and (3) nonhighway diesel use (about 10 percent). The estimates also suggested that the shares of total SCM government fuel uses were about 28 percent for State governments, 30 percent for county governments, and 42 percent for municipal governments.
3. The estimated sampling errors indicated in RSEs for highway use, nonhighway use, and total use are about 8 percent, 132 percent, and 20 percent, respectively. The sampling errors for nonhighway use are very high, indicating that nonhighway use is highly variable from government to government and that the current sample size is simply too small to estimate such uses with reasonable accuracy. The uncertainty of the estimates are even higher when broken down by fuel type. Estimates of gasohol use have the largest RSEs.

5.5 QUALITY OF THE ESTIMATES

As indicated earlier, the estimated sampling errors discussed above can be reduced by increasing the sample size and, if given a large enough sample size, through better stratification by constructing models for each State or Census Division. The major limitations of this vehicle-based method are, however, on its nonsampling errors, i.e., the poor quality of the number of government-owned vehicles, especially when broken down by vehicle type and government type. In addition, the estimated fuel use includes some small portion of alternative fuels, and those fuels that were used by highway vehicles for off-the-road travels were counted twice in Step 1.5 and Step 2.

No good information was found on the amount of alternative fuels used by the SCM governments. Runzheimer's survey suggested that the amount is very small. The study team's crude estimate of the amount of alternative fuels was about 5 percent of the total fuels. We also expected the amount of fuels used by SCM government highway vehicles for off-the-road travels to be small and gave an estimate of about 5 percent of the total fuels.

Therefore, our best estimate with the vehicle-based method was to subtract 10 percent from those estimates given in Tables 14, 15, and 16. This gives an estimate of total SCM government motor fuel uses of 4.60, 4.76, and 5.02 billion gallons in 1992, 1995, and 2000. Of course, the projections for years 1995 and 2000 are assuming that the share of alternative fuels does not increase in the future (which may not be a good assumption).

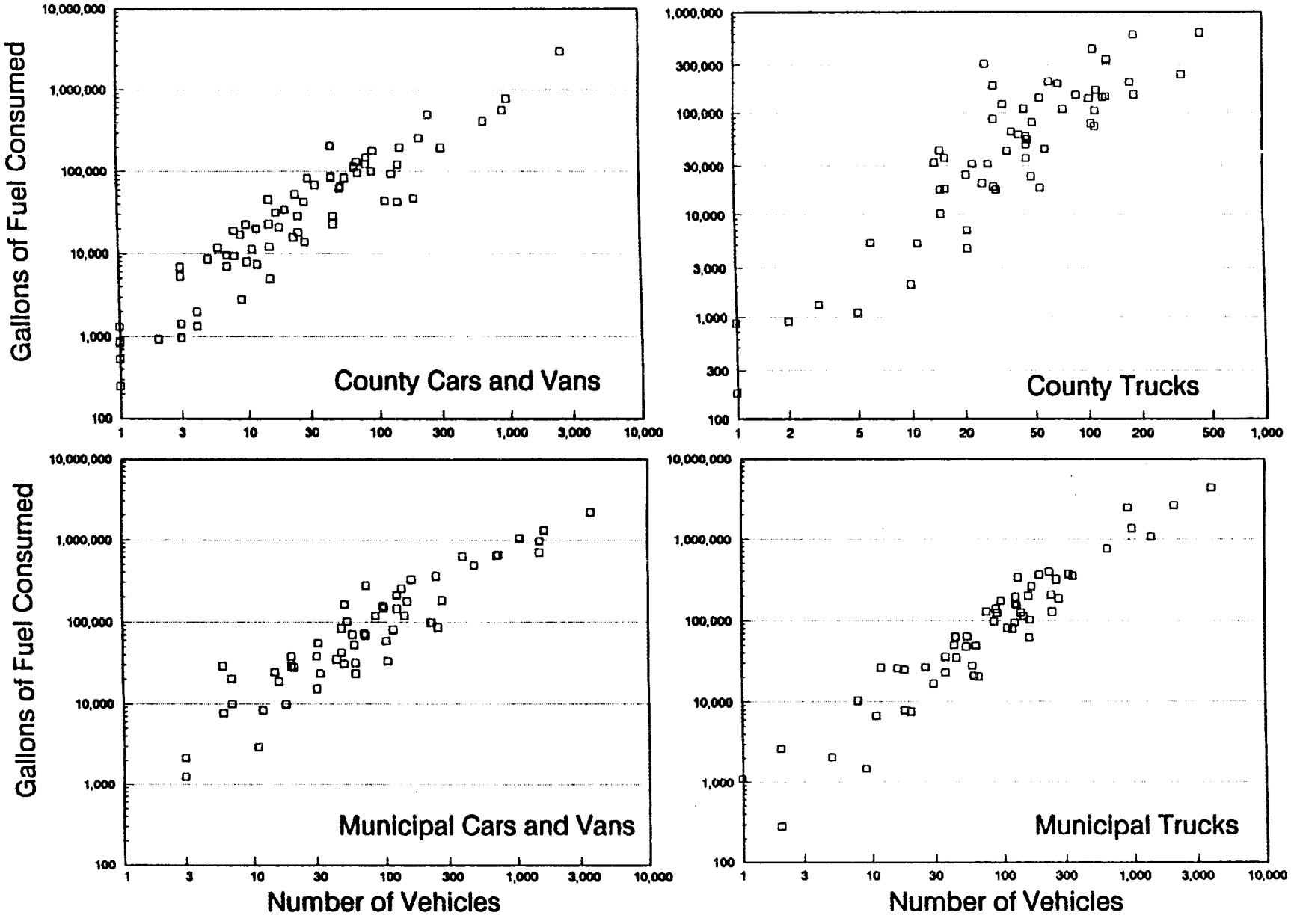

Figure 1. The relationships between fuel use and number of vehcles in log scale.

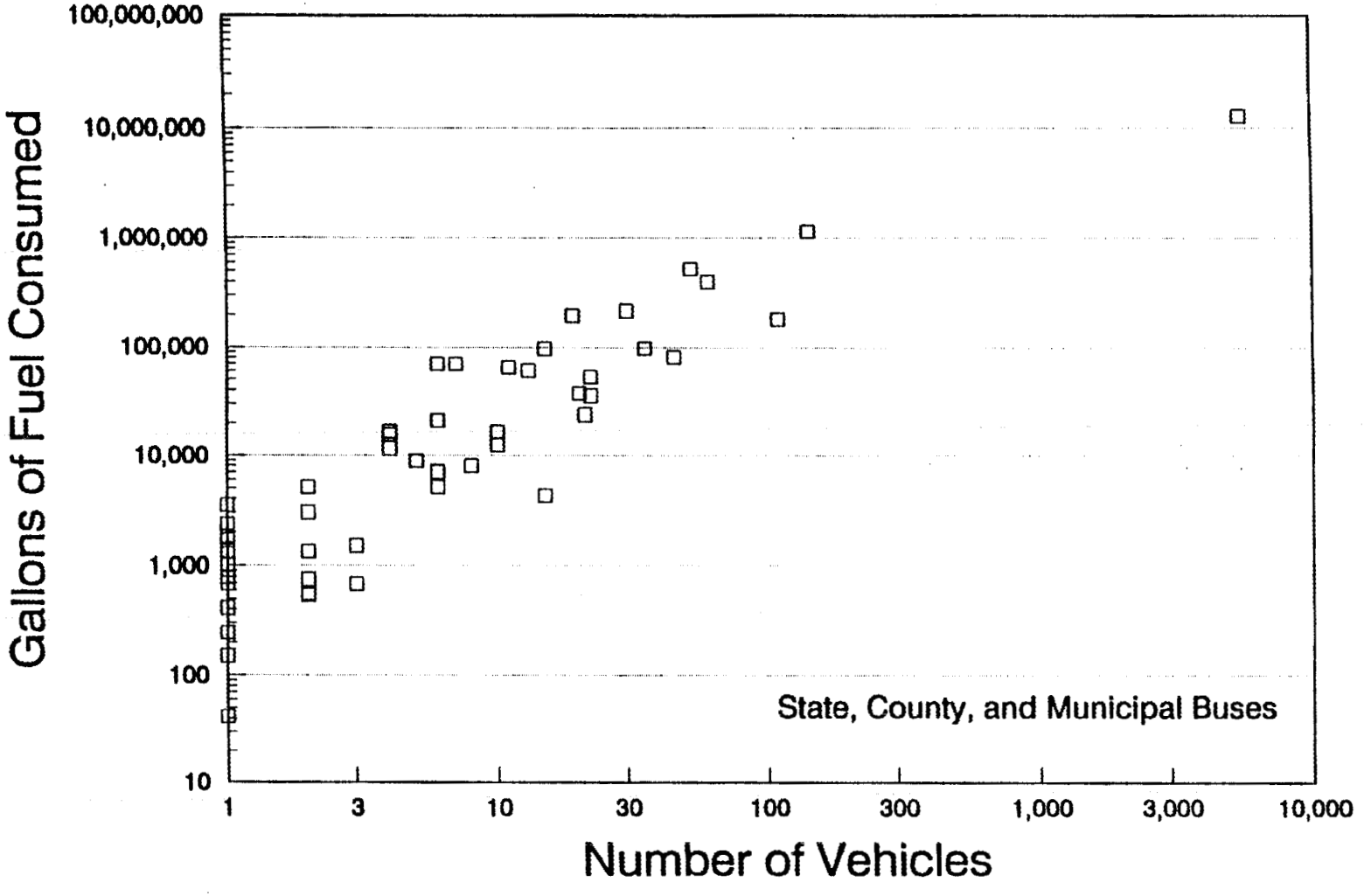

Fig 1. (Cont) Relationships between fuel use and number of vehcles in log scale.

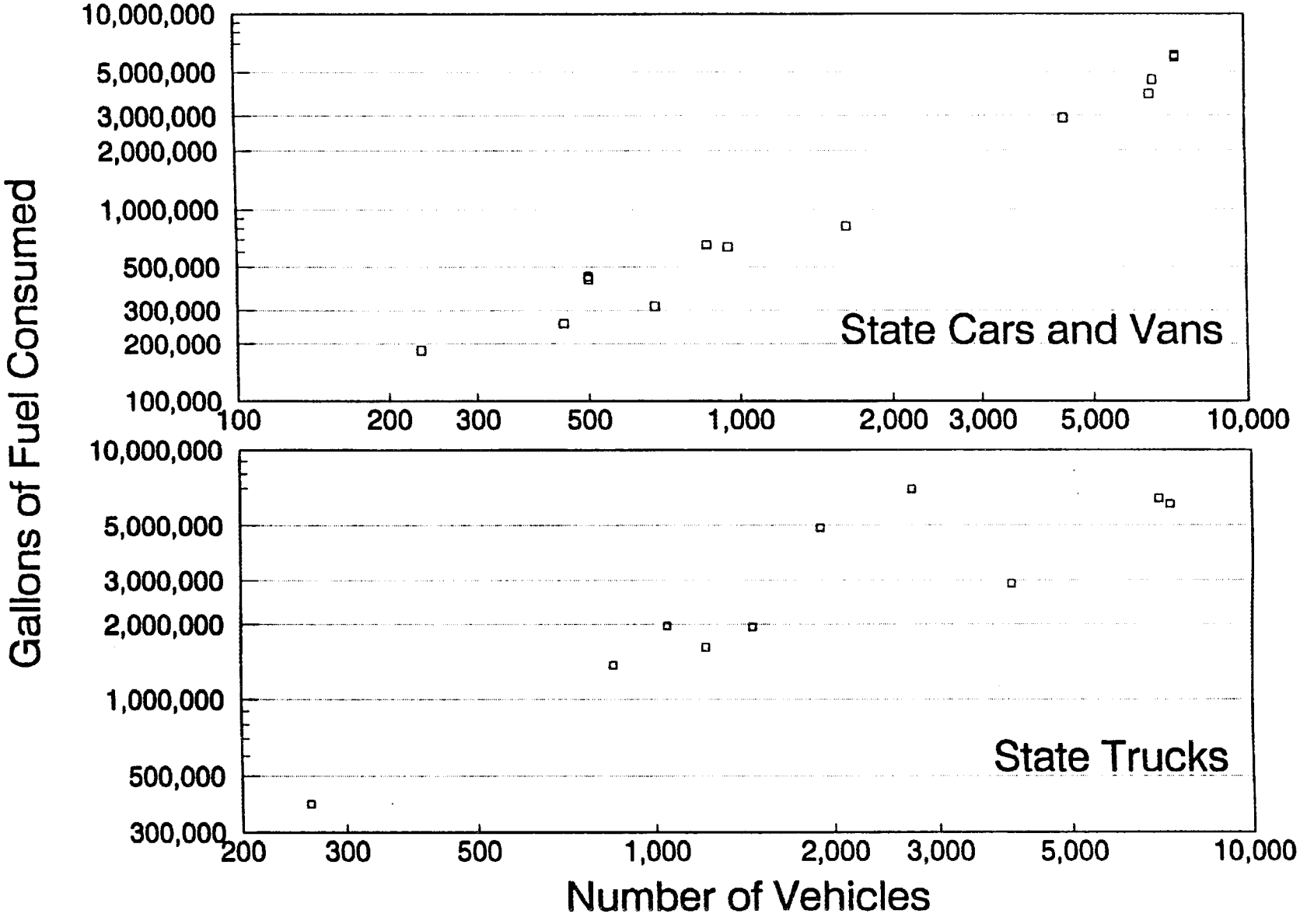

Fig 1. (Cont) Relationships between fuel use and number of vehcles in log scale.

Table 7. Data used to establish the relationship between fuel use and number of vehicles

overnment		Cars & Vans			Buses			Trucks		
	STATE	Gal/Veh	No. of Vehicles	Gal. Consumed	Gal/Veh	No. of Vehicles	Gal. Consumed	Gal/Veh	No. of Vehicles	Gal. Consumed
TATE										
ew York		594	6,500	3,858,500						
issouri		761	862	656,067	1,667	1	1,667	2,583	2,702	6,979,143
orth Dakota		671	950	637,662	1,000	8	8,000	1,613	850	1,371,429
elaware		504	1,628	820,859						
aryland		691	6,600	4,560,000						
uth Carolina		816	7,300	5,956,000	2,333	5,475	12,775,000	917	7,000	6,416,667
uisiana		663	4,404	2,921,193				732	3,960	2,899,524
izona		573	446	255,529				1,341	1,461	1,959,083
olorado		863	501	432,360				2,571	1,900	4,885,714
aho		795	232	184,480				1,888	1,048	1,979,067
ontana		894	500	447,111				1,335	1,220	1,628,942
evada		466	677	315,416	778	1	778	1,483	261	387,091
ashington		834	7,308	6,092,323						
mber of States		13	13	13	4	4	4	9	9	9
an		702	2,916	2,087,500	1,444	1,371	3,196,361	1,607	2,287	3,167,407
ndard Deviation		139	2,984	2,277,651	703	2,736	6,385,760	648	2,087	2,353,352
OUNTY										
rdostook	ME	1,714	20	34,286						
ancock	ME	3,038	15	45,577						
iscataquis	ME	2,269	3	6,807						
omerset	ME	1,861	17	31,636	2,353	1	2,353			
ssex	MA	1,249	53	66,207	229	3	686	211	10	2,109
elknap	NH	1,176	8	9,412						
ockingham	NH	1,524	28	42,667	3,889	4	15,556	480	11	5,278
rafford	NH	1,030	11	11,334	411	1	411	876	1	876
llivan	NH	617	12	7,402	42	1	42	444	3	1,333
amoille	VT	1,889	9	17,000						
ape May	NJ	1,995	249	496,786	1,250	10	12,500	1,488	115	171,067
henango	NY	4,635	45	208,553	4,667	13	60,667	3,342	62	207,233
ortland	NY	298	144	42,899				2,621	132	345,989
orest	PA	791	10	7,909						
ankakee	IL	498	46	22,890				1,391	23	32,000

Table 7. Data used to establish the relationship between fuel use and number of vehicles (continued)

Government		Cars & Vans			Buses			Trucks		
	STATE	Gal/Veh	No. of Vehicles	Gal. Consumed	Gal/Veh	No. of Vehicles	Gal. Consumed	Gal/Veh	No. of Vehicles	Gal. Consumed
Pope	IL	1,769	3	5,308						
Carroll	IN	1,528	15	22,915				1,774	38	67,418
Gogebic	MI	321	3	964				1,478	75	110,857
Cuyahoga	OH	378	116	43,900	150	1	150	224	21	4,700
Fairfield	OH	867	1	867				1,498	42	62,923
Milwaukee	WS	636	312	198,387	857	6	5,145	1,397	448	625,632
Cerro Gordo	IA	1,159	18	20,858				796	46	36,607
Delaware	IA	332	4	1,328				577	31	17,875
Woodlbury	IA	1,709	5	8,546				1,321	46	60,752
Jewell	KS	250	1	250				691	15	10,361
Sedgwick	KS	247	191	47,099				671	113	75,869
Seward	KS	1,313	1	1,313				2,297	16	36,750
Cook	MN	684	23	15,727				339	21	7,120
Hennepin	MN	1,221	213	260,022	270	2	540	1,139	179	203,881
Renville	MN	1,149	25	28,730				3,652	34	124,167
Jasper	MO	1,916	45	86,242						
Pulaski	MO	2,267	10	22,667				2,944	15	44,167
Douglas	NE	832	146	121,541				1,127	131	147,696
Morton	ND				687	1	687	340	55	18,717
Walsh	ND							6,299	30	188,961
Brown	SD	528	1	528				1,202	47	56,472
Minnehaha	SD	2,764	30	82,931				180	1	180
Prince George's	MD	1,148	2581	2,963,721	1,798	45	80,914	942	114	107,432
Mecklenberg	NC	781	998	779,785	1,608	22	35,376	1,355	105	142,246
Pitt	NC	720	130	93,614				1,147	28	32,115
Georgetown	SC	1,869	71	132,667	1,333	1	1,333	2,606	55	143,333
Kanawha	WV	1,487	83	123,455				222	5	1,111
Lewis	WV	1,668	12	20,010				457	2	914
Bourbon	KY	2,375	8	19,000				1,150	16	18,400
Hardin	KY	2,207	24	52,965				2,971	30	89,143
Jefferson	KY	635	660	418,941				815	189	154,078
Hinds	MS	1,318	152	200,400				3,202	188	601,943
Shelby	TN	606	930	563,366	1,134	21	23,814	694	350	242,968

Table 7. Data used to establish the relationship between fuel use and number of vehicles (continued)

Government		Cars & Vans			Buses			Trucks		
	STATE	Gal/Veh	No. of Vehicles	Gal. Consumed	Gal/Veh	No. of Vehicles	Gal. Consumed	Gal/Veh	No. of Vehicles	Gal. Consumed
Tangipahoa	LA	1,970	6	11,818				11,574	27	312,500
Washington	LA	500	4	2,000				1,194	21	25,083
Comal	TX	1,692	68	115,048				2,486	45	111,875
Graham	AZ	805	15	12,080				1,094	46	50,325
Mesa	CO	1,096	92	100,848				3,940	110	433,417
Lewis	ID	1,365	7	9,556						
Bingham	ID	2,030	34	69,026	3,500	1	3,500	2,833	70	198,333
Canyon	ID	1,339	72	96,378				801	26	20,833
Bannock	ID	1,887	45	84,909				1,213	36	43,650
Cascade	MT	463	2	926						
Elko	NV	476	3	1,429				1,193	15	17,900
Los Alamos	NM	725	25	18,114				749	108	80,881
Mora	NM	1,002	7	7,011				889	6	5,333
Utah	UT	1,907	95	181,190	1,000	1	1,000			
Kenai Penisula	AK	1,465	57	83,500	1,875	20	37,500	773	59	45,600
Kodiak Island	AK	314	9	2,826						
Matanuska-Susitna	AK	330	15	4,953				1,153	126	145,330
Plumas	CA	833	1	833				1,719	89	153,000
Kauai	HI	1,786	84	150,024						
Columbia	OR	494	28	13,823				494	49	24,190
Sherman	OR							2,349	14	32,885
Island	WA	1,201	52	62,431				642	30	19,273
Jefferson	WA	624	46	28,692				1,658	50	82,898
Number of Counties		68	68	68	18	18	18	57	57	57
Mean		1,258	121	124,218	1,503	9	15,676	1,634	66	105,333
Standard Deviation		788	353	376,155	1,340	12	23,609	1,760	81	134,789
MUNICIPALS										
Hartford	CT	1,578	400	631,169				738	110	81,136
Milford	CT	1,866	137	255,576	4,167	4	16,667	1,556	90	140,000
Bangor	ME	624	50	31,190	5,905	11	64,955	1,119	87	97,383
Manchester	NH	3,225	51	164,475	1,662	109	181,194	904	53	47,897
Newport	VT	1,188	16	19,000				1,389	18	25,000
Carteret	NJ	500	31	15,500	500	3	1,500	1,032	26	26,833

Table 7. Data used to establish the relationship between fuel use and number of vehicles (continued)

Government		Cars & Vans			Buses			Trucks		
	STATE	Gal/Veh	No. of Vehicles	Gal. Consumed	Gal/Veh	No. of Vehicles	Gal. Consumed	Gal/Veh	No. of Vehicles	Gal. Consumed
Guttenberg	NJ	700	12	8,400	375	2	750	417	5	2,086
North Wildwood	NJ	1,646	15	24,695				143	2	286
Aurora	IL	1,177	151	177,787				779	147	114,462
Hometown	IL	4,866	6	29,197				167	9	1,505
Hammond	IN	1,160	126	146,132				1,567	168	263,283
Lawrenceburg	IN	1,357	21	28,500				1,455	44	64,000
Middleton	OH	696	118	82,077	11,667	6	70,000			
Green Bay	WI	958	73	69,911	2,791	35	97,669	558	30	16,740
Marshfield	WI	272	11	2,995				975	37	36,067
Milwaukee	WI	973	1088	1,058,370	278	2	556	2,687	925	2,485,036
Ames	IA	1,226	58	71,100				1,358	92	124,900
Manchester	IA	1,294	6	7,763				438	18	7,877
Bloomington	MN	316	107	33,786	2,875	4	11,500	390	161	62,714
Columbia Heights	MN	719	33	23,722	244	1	244	622	37	23,009
Morris	MN				1,783	5	8,915	382	20	7,633
Normandy	MO							1,294	8	10,348
University City	MO	1,744	32	55,806	2,562	2	5,125	1,198	54	64,677
Lincoln	NE	664	278	184,576	10,000	52	520,000	688	272	187,032
Bismarck	ND	422	3	1,267				760	125	95,000
Grand Forks	ND				6,454	15	96,816			
New Castle	DE	1,441	7	10,088						
Atlanta	GA	457	1535	701,827	1,645	10	16,447	781	1387	1,083,671
Warner Robins	GA	3,739	74	276,667				1,199	130	155,879
Rocky Mount	NC	1,593	99	157,667	10,000	7	70,000	1,883	193	363,382
Hilton Head Island	SC	556	18	10,000				1,111	1	1,111
Spartanburg	SC	1,475	101	149,000	286	15	4,286	1,790	98	175,467
Tazewell	VA	2,917	7	20,417				1,633	16	26,125
Benwood	WV	729	3	2,188				1,333	2	2,667
Gasden	AL	841	144	121,072	3,510	6	21,057	1,264	159	200,996
Jeffersontown	KY	1,772	48	85,039				615	11	6,764
Louisville	KY	879	750	659,314				1,010	350	353,571
Johnson City	TN	1,440	250	360,000	6,600	60	396,000	1,712	230	393,750
Knoxville	TN	1,000	490	490,000	1,833	1	1,833	1,228	260	319,192

Table 7. Data used to establish the relationship between fuel use and number of vehicles (continued)

Government		Cars & Vans			Buses			Trucks		
	STATE	Gal/Veh	No. of Vehicles	Gal. Consumed	Gal/Veh	No. of Vehicles	Gal. Consumed	Gal/Veh	No. of Vehicles	Gal. Consumed
Maumelle	AR	1,926	20	38,529				2,222	12	26,667
Lafayette	LA	442	226	99,822	10,256	19	194,872	1,147	324	371,484
Ada	OK	1,440	20	28,800				1,705	76	129,600
Lawton	OK	2,023	163	329,829	667	2	1,333	2,552	132	336,873
Houston	TX	588	3753	2,207,647				1,098	4007	4,400,133
Kerrville	TX	809	44	35,600				475	59	28,025
Temple	TX	1,381	87	120,171				1,278	126	161,000
Yuma	AZ	1,029	71	73,065				1,537	127	195,218
Phoenix	AZ	799	1668	1,332,708	1,173	6	7,035	1,289	2073	2,672,602
Commerce	CO	1,927	53	102,143				778	45	35,000
Missoula	MT	900	48	43,213				675	120	81,055
Billings	MT	575	104	59,806	7,190	30	215,714	868	238	206,533
Kalispell	MT	1,252	31	38,800				1,167	43	50,167
Henderson	NV	1,688	126	212,667	1,500	2	3,000	905	140	126,750
Albuquerque	NM	634	1544	978,372	8,180	141	1,153,380	1,388	996	1,382,868
Juneau	AK				2,400	22	52,800			
Chino	CA	387	61	23,579	1,000	1	1,000	787	63	49,550
Sacramento	CA	881	728	641,150				1,193	641	764,585
Salem	OR	339	257	87,142				532	242	128,827
Bellevue	WA	434	231	100,283				627	164	102,762
Puyallup	WA	527	61	32,167				344	61	21,000
Tukwila	WA	889	60	53,333				311	66	20,500
Number of Municipals		57	57	57	28	28	28	57	57	57
Mean		1,208	276	224,651	3,839	20	114,809	1,071	265	322,082
Standard Deviation		858	605	390,392	3,564	33	239,042	550	619	752,105
STATE, COUNTY AND MUNICIPALS										
Number of Governments		138	138	138	50	50	50	123	123	123
Mean		1,185	448	350,648	2,807	124	325,645	1,371	320	429,832
Standard Deviation		795	1,278	950,892	3,086	773	1,806,023	1,291	881	1,112,939

Table 8. Estimated regression parameters and associated statistics using Method 1 - a vehicle-based method

Dependent Variable = log (Total Fuels Consumed by Vehicles)

Covariates and Statistics	Cars and Vans			Buses	Trucks		
	State	County	Municipal	State, County & Municipal	State	County	Municipal
Intercept α	6.5423 (17.62)	6.8568 (40.05)	7.2562 (30.80)	6.7339 (29.73)	8.7583 (8.61)	6.1877 (19.68)	6.3133 (28.83)
Log (Number of Vehicles) β	0.9989 (19.99)	1.0245 (21.84)	0.9173 (17.92)	1.3332 (14.66)	0.7990 (5.95)	1.2389 (14.91)	1.1173 (23.68)
Residual standard deviation, $\hat{\sigma}$	0.2181	0.6756	0.6174	1.0992	0.4110	0.7955	0.5814
Var ($\hat{\alpha}$)	0.1378	0.0293	0.0555	0.0513	1.0344	0.0988	0.0480
Var ($\hat{\beta}$)	0.0025	0.0022	0.0026	0.0083	0.0180	0.0069	0.0022
Cov ($\hat{\alpha}$, $\hat{\beta}$)	-0.0183	-0.0071	-0.0113	-0.0150	- 0.1354	-0.0246	-0.0097
Sample Size, n	13	68	57	50	10	57	57
Number of parameters, p	2	2	2	2	2	2	2
R^2	0.97	0.88	0.85	0.82	0.82	0.80	0.91

Note: Values in parentheses are t-statistics of the estimates above.

Table 9. Estimated regression parameters and associated statistics of the final models used in Method 1

Dependent Variable = log (Fuel Consumed per Vehicle)

Parameters and Statistics	Cars and Vans			Buses	Trucks		
	State	County	Municipal	State, County & Municipal	State	County	Municipal
Intercept α	6.5345 (117.5)	6.9354 (85.8)	6.8992 (83.9)	7.3371 (42.6)	7.2481 (55.1)	7.0393 (63.4)	6.8228 (85.5)
Residual standard deviation, $\hat{\sigma}$	0.2006	0.6669	0.6207	1.2182	0.4159	0.8381	0.6023
Var ($\hat{\alpha}$)	0.0031	0.0065	0.0068	0.0297	0.0173	0.0123	0.0064
Sample Size, n	13	68	57	50	10	57	57
Estimated Gallons per Vehicle	702.48	1,284.05	1,202.11	3,226.35	1,532.39	1,620.53	1,101.23

Note: Values in parentheses are t-statistics of the estimates above.

Table 10. Data used to estimate motor fuel uses by other vehicles presented as a fraction of total fuel uses by cars, vans, buses and trucks

			Fuel Use (gallons)					
	STATE	Division	Cars & Vans	Buses	Trucks	Subtotal	Other Vehicle	Other / Subtotal
STATE								
North Dakota		4	637,662	8,000	1,371,429	2,017,091	1,200	0.0006
Idaho		8	184,480	0	1,979,067	2,163,547	20,000	0.0092
COUNTY								
Ardostook	ME	1	34,286	0	0	34,286	0	0.0000
Piscataquis	ME	1	6,807	0	0	6,807	0	0.0000
Somerset	ME	1	31,636	2,353	0	33,989	0	0.0000
Belknap	NH	1	9,412	0	0	9,412	0	0.0000
Rockingham	NH	1	42,667	15,556	5,278	63,500	0	0.0000
Strafford	NH	1	11,334	411	876	12,621	0	0.0000
Lamoille	VT	1	17,000	0	0	17,000	0	0.0000
Cape May	NJ	2	496,786	12,500	171,067	680,352	40,667	0.0598
Cortland	NY	2	42,899	0	345,989	388,889	0	0.0000
Forest	PA	2	7,909	0	0	7,909	0	0.0000
Kankakee	IL	3	22,890	0	32,000	54,890	833	0.0152
Carroll	IN	3	22,915	0	67,418	90,333	0	0.0000
Gogebic	MI	3	964	0	110,857	111,821	0	0.0000
Cuyahoga	OH	3	43,900	150	4,700	48,750	0	0.0000
Fairfield	OH	3	867	0	62,923	63,790	0	0.0000
Milwaukee	WI	3	198,387	5,145	625,632	829,164	14,125	0.0170
Jewell	KS	4	250	0	10,361	10,611	0	0.0000
Sedgwick	KS	4	47,099	0	75,869	122,968	7,670	0.0624
Cook	MN	4	15,727	0	7,120	22,847	0	0.0000
Hennepin	MN	4	260,022	540	203,881	464,443	0	0.0000
Douglas	NE	4	121,541	0	147,696	269,237	0	0.0000
Walsh	ND	4	0	0	188,961	188,961	0	0.0000
Pitt	NC	5	93,614	0	32,115	125,729	0	0.0000
Kanawha	WV	5	123,455	0	1,111	124,566	0	0.0000
Bourbon	KY	6	19,000	0	18,400	37,400	0	0.0000
Jefferson	KY	6	418,941	0	154,078	573,019	0	0.0000
Hinds	MS	6	200,400	0	601,943	802,343	43,920	0.0547
Shelby	TN	6	563,366	23,814	242,968	830,147	0	0.0000

Table 10. Data used to estimate motor fuel uses by other vehicles presented as a fraction of total fuel uses by cars, vans, buses and trucks (continued)

			Fuel Use (gallons)					
	STATE	Division	Cars & Vans	Buses	Trucks	Subtotal	Other Vehicle	Other / Subtotal
Tangipahoa	LA	7	11,818	0	312,500	324,318	0	0.0000
Comal	TX	7	115,048	0	111,875	226,923	0	0.0000
Mesa	CO	8	100,848	0	433,417	534,265	0	0.0000
Bingham	ID	8	69,026	3,500	198,333	270,859	1,000	0.0037
Canyon	ID	8	96,378	0	20,833	117,211	0	0.0000
Cascade	MT	8	926	0	0	926	0	0.0000
Matanuska-Susitna	AK	9	4,953	0	145,330	150,283	0	0.0000
Plumas	CA	9	833	0	153,000	153,833	7,500	0.0488
MUNICIPALS								
Bangor	ME	1	31,190	64,955	97,383	193,528	15,000	0.0775
Newport	VT	1	19,000	0	25,000	44,000	120	0.0027
Carteret	NJ	2	15,500	1,500	26,833	43,833	0	0.0000
Guttenberg	NJ	2	8,400	750	2,086	11,236	50	0.0045
North Wildwood	NJ	2	24,695	0	286	24,980	0	0.0000
Hometown	IL	3	29,197	0	1,505	30,703	38	0.0012
Hammond	IN	3	146,132	0	263,283	409,415	0	0.0000
Lawrenceburg	IN	3	28,500	0	64,000	92,500	0	0.0000
Milwaukee	WI	3	1,058,370	556	2,485,036	3,543,962	129,829	0.0366
Columbia Heights	MN	4	23,722	244	23,009	46,975	0	0.0000
Morris	MN	4	0	8,915	7,633	16,549	0	0.0000
University City	MO	4	55,806	5,125	64,677	125,608	13,434	0.1070
Lincoln	NE	4	184,576	520,000	187,032	891,607	0	0.0000
Grand Forks	ND	4	0	96,816	0	96,816	0	0.0000
New Castle	DE	5	10,088	0	0	10,088	0	0.0000
Hilton Head Island	SC	5	10,000	0	1,111	11,111	0	0.0000
Spartanburg	SC	5	149,000	4,286	175,467	328,752	0	0.0000
Tazewell	VA	5	20,417	0	26,125	46,542	0	0.0000
Louisville	KY	6	659,314	0	353,571	1,012,885	120,000	0.1185
Johnson City	TN	6	360,000	396,000	393,750	1,149,750	45,000	0.0391
Knoxville	TN	6	490,000	1,833	319,192	811,025	16,667	0.0206
Lawton	OK	7	329,829	1,333	336,873	668,035	91	0.0001
Kerrville	TX	7	35,600	0	28,025	63,625	267	0.0042

Table 10. Data used to estimate motor fuel uses by other vehicles presented as a fraction of total fuel uses by cars, vans, buses and trucks (continued)

			Fuel Use (gallons)					
	STATE	Division	Cars & Vans	Buses	Trucks	Subtotal	Other Vehicle	Other / Subtotal
Temple	TX	7	120,171	0	161,000	281,171	4,500	0.0160
Phoenix	AZ	8	1,332,708	7,035	2,672,602	4,012,345	33,965	0.0085
Commerce	CO	8	102,143	0	35,000	137,143	4,286	0.0313
Billings	MT	8	59,806	215,714	206,533	482,053	0	0.0000
Kalispell	MT	8	38,800	0	50,167	88,967	800	0.0090
Albuquerque	NM	8	978,372	1,153,380	1,382,868	3,514,620	138,083	0.0393
Salem	OR	9	87,142	0	128,827	215,969	25,267	0.1170
Tukwila	WA	9	53,333	0	20,500	73,833	15,000	0.2032
Number of Governments								**69**
Mean								**0.0161**
Standard Deviation								**0.0363**

Table 11. Data used to estimate shares of highway and non-highway uses

Government	State	Division	Total Fuel Use		Fuel Use in Percent		Non-highway Use/Highway Use	Population	Land Area
			Highway	Non-highway	Highway	Non-highway			
STATE									
Michigan		3	3,576,650	0	100	0	0.00%	9,353,993	58,527
Delaware		5	2,170,270	980,820	69	31	45.19%	675,868	2,044
Maryland		5	6,720,000	280,000	96	4	4.17%	4,885,979	10,460
Arizona		8	3,156,865	284,926	92	8	9.03%	3,849,552	114,000
Montana		8	2,169,343	0	100	0	0.00%	811,312	147,046
Utah		8	6,455,000	453,000	93	7	7.02%	1,793,941	84,899
Alaska		9	2,588,000	0	100	0	0.00%	547,218	591,004
Number of States			7	7	7	7	7	7	7
Mean			3,833,733	285,535	93	7	9.34%	3,131,123	143,997
Standard Deviation			1,949,999	354,985	11	11	0.16	3,219,581	203,922
COUNTY									
Ardostook	ME	1	29,428	0	100	0	0.00%	87,212	6,721
Piscataquis	ME	1	97,670	0	100	0	0.00%	18,944	3,986
Somerset	ME	1	36,923	0	100	0	0.00%	50,748	3,930
Essex	MA	1	65,255	1,721	97	3	2.64%	680,246	495
Rockingham	NH	1	47,905	3,402	93	7	7.10%	259,445	699
Sullivan	NH	1	6,089	1,309	82	18	21.50%	39,607	540
Cortland	NY	2	218,265	29,235	88	12	13.39%	49,498	500
Pope	IL	3	26,187	0	100	0	0.00%	4,365	374
Stephenson	IL	3	60,071	5,875	91	9	9.78%	47,952	564
Orange	IN	3	47,900	19,000	72	28	39.67%	18,537	408
Gogebic	MI	3	111,931	28,742	80	20	25.68%	17,879	1,105
Cuyahoga	OH	3	104,975	5,525	95	5	5.26%	1,401,222	459
Langlade	WI	3	150,685	64,197	70	30	42.60%	19,579	873
Milwaukee	WI	3	923,748	107,927	90	10	11.68%	958,008	241
Washington	WI	3	87,856	17,472	83	17	19.89%	14,103	815
Delaware	IA	4	48,823	2,834	95	5	5.80%	18,074	578
Woodbury	IA	4	333,858	69,232	83	17	20.74%	97,931	873
Sedgwick	KS	4	400,039	171,516	70	30	42.87%	409,864	1,007
Cook	MN	4	49,917	30,800	62	38	61.70%	3,926	1,412
Renville	MN	4	75,000	38,000	66	34	50.67%	17,756	984
Jasper	MS	4	61,000	18,000	77	23	29.51%	91,670	641
Douglas	NE	4	271,431	36,589	88	12	13.48%	420,505	333
Cass	ND	4	112,271	0	100	0	0.00%	105,183	1,767
Morton	ND	4	124,938	0	100	0	0.00%	24,350	1,921
Walsh	ND	4	48,021	2,528	95	5	5.26%	13,836	1,290
Prince George's	MI	5	4,673,946	178,845	96	4	3.83%	738,388	487

Table 11. Data used to estimate shares of highway and non-highway uses (continued)

Government	State	Division	Total Fuel Use		Fuel Use in Percent		Non-highway Use/Highway Use	Population	Land Area
			Highway	Non-highway	Highway	Non-highway			
Dare	NC	5	251,295	23,599	91	9	9.39%	23,793	391
Haywood	NC	5	82,071	19,200	81	19	23.39%	47,655	555
Mecklenberg	NC	5	840,000	0	100	0	0.00%	523,315	528
Pitt	NC	5	191,872	39,000	83	17	20.33%	110,897	657
Georgetown	SC	5	104,236	97,834	52	48	93.86%	47,710	822
Sumter	SC	5	293,262	39,054	88	12	13.32%	104,728	665
Fairfax	VA	5	6,080,424	212,846	97	3	3.50%	853,600	394
Page	VA	5	27,344	12,965	68	32	47.41%	22,254	313
Wood	WV	5	39,401	3,500	92	8	8.88%	86,854	367
Bourbon	KY	6	34,115	2,449	93	7	7.18%	19,350	292
Hardin	KY	6	74,204	31,854	70	30	42.93%	90,762	629
Jefferson	KY	6	1,114,800	45,200	96	4	4.05%	661,653	386
Hinds	MS	6	337,623	147,132	70	30	43.58%	257,203	875
Roane	TN	6	245,840	16,036	94	6	6.52%	48,270	357
Tangipahoa	LA	7	97,876	107,275	48	52	109.60%	87,056	783
Washington	LA	7	61,000	0	100	0	0.00%	43,110	676
Comal	TX	7	197,245	0	100	0	0.00%	54,854	555
Gila	AZ	8	132,311	38,423	77	23	29.04%	41,008	4,752
Mesa	CO	8	266,517	0	100	0	0.00%	97,572	3,309
Bingham	ID	8	215,860	24,000	90	10	11.12%	38,069	2,096
Canyon	ID	8	114,700	2,500	98	2	2.18%	92,229	584
Shoshone	ID	8	86,343	14,450	86	14	16.74%	13,663	2,641
Kenai Penisula	AK	9	131,500	1,500	99	1	1.14%	43,571	16,056
Matanuska-Susit	AK	9	55,137	0	100	0	0.00%	39,388	24,502
Los Angeles	CA	9	3,066,000	779,714	80	20	25.43%	9,065,967	4,070
Plumas	CA	9	124,076	65,642	65	35	52.90%	20,405	2,573
Columbia	OR	9	55,292	0	100	0	0.00%	38,453	651
Sherman	OR	9	40,669	1,690	96	4	4.16%	1,924	827
Jefferson	WA	9	52,385	60,315	46	54	115.14%	21,464	1,805
Number of Counties			55	55	55	55	55	55	55
Mean			411,410	47,617	86	14	20.45%	331,011	1,929
Standard Deviation			1,078,963	112,005	14	14	0.27	1,233,099	3,914
MUNICIPALS									
Hartford	CT	1	366,000	0	100	0	0.00%	144,255	
Bangor	ME	1	248,253	33,068	88	12	13.32%	32,437	
Laconia	NH	1	93,750	31,250	75	25	33.33%	18,107	
Newport	VT	1	39,500	4,000	91	9	10.13%	4,623	
Carteret	NJ	2	80,000	0	100	0	0.00%	20,822	

Table 11. Data used to estimate shares of highway and non-highway uses (continued)

Government	State	Division	Total Fuel Use		Fuel Use in Percent		Non-highway Use/Highway Use	Population	Land Area
			Highway	Non-highway	Highway	Non-highway			
North Wildwood	NJ	2	24,988	0	100	0	0.00%	5,294	
Reading	PA	2	59,237	10,948	84	16	18.48%	82,192	
Aurora	IL	3	356,283	14,272	96	4	4.01%	93,326	
Lasalle	IL	3	9,900	0	100	0	0.00%	9,634	
Hammond	IN	3	352,359	19,186	95	5	5.45%	82,897	
Lawrenceburg	IN	3	48,011	3,830	93	7	7.98%	5,329	
Middleton	OH	3	190,196	9,577	95	5	5.04%	50,407	
Green Bay	WI	3	749,963	80,306	90	10	10.71%	99,240	
Milwaukee	WI	3	1,628,250	28,984	98	2	1.78%	622,002	
Manchester	IA	4	13,639	4,256	76	24	31.20%	4,613	
Ulysses	KS	4	25,240	1,185	96	4	4.69%	5,116	
Bloomington	MN	4	199,262	43,043	82	18	21.60%	90,872	
Columbia Heights	MN	4	51,870	5,427	91	9	10.46%	22,139	
Normandy	MO	4	29,194	444	99	1	1.52%	5,011	
University City	MO	4	136,310	48,802	74	26	35.80%	42,499	
Lincoln	NE	4	973,757	63,150	94	6	6.49%	192,447	
Bismarck	ND	4	53,449	16,701	76	24	31.25%	50,065	
New Castle	DE	5	13,168	219	98	2	1.66%	5,294	
Atlanta	GA	5	2,045,834	982,358	68	32	48.02%	443,667	
Warner Robins	GA	5	269,896	37,503	88	12	13.90%	47,920	
Fayetteville	NC	5	259,088	15,529	94	6	5.99%	81,506	
Rocky Mount	NC	5	276,500	31,000	90	10	11.21%	52,614	
Spartanburg	SC	5	224,110	10,885	95	5	4.86%	48,007	
Tazewell	VA	5	29,775	1,437	95	5	4.83%	4,451	
Benwood	WV	5	11,193	0	100	0	0.00%	1,721	
Enterprise	AL	6	133,555	16,989	89	11	12.72%	19,936	
Jeffersontown	KY	6	35,150	2,706	93	7	7.70%	19,145	
Biloxi	MS	6	9,170	7,330	56	44	79.93%	46,024	
Johnson City	TN	6	752,052	68,000	92	8	9.04%	44,939	
Knoxville	TN	6	707,000	33,000	96	4	4.67%	179,408	
Fort Smith	AR	7	160,000	40,000	80	20	25.00%	75,771	
Maumelle	AR	7	34,632	3,679	90	10	10.62%	4,807	
Lafayette	LA	7	686,466	34,644	95	5	5.05%	88,271	
Ada	OK	7	110,000	37,000	75	25	33.64%	16,929	
Lawton	OK	7	292,000	108,000	73	27	36.99%	77,106	
Kerrville	TX	7	69,000	10,800	86	14	15.65%	21,174	
Temple	TX	7	269,998	36,531	88	12	13.53%	51,911	
Yuma	AZ	8	195,850	24,150	89	11	12.33%	58,856	

Table 11. Data used to estimate shares of highway and non-highway uses (continued)

Government	State	Division	Total Fuel Use		Fuel Use in Percent		Non-highway Use/Highway Use	Population	Land Area
			Highway	Non-highway	Highway	Non-highway			
Phoenix	AZ	8	4,326,245	565,013	88	12	13.06%	1,059,637	
Commerce	CO	8	71,000	8,000	90	10	11.27%	16,886	
Elko	NV	8	76,209	0	100	0	0.00%	18,525	
Henderson	NV	8	220,000	20,000	92	8	9.09%	64,408	
Las Vegas	NM	8	128,026	6,872	95	5	5.37%	16,164	
Albuquerque	NM	8	3,046,041	39,183	99	1	1.29%	386,946	
Juneau	AK	9	205,467	19,985	91	9	9.73%	25,186	
Medford	OR	9	154,000	7,000	96	4	4.55%	47,156	
Bellevue	WA	9	305,000	15,000	95	5	4.92%	91,981	
Puyallup	WA	9	70,325	2,633	96	4	3.74%	22,170	
Tukwila	WA	9	78,752	15,884	83	17	20.17%	5,430	
Number of Municipals			54	54	54	54	54	54	
Mean			388,795	48,514	90	10	12.85%	89,394	
Standard Deviation			765,538	150,818	9	9	0.15	175,202	
STATE, COUNTY AND MUNICIPALS									
Number of Governments			116	116	116	116	116	116	62
Mean			607,401	62,392	88	12	16.24%	387,506	17,969
Standard Deviation			1,299,826	161,784	12	12	0.21	1,330,565	78,476

Table 12. Data used to estimate shares of highway fuel use by fuel type

Government	State	Division	Highway Fuel Use			Highway use in Percent		
			Gasoline	Gasohol	Diesel	Gasoline	Gasohol	Diesel
STATE								
Michigan		3	3,506,650	0	70,000	98.04	0.00	1.96
Delaware		5	1,708,861	0	461,409	78.74	0.00	21.26
Maryland		5	5,445,000	0	1,275,000	81.03	0.00	18.97
South Carolina		5	18,366,500	0	6,233,000	74.66	0.00	25.34
Arizona		8	1,781,138	365,536	1,010,191	56.42	11.58	32.00
Montana		8	1,111,260	0	1,058,083	51.23	0.00	48.77
Utah		8	3,825,000	0	2,630,000	59.26	0.00	40.74
Alaska		9	1,053,000	0	1,535,000	40.69	0.00	59.31
Number of States			8	8	8	8	8	8
Mean			4,599,676	45,692	1,784,085	67.51	1.45	31.04
Standard Deviation			5,770,414	129,236	1,950,940	18.78	4.09	18.24
COUNTY								
Ardostook	ME	1	29,428	0	0	100.00	0.00	0.00
Piscataquis	ME	1	97,670	0	0	100.00	0.00	0.00
Somerset	ME	1	36,923	0	0	100.00	0.00	0.00
Essex	MA	1	65,255	0	0	100.00	0.00	0.00
Belknap	NH	1	8,325	0	0	100.00	0.00	0.00
Rockingham	NH	1	47,905	0	0	100.00	0.00	0.00
Sullivan	NH	1	6,089	0	0	100.00	0.00	0.00
Cortland	NY	2	134,640	0	83,625	61.69	0.00	38.31
Pope	IL	3	26,187	0	0	100.00	0.00	0.00
Stephenson	IL	3	46,391	0	13,680	77.23	0.00	22.77
Carroll	IN	3	48,211	0	40,634	54.26	0.00	45.74
Orange	IN	3	39,000	0	8,900	81.42	0.00	18.58
Gogebic	MI	3	28,639	0	83,292	25.59	0.00	74.41
Cuyahoga	OH	3	88,825	16,150	0	84.62	15.38	0.00
Langlade	WI	3	48,099	0	102,586	31.92	0.00	68.08
Milwaukee	WI	3	614,313	0	309,435	66.50	0.00	33.50
Washington	WI	3	16,498	0	71,358	18.78	0.00	81.22
Delaware	IA	4	389	8,729	39,705	0.80	17.88	81.32
Woodbury	IA	4	0	61,179	272,679	0.00	18.32	81.68
Sedgwick	KS	4	2,138	0	169,378	1.25	0.00	98.75
Cook	MN	4	30,917	0	19,000	61.94	0.00	38.06
Renville	MN	4	0	15,000	60,000	0.00	20.00	80.00
Jasper	MO	4	55,000	0	6,000	90.16	0.00	9.84
Pulaski	MO	4	22,670	0	0	100.00	0.00	0.00
Douglas	NE	4	0	175,167	96,264	0.00	64.53	35.47

Table 12. Data used to estimate shares of highway fuel use by fuel type (continued)

Government	State	Division	Highway Fuel Use			Highway use in Percent		
			Gasoline	Gasohol	Diesel	Gasoline	Gasohol	Diesel
Cass	ND	4	0	11,200	101,071	0.00	9.98	90.02
Morton	ND	4	15,746	0	109,192	12.60	0.00	87.40
Walsh	ND	4	12,762	0	35,259	26.58	0.00	73.42
Prince George's	DE	5	2,935,196	0	1,738,750	62.80	0.00	37.20
Dare	NC	5	93,323	0	157,973	37.14	0.00	62.86
Haywood	NC	5	66,149	0	15,922	80.60	0.00	19.40
Mecklenberg	NC	5	0	714,000	126,000	0.00	85.00	15.00
Pitt	NC	5	174,239	0	17,633	90.81	0.00	9.19
Georgetown	SC	5	80,578	0	23,658	77.30	0.00	22.70
Sumter	SC	5	259,504	0	33,758	88.49	0.00	11.51
Fairfax	VA	5	2,519,976	0	3,560,448	41.44	0.00	58.56
Page	VA	5	27,344	0	0	100.00	0.00	0.00
Lewis	WV	5	16,060	0	4,320	78.80	0.00	21.20
Wood	WV	5	39,401	0	0	100.00	0.00	0.00
Bourbon	KY	6	33,425	0	690	97.98	0.00	2.02
Hardin	KY	6	66,143	0	8,061	89.14	0.00	10.86
Jefferson	KY	6	1,029,000	0	85,800	92.30	0.00	7.70
Hinds	MS	6	321,676	0	15,947	95.28	0.00	4.72
Roane	TN	6	203,805	0	42,035	82.90	0.00	17.10
Tangipahoa	LA	7	55,201	0	42,675	56.40	0.00	43.60
Washington	LA	7	42,000	0	19,000	68.85	0.00	31.15
Comal	TX	7	172,045	0	25,200	87.22	0.00	12.78
Gila	AZ	8	73,843	0	58,468	55.81	0.00	44.19
Logan	CO	8	8,000	0	0	100.00	0.00	0.00
Mesa	CO	8	121,517	0	145,000	45.59	0.00	54.41
Bingham	ID	8	72,910	0	142,950	33.78	0.00	66.22
Canyon	ID	8	114,700	0	0	100.00	0.00	0.00
Bannock	ID	8	45,000	0	12,000	78.95	0.00	21.05
Shoshone	ID	8	28,543	0	57,800	33.06	0.00	66.94
Kenai Penisula	AK	9	106,000	0	25,500	80.61	0.00	19.39
Kodiak Island	AK	9	1,798	0	0	100.00	0.00	0.00
Matanuska-Susitna	AK	9	50,552	0	4,585	91.68	0.00	8.32
Los Angeles	CA	9	2,070,000	0	996,000	67.51	0.00	32.49
Plumas	CA	9	65,738	0	58,338	52.98	0.00	47.02
Columbia	OR	9	24,782	0	30,510	44.82	0.00	55.18
Sherman	OR	9	10,594	0	30,075	26.05	0.00	73.95
Jefferson	WA	9	49,500	0	2,885	94.49	0.00	5.51
Number of Counties			**62**	**62**	**62**	**62**	**62**	**62**

Table 12. Data used to estimate shares of highway fuel use by fuel type (continued)

Government	State	Division	Highway Fuel Use			Highway use in Percent		
			Gasoline	Gasohol	Diesel	Gasoline	Gasohol	Diesel
Mean			201,622	16,152	146,839	64.97	5.73	31.30
Standard Deviation			552,097	93,101	507,862	34.11	13.96	30.16
MUNICIPALS								
Ansonia	CT	1	57,508	0	0	100.00	0.00	0.00
Hartford	CT	1	228,000	0	138,000	62.30	0.00	37.70
Bangor	ME	1	86,739	0	161,514	34.94	0.00	65.06
Newport	VT	1	34,500	0	5,000	87.34	0.00	12.66
Carteret	NJ	2	55,000	0	25,000	68.75	0.00	31.25
North Wildwood	NJ	2	24,962	0	26	99.90	0.00	0.10
Reading1	PA	2	45,484	0	13,753	76.78	0.00	23.22
Aurora	IL	3	279,103	0	77,180	78.34	0.00	21.66
Lasalle	IL	3	3,500	0	6,400	35.35	0.00	64.65
Hammond	IN	3	201,488	0	150,871	57.18	0.00	42.82
Lawrenceburg	IN	3	36,700	0	11,311	76.44	0.00	23.56
Middleton	OH	3	111,039	0	79,157	58.38	0.00	41.62
Green Bay	WI	3	302,688	0	447,275	40.36	0.00	59.64
Milwaukee	WI	3	686,649	0	941,601	42.17	0.00	57.83
Manchester	IA	4	12,620	0	1,019	92.53	0.00	7.47
Ulysses	KS	4	0	15,662	9,578	0.00	62.05	37.95
Bloomington	MN	4	151,083	0	48,179	75.82	0.00	24.18
Columbia Heights	MN	4	44,483	0	7,387	85.76	0.00	14.24
Normandy	MO	4	25,702	0	3,492	88.04	0.00	11.96
University City	MO	4	106,220	0	30,090	77.93	0.00	22.07
Lincoln	NE	4	460,607	0	513,150	47.30	0.00	52.70
Bismarck	ND	4	38,790	0	14,659	72.57	0.00	27.43
Dickinson	ND	4	7,805	0	0	100.00	0.00	0.00
New Castle	DE	5	9,968	0	3,200	75.70	0.00	24.30
Atlanta	GA	5	1,502,202	0	543,632	73.43	0.00	26.57
Warner Robins	GA	5	193,342	0	76,554	71.64	0.00	28.36
Fayetteville	NC	5	143,612	0	115,476	55.43	0.00	44.57
Rocky Mount	NC	5	116,500	0	160,000	42.13	0.00	57.87
Spartanburg	SC	5	154,529	0	69,581	68.95	0.00	31.05
Woodruff	SC	5	22,081	0	8,357	72.54	0.00	27.46
Tazewell	VA	5	24,221	0	5,554	81.35	0.00	18.65
Benwood	WV	5	10,193	0	1,000	91.07	0.00	8.93
Enterprise	AL	6	83,091	0	50,464	62.21	0.00	37.79
Jeffersontown	KY	6	35,150	0	0	100.00	0.00	0.00
Biloxi	MS	6	5,520	0	3,650	60.20	0.00	39.80

Table 12. Data used to estimate shares of highway fuel use by fuel type (continued)

Government	State	Division	Highway Fuel Use			Highway use in Percent		
			Gasoline	Gasohol	Diesel	Gasoline	Gasohol	Diesel
Johnson City	TN	6	370,152	0	381,900	49.22	0.00	50.78
Knoxville	TN	6	523,000	0	184,000	73.97	0.00	26.03
Fort Smith	AR	7	90,000	0	70,000	56.25	0.00	43.75
Maumelle	AR	7	34,438	0	194	99.44	0.00	0.56
Lafayette	LA	7	439,384	0	247,082	64.01	0.00	35.99
Ada	OK	7	85,000	0	25,000	77.27	0.00	22.73
Lawton	OK	7	220,000	0	72,000	75.34	0.00	24.66
Kerrville	TX	7	69,000	0	0	100.00	0.00	0.00
Temple	TX	7	172,998	0	97,000	64.07	0.00	35.93
Yuma	AZ	8	115,000	0	80,850	58.72	0.00	41.28
Phoenix	AZ	8	1,016,130	1,944,204	1,365,911	23.49	44.94	31.57
Commerce	CO	8	48,000	0	23,000	67.61	0.00	32.39
Missoula	MT	8	68,055	0	40,554	62.66	0.00	37.34
Elko	NV	8	54,207	0	22,002	71.13	0.00	28.87
Henderson	NV	8	200,000	0	20,000	90.91	0.00	9.09
Las Vegas	NM	8	89,082	0	38,944	69.58	0.00	30.42
Albuquerque	NM	8	1,898,194	0	1,147,847	62.32	0.00	37.68
Juneau	AK	9	104,279	0	101,188	50.75	0.00	49.25
Medford	OR	9	119,700	0	34,300	77.73	0.00	22.27
Bellevue	WA	9	240,000	0	65,000	78.69	0.00	21.31
Puyallup	WA	9	51,286	0	19,039	72.93	0.00	27.07
Tukwila	WA	9	51,354	0	27,398	65.21	0.00	34.79
Number of Municipals			57	57	57	57	57	57
Mean			199,304.18	34,384	136,585	68.84	1.88	29.28
Standard Deviation			343,588.28	257,487	273,574	20.15	10.06	16.79
STATE, COUNTY AND MUNICIPALS								
Number of Governments			127	127	127	127	127	127
Mean			477,624	26,195	245,370	66.87	2.75	30.38
Standard Deviation			1,789,283	186,266	728,040	27.69	11.89	24.19

Table 13. Data used to estimate shares of non-highway fuel use by fuel type

Government	State	Division	Non-highway Fuel Use			Non-highway use in Percent		
			Gasoline	Gasohol	Diesel	Gasoline	Gasohol	Diesel
STATE								
Delaware		5	732,369	0	248,451	74.67	0.00	25.33
Maryland		5	55,000	0	225,000	19.64	0.00	80.36
Arizona		8	0	0	284,926	0.00	0.00	100.00
Utah		8	23,000	0	430,000	5.08	0.00	94.92
Number of States			4	4	4	4	4	4
Mean			202,592	0	297,094	24.85	0.00	75.15
Standard Deviation			353,904	0	91,971	34.24	0.00	34.24
COUNTY								
Essex	MA	1	1,721	0	0	100.00	0.00	0.00
Rockingham	NH	1	300	0	3,102	8.82	0.00	91.18
Sullivan	NH	1	0	0	1,309	0.00	0.00	100.00
Cortland	NY	2	1,360	0	27,875	4.65	0.00	95.35
Stephenson	IL	3	5,155	0	720	87.74	0.00	12.26
Orange	IN	3	0	0	19,000	0.00	0.00	100.00
Gogebic	MI	3	1,374	0	27,368	4.78	0.00	95.22
Cuyahoga	OH	3	4,675	850	0	84.62	15.38	0.00
Langlade	WI	3	2,235	0	61,962	3.48	0.00	96.52
Milwaukee	WI	3	107,927	0	0	100.00	0.00	0.00
Washington	WI	3	2,768	0	14,704	15.84	0.00	84.16
Delaware	IA	4	8	0	2,826	0.28	0.00	99.72
Woodbury	IA	4	0	0	69,232	0.00	0.00	100.00
Sedgwick	KS	4	308,476	0	91,563	77.11	0.00	22.89
Cook	MN	4	0	0	30,800	0.00	0.00	100.00
Renville	MN	4	0	8,000	30,000	0.00	21.05	78.95
Jasper	MS	4	0	0	18,000	0.00	0.00	100.00
Pulaski	MS	4	25,941	0	69,995	27.04	0.00	72.96
Douglas	NE	4	0	502	36,087	0.00	1.37	98.63
Walsh	ND	4	672	0	1,856	26.58	0.00	73.42
Prince George's	MD	5	3,000	0	175,845	1.68	0.00	98.32
Dare	NC	5	0	0	23,599	0.00	0.00	100.00
Haywood	NC	5	0	0	19,200	0.00	0.00	100.00
Pitt	NC	5	0	0	39,000	0.00	0.00	100.00
Georgetown	SC	5	26,859	0	70,975	27.45	0.00	72.55
Sumter	SC	5	5,296	0	33,758	13.56	0.00	86.44
Fairfax	VA	5	25,454	0	187,392	11.96	0.00	88.04
Page	VA	5	0	0	12,965	0.00	0.00	100.00
Wood	WV	5	3,500	0	0	100.00	0.00	0.00
Bourbon	KY	6	1,759	0	690	71.83	0.00	28.17

Table 13. Data used to estimate shares of non-highway fuel use by fuel type (continued)

Government	State	Division	Non-highway Fuel Use			Non-highway use in Percent		
			Gasoline	Gasohol	Diesel	Gasoline	Gasohol	Diesel
Hardin	KY	6	600	0	31,254	1.88	0.00	98.12
Jefferson	KY	6	21,000	0	24,200	46.46	0.00	53.54
Hinds	MS	6	56,766	0	90,366	38.58	0.00	61.42
Roane	TN	6	0	0	16,036	0.00	0.00	100.00
Tangipahoa	LA	7	8,480	0	98,795	7.90	0.00	92.10
Gila	AZ	8	0	0	38,423	0.00	0.00	100.00
Logan	CO	8	35,286	0	159,576	18.11	0.00	81.89
Bingham	ID	8	2,000	0	22,000	8.33	0.00	91.67
Canyon	ID	8	1,500	0	1,000	60.00	0.00	40.00
Bannock	ID	8	0	0	64,000	0.00	0.00	100.00
Shoshone	ID	8	0	0	14,450	0.00	0.00	100.00
Kenai Penisula	AK	9	500	0	1,000	33.33	0.00	66.67
Los Angeles	CA	9	415,714	0	364,000	53.32	0.00	46.68
Plumas	CA	9	7,304	0	58,338	11.13	0.00	88.87
Sherman	OR	9	107	0	1,583	6.33	0.00	93.67
Island	WA	9	127	0	4,240	2.91	0.00	97.09
Jefferson	WA	9	5,500	0	54,815	9.12	0.00	90.88
Number of Counties			47	47	47	47	47	47
Mean			23,050	199	44,977	22.66	0.80	76.54
Standard Deviation			75,453	1,171	65,553	31.85	3.76	32.37
MUNICIPALS								
Bangor	ME	1	4,565	0	28,503	13.80	0.00	86.20
Newport	VT	1	2,000	0	2,000	50.00	0.00	50.00
Reading	PA	2	5,054	0	5,894	46.16	0.00	53.84
Aurora	IL	3	5,696	0	8,576	39.91	0.00	60.09
Hammond	IN	3	0	0	19,186	0.00	0.00	100.00
Lawrenceburg	IN	3	600	0	3,230	15.67	0.00	84.33
Middleton	OH	3	6,458	0	3,119	67.43	0.00	32.57
Green Bay	WI	3	13,375	0	66,931	16.66	0.00	83.34
Milwaukee	WI	3	28,984	0	0	100.00	0.00	0.00
Manchester	IA	4	1,998	0	2,258	46.95	0.00	53.05
Ulysses	KS	4	0	137	1,048	0.00	11.56	88.44
Bloomington	MN	4	9,417	0	33,626	21.88	0.00	78.12
Columbia Heights	MN	4	1,190	0	4,237	21.93	0.00	78.07
Normandy	MO	4	260	0	184	58.56	0.00	41.44
University City	MO	4	20,286	0	28,516	41.57	0.00	58.43
Lincoln	NE	4	12,630	0	50,520	20.00	0.00	80.00
Bismarck	ND	4	2,042	0	14,659	12.23	0.00	87.77
Dickinson	ND	4	12,774	0	16,744	43.28	0.00	56.72

Table 13. Data used to estimate shares of non-highway fuel use by fuel type (continued)

Government	State	Division	Non-highway Fuel Use			Non-highway use in Percent		
			Gasoline	Gasohol	Diesel	Gasoline	Gasohol	Diesel
New Castle	DE	5	119	0	100	54.34	0.00	45.66
Atlanta	GA	5	166,911	0	815,447	16.99	0.00	83.01
Warner Robins	GA	5	1,838	0	35,665	4.90	0.00	95.10
Fayetteville	NC	5	0	0	15,529	0.00	0.00	100.00
Rocky Mount	NC	5	11,000	0	20,000	35.48	0.00	64.52
Spartanburg	SC	5	3,154	0	7,731	28.98	0.00	71.02
Tazewell	VA	5	0	0	1,437	0.00	0.00	100.00
Enterprise	AL	6	4,373	0	12,616	25.74	0.00	74.26
Jeffersontown	KY	6	1,850	0	856	68.37	0.00	31.63
Biloxi	MS	6	3,680	0	3,650	50.20	0.00	49.80
Johnson City	TN	6	18,000	0	50,000	26.47	0.00	73.53
Knoxville	TN	6	7,000	0	26,000	21.21	0.00	78.79
Fort Smith	AR	7	0	0	40,000	0.00	0.00	100.00
Maumelle	AR	7	0	0	3,679	0.00	0.00	100.00
Lafayette	LA	7	0	0	34,644	0.00	0.00	100.00
Ada	OK	7	0	0	37,000	0.00	0.00	100.00
Lawton	OK	7	60,000	0	48,000	55.56	0.00	44.44
Kerrville	TX	7	0	0	10,800	0.00	0.00	100.00
Temple	TX	7	3,531	0	33,000	9.67	0.00	90.33
Yuma	AZ	8	15,000	0	9,150	62.11	0.00	37.89
Phoenix	AZ	8	5,972	11,944	547,097	1.06	2.11	96.83
Commerce	CO	8	2,000	0	6,000	25.00	0.00	75.00
Henderson	NV	8	0	0	20,000	0.00	0.00	100.00
Las Vegas	NM	8	0	0	6,872	0.00	0.00	100.00
Albuquerque	NM	8	39,183	0	0	100.00	0.00	0.00
Juneau	AK	9	2,128	0	17,857	10.65	0.00	89.35
Medford	OR	9	6,300	0	700	90.00	0.00	10.00
Bellevue	WA	9	10,000	0	5,000	66.67	0.00	33.33
Puyallup	WA	9	518	0	2,115	19.67	0.00	80.33
Tukwila	WA	9	12,839	0	3,045	80.83	0.00	19.17
Number of Municipals			48	48	48	48	48	48
Mean			10,473	252	43,817	30.62	0.28	69.09
Standard Deviation			25,614	1,724	158,139	28.74	1.69	28.48
STATE, COUNTY AND MUNICIPALS								
Number of Governments			99	99	99	99	99	99
Mean			24,287	216	54,601	26.61	0.52	72.87
Standard Deviation			90,625	1,439	118,022	30.39	2.84	30.50

Table 14. Estimates of State and local governments motor fuel use for year 1992 -- Method 1

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
AL	43,013,576 (43%)	1,768,915 (434%)	19,541,686 (80%)	64,324,180 (9%)	2,779,746 (231%)	54,320 (918%)	7,612,180 (150%)	10,446,247 (133%)	74,770,424 (21%)
AK	6,746,498 (42%)	277,447 (434%)	3,065,031 (80%)	10,088,976 (7%)	435,991 (231%)	8,520 (917%)	1,193,938 (149%)	1,638,450 (132%)	11,727,426 (20%)
AZ	22,690,164 (42%)	933,123 (434%)	10,308,467 (80%)	33,931,756 (8%)	1,466,349 (231%)	28,655 (917%)	4,015,514 (149%)	5,510,518 (132%)	39,442,272 (20%)
AR	22,454,004 (43%)	923,411 (435%)	10,201,176 (81%)	33,578,592 (11%)	1,451,087 (232%)	28,356 (919%)	3,973,720 (150%)	5,453,164 (133%)	39,031,756 (21%)
CA	305,553,856 (42%)	12,565,771 (433%)	138,817,488 (80%)	456,937,120 (6%)	19,746,374 (231%)	385,874 (916%)	54,074,344 (149%)	74,206,592 (132%)	531,143,712 (19%)
CO	28,522,112 (42%)	1,172,960 (434%)	12,958,004 (80%)	42,653,076 (9%)	1,843,237 (231%)	36,020 (918%)	5,047,603 (150%)	6,926,860 (133%)	49,579,936 (20%)
CT	25,492,006 (42%)	1,048,348 (433%)	11,581,384 (80%)	38,121,740 (7%)	1,647,417 (231%)	32,193 (916%)	4,511,361 (149%)	6,190,971 (132%)	44,312,712 (20%)
DE	5,825,431 (42%)	239,568 (433%)	2,646,577 (80%)	8,711,576 (6%)	376,468 (231%)	7,357 (916%)	1,030,936 (149%)	1,414,760 (132%)	10,126,336 (19%)
DC	3,271,335 (42%)	134,532 (433%)	1,486,215 (80%)	4,892,082 (6%)	211,410 (231%)	4,131 (916%)	578,933 (149%)	794,474 (132%)	5,686,556 (19%)
FL	235,891,840 (42%)	9,700,951 (434%)	107,169,048 (80%)	352,761,856 (9%)	15,244,477 (231%)	297,900 (918%)	41,746,148 (150%)	57,288,528 (132%)	410,050,368 (20%)
GA	80,607,944 (43%)	3,314,967 (435%)	36,621,344 (81%)	120,544,256 (10%)	5,209,277 (232%)	101,797 (919%)	14,265,314 (150%)	19,576,388 (133%)	140,120,640 (21%)
HI	9,132,181 (42%)	375,557 (434%)	4,148,881 (80%)	13,656,619 (7%)	590,166 (231%)	11,533 (917%)	1,616,136 (149%)	2,217,835 (132%)	15,874,454 (20%)
ID	23,912,284 (42%)	983,382 (434%)	10,863,693 (80%)	35,759,360 (8%)	1,545,328 (231%)	30,198 (917%)	4,231,795 (149%)	5,807,321 (132%)	41,566,680 (20%)
IL	64,749,684 (42%)	2,662,803 (433%)	29,416,710 (80%)	96,829,200 (6%)	4,184,439 (231%)	81,770 (916%)	11,458,853 (149%)	15,725,063 (132%)	112,554,264 (19%)
IN	65,940,996 (43%)	2,711,795 (435%)	29,957,940 (81%)	98,610,736 (10%)	4,261,428 (232%)	83,275 (919%)	11,669,681 (150%)	16,014,384 (133%)	114,625,120 (21%)
IA	42,680,120 (43%)	1,755,202 (435%)	19,390,190 (81%)	63,825,512 (10%)	2,758,197 (232%)	53,899 (919%)	7,553,168 (150%)	10,365,264 (133%)	74,190,776 (21%)
KS	23,378,378 (42%)	961,426 (434%)	10,621,132 (80%)	34,960,936 (7%)	1,510,824 (231%)	29,524 (917%)	4,137,308 (149%)	5,677,657 (132%)	40,638,592 (20%)
KY	72,147,704 (42%)	2,967,044 (434%)	32,777,736 (80%)	107,892,488 (8%)	4,662,535 (231%)	91,113 (917%)	12,768,092 (149%)	17,521,740 (132%)	125,414,224 (20%)

Table 14. Estimates of State and local governments motor fuel use for year 1992 – Method 1 (continued)

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
LA	33,549,698 (42%)	1,379,717 (434%)	15,242,108 (80%)	50,171,524 (8%)	2,168,145 (231%)	42,369 (917%)	5,937,343 (149%)	8,147,856 (132%)	58,319,380 (20%)
ME	17,030,880 (43%)	700,388 (435%)	7,737,373 (81%)	25,468,640 (10%)	1,100,618 (232%)	21,508 (919%)	3,013,981 (150%)	4,136,107 (133%)	29,604,748 (21%)
MD	32,496,078 (43%)	1,336,387 (434%)	14,763,434 (80%)	48,595,900 (9%)	2,100,054 (231%)	41,038 (918%)	5,750,882 (150%)	7,891,975 (133%)	56,487,876 (21%)
MA	30,983,646 (42%)	1,274,189 (433%)	14,076,315 (80%)	46,334,152 (6%)	2,002,314 (231%)	39,128 (916%)	5,483,225 (149%)	7,524,667 (132%)	53,858,820 (20%)
MI	118,365,264 (42%)	4,867,721 (434%)	53,775,036 (80%)	177,008,032 (8%)	7,649,339 (231%)	149,480 (917%)	20,947,286 (149%)	28,746,106 (132%)	205,754,144 (20%)
MN	40,259,184 (43%)	1,655,642 (435%)	18,290,324 (81%)	60,205,152 (11%)	2,601,744 (232%)	50,842 (920%)	7,124,731 (150%)	9,777,317 (133%)	69,982,472 (21%)
MS	26,957,040 (43%)	1,108,597 (435%)	12,246,970 (81%)	40,312,608 (11%)	1,742,095 (232%)	34,043 (920%)	4,770,630 (150%)	6,546,768 (133%)	46,859,376 (22%)
MO	30,201,680 (44%)	1,242,031 (436%)	13,721,056 (81%)	45,164,768 (13%)	1,951,779 (233%)	38,141 (922%)	5,344,839 (151%)	7,334,759 (133%)	52,499,528 (23%)
MT	13,571,496 (42%)	558,122 (434%)	6,165,725 (80%)	20,295,344 (7%)	877,056 (231%)	17,139 (917%)	2,401,769 (149%)	3,295,964 (132%)	23,591,308 (20%)
NE	24,022,914 (43%)	987,932 (434%)	10,913,954 (80%)	35,924,800 (9%)	1,552,477 (231%)	30,338 (918%)	4,251,373 (150%)	5,834,188 (133%)	41,758,988 (21%)
NV	13,003,726 (42%)	534,773 (433%)	5,907,779 (80%)	19,446,278 (6%)	840,364 (231%)	16,422 (916%)	2,301,290 (149%)	3,158,076 (132%)	22,604,354 (19%)
NH	11,430,383 (42%)	470,070 (434%)	5,192,987 (80%)	17,093,440 (8%)	738,687 (231%)	14,435 (917%)	2,022,853 (149%)	2,775,975 (132%)	19,869,414 (20%)
NJ	117,545,352 (42%)	4,834,003 (433%)	53,402,540 (80%)	175,781,904 (6%)	7,596,352 (231%)	148,444 (916%)	20,802,186 (149%)	28,546,982 (132%)	204,328,880 (19%)
NM	19,729,426 (42%)	811,364 (433%)	8,963,361 (80%)	29,504,152 (6%)	1,275,011 (231%)	24,916 (916%)	3,491,548 (149%)	4,791,475 (132%)	34,295,628 (19%)
NY	127,650,928 (42%)	5,249,590 (433%)	57,993,648 (80%)	190,894,176 (7%)	8,249,423 (231%)	161,206 (916%)	22,590,586 (149%)	31,001,216 (132%)	221,895,392 (20%)
NC	120,112,080 (43%)	4,939,558 (435%)	54,568,640 (81%)	179,620,288 (12%)	7,762,226 (232%)	151,686 (921%)	21,256,424 (150%)	29,170,336 (133%)	208,790,624 (22%)
ND	11,449,492 (43%)	470,855 (434%)	5,201,668 (80%)	17,122,016 (9%)	739,922 (231%)	14,459 (918%)	2,026,235 (150%)	2,780,616 (133%)	19,902,632 (21%)
OH	110,719,736 (43%)	4,553,302 (435%)	50,301,564 (81%)	165,574,608 (11%)	7,155,247 (232%)	139,824 (920%)	19,594,246 (150%)	26,889,318 (133%)	192,463,920 (21%)

Table 14. Estimates of State and local governments motor fuel use for year 1992 – Method 1 (continued)

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
OK	57,611,404 (43%)	2,369,244 (435%)	26,173,686 (81%)	86,154,336 (10%)	3,723,129 (232%)	72,756 (919%)	10,195,580 (150%)	13,991,465 (133%)	100,145,800 (21%)
OR	42,069,500 (43%)	1,730,090 (434%)	19,112,778 (80%)	62,912,372 (9%)	2,718,736 (231%)	53,128 (918%)	7,445,106 (150%)	10,216,970 (133%)	73,129,344 (21%)
PA	82,796,176 (42%)	3,404,957 (433%)	37,615,492 (80%)	123,816,632 (7%)	5,350,691 (231%)	104,561 (916%)	14,652,570 (149%)	20,107,822 (132%)	143,924,448 (20%)
RI	6,085,959 (42%)	250,282 (434%)	2,764,938 (80%)	9,101,180 (7%)	393,304 (231%)	7,686 (917%)	1,077,042 (149%)	1,478,032 (132%)	10,579,212 (20%)
SC	43,078,724 (43%)	1,771,594 (436%)	19,571,282 (81%)	64,421,600 (12%)	2,783,956 (232%)	54,403 (921%)	7,623,709 (150%)	10,462,068 (133%)	74,883,664 (22%)
SD	13,464,293 (42%)	553,713 (434%)	6,117,021 (80%)	20,135,028 (8%)	870,128 (231%)	17,004 (917%)	2,382,797 (150%)	3,269,929 (132%)	23,404,956 (20%)
TN	69,443,776 (43%)	2,855,846 (434%)	31,549,302 (81%)	103,848,928 (9%)	4,487,794 (231%)	87,698 (918%)	12,289,573 (150%)	16,865,066 (133%)	120,713,992 (21%)
TX	386,221,728 (42%)	15,883,203 (434%)	175,466,064 (80%)	577,571,008 (8%)	24,959,524 (231%)	487,747 (917%)	68,350,264 (149%)	93,797,536 (132%)	671,368,576 (20%)
UT	14,837,960 (42%)	610,205 (433%)	6,741,098 (80%)	22,189,264 (6%)	958,901 (231%)	18,738 (916%)	2,625,897 (149%)	3,603,537 (132%)	25,792,800 (19%)
VT	7,208,784 (42%)	296,458 (434%)	3,275,054 (80%)	10,780,296 (9%)	465,867 (231%)	9,104 (918%)	1,275,750 (150%)	1,750,720 (133%)	12,531,016 (20%)
VA	78,382,456 (43%)	3,223,445 (435%)	35,610,276 (81%)	117,216,184 (10%)	5,065,456 (232%)	98,987 (919%)	13,871,467 (150%)	19,035,910 (133%)	136,252,096 (21%)
WA	44,047,068 (42%)	1,811,417 (434%)	20,011,216 (80%)	65,869,704 (7%)	2,846,536 (231%)	55,626 (917%)	7,795,079 (149%)	10,697,240 (132%)	76,566,944 (20%)
WV	52,181,400 (42%)	2,145,938 (433%)	23,706,758 (80%)	78,034,096 (7%)	3,372,216 (231%)	65,898 (917%)	9,234,624 (149%)	12,672,738 (132%)	90,706,832 (20%)
WI	50,258,684 (42%)	2,066,867 (434%)	22,833,240 (80%)	75,158,792 (7%)	3,247,960 (231%)	63,470 (917%)	8,894,357 (149%)	12,205,788 (132%)	87,364,576 (20%)
WY	11,175,470 (42%)	459,586 (434%)	5,077,176 (80%)	16,712,233 (8%)	722,213 (231%)	14,113 (918%)	1,977,740 (150%)	2,714,067 (132%)	19,426,300 (20%)
TOTAL	2,939,952,380 (42%)	120,904,280 (434%)	1,335,662,590 (80%)	4,396,519,420 (8%)	189,994,016 (231%)	3,712,773 (917%)	520,288,000 (149%)	713,994,816 (132%)	5,110,514,180 (20%)

Note: Values in parentheses are standard deviations of the estimates above (in percentages of the estimates).

Table 15. Estimates of State and local governments motor fuel use for year 1995 -- Method 1

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
AL	45,588,088	1,874,791	20,711,322	68,174,200	2,946,124	57,572	8,067,796	11,071,491	79,245,688
AK	6,901,066	283,803	3,135,253	10,320,122	445,980	8,715	1,221,292	1,675,988	11,996,110
AZ	23,128,564	951,152	10,507,638	34,587,356	1,494,680	29,208	4,093,098	5,616,987	40,204,344
AR	24,317,610	1,000,051	11,047,838	36,365,500	1,571,522	30,710	4,303,526	5,905,758	42,271,256
CA	314,818,368	12,946,770	143,026,496	470,791,648	20,345,092	397,574	55,713,900	76,456,568	547,248,192
CO	28,871,338	1,187,321	13,116,663	43,175,324	1,865,806	36,461	5,109,406	7,011,673	50,186,996
CT	25,685,614	1,056,310	11,669,343	38,411,268	1,659,929	32,438	4,545,623	6,237,990	44,649,256
DE	5,925,453	243,682	2,692,018	8,861,153	382,932	7,483	1,048,637	1,439,051	10,300,204
DC	3,329,197	136,912	1,512,502	4,978,611	215,149	4,204	589,173	808,526	5,787,137
FL	245,397,376	10,091,862	111,487,544	366,976,800	15,858,771	309,905	43,428,360	59,597,036	426,573,824
GA	83,711,264	3,442,590	38,031,228	125,185,088	5,409,829	105,716	14,814,514	20,330,060	145,515,152
HI	9,408,214	386,909	4,274,287	14,069,409	608,004	11,881	1,664,986	2,284,872	16,354,281
ID	23,967,250	985,643	10,888,665	35,841,560	1,548,880	30,267	4,241,522	5,820,670	41,662,228
IL	65,286,416	2,684,876	29,660,554	97,631,848	4,219,125	82,448	11,553,839	15,855,413	113,487,264
IN	66,880,444	2,750,430	30,384,746	100,015,624	4,322,139	84,461	11,835,937	16,242,538	116,258,160
IA	42,701,336	1,756,074	19,399,828	63,857,240	2,759,568	53,926	7,556,922	10,370,416	74,227,656
KS	23,629,372	971,748	10,735,163	35,336,284	1,527,045	29,841	4,181,727	5,738,613	41,074,896
KY	74,089,160	3,046,885	33,659,768	110,795,816	4,788,002	93,565	13,111,675	17,993,242	128,789,056
LA	34,653,288	1,425,102	15,743,485	51,821,876	2,239,464	43,763	6,132,647	8,415,873	60,237,748
ME	17,174,534	706,295	7,802,637	25,683,466	1,109,902	21,689	3,039,404	4,170,995	29,854,460
MD	34,049,856	1,400,286	15,469,337	50,919,480	2,200,467	43,000	6,025,857	8,269,324	59,188,804
MA	31,391,264	1,290,952	14,261,502	46,943,720	2,028,656	39,643	5,555,362	7,623,661	54,567,380
MI	119,641,640	4,920,211	54,354,912	178,916,768	7,731,824	151,092	21,173,168	29,056,084	207,972,848
MN	41,154,576	1,692,464	18,697,114	61,544,156	2,659,609	51,973	7,283,190	9,994,771	71,538,928
MS	27,956,878	1,149,715	12,701,210	41,807,804	1,806,709	35,306	4,947,573	6,789,588	48,597,392
MO	30,784,628	1,266,005	13,985,898	46,036,532	1,989,452	38,877	5,448,004	7,476,333	53,512,864
MT	13,596,473	559,149	6,177,073	20,332,696	878,670	17,171	2,406,189	3,302,030	23,634,726
NE	24,108,006	991,431	10,952,613	36,052,052	1,557,977	30,445	4,266,432	5,854,854	41,906,904
NV	13,135,868	540,207	5,967,813	19,643,888	848,904	16,589	2,324,675	3,190,168	22,834,056

Table 15. Estimates of State and local governments motor fuel use for year 1995 -- Method 1 (continued)

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
NH	11,661,181	479,561	5,297,842	17,438,584	753,602	14,727	2,063,698	2,832,026	20,270,610
NJ	124,220,600	5,108,519	56,435,196	185,764,320	8,027,738	156,874	21,983,512	30,168,126	215,932,448
NM	19,840,214	815,920	9,013,693	29,669,828	1,282,171	25,056	3,511,154	4,818,381	34,488,208
NY	133,099,496	5,473,660	60,469,012	199,042,176	8,601,536	168,087	23,554,826	32,324,450	231,366,624
NC	122,497,000	5,037,637	55,652,144	183,186,784	7,916,351	154,698	21,678,486	29,749,536	212,936,320
ND	11,518,329	473,686	5,232,942	17,224,958	744,370	14,546	2,038,417	2,797,333	20,022,292
OH	111,458,096	4,583,667	50,637,012	166,678,784	7,202,964	140,757	19,724,914	27,068,636	193,747,424
OK	61,132,396	2,514,044	27,773,324	91,419,768	3,950,673	77,202	10,818,696	14,846,571	106,266,336
OR	42,797,812	1,760,042	19,443,660	64,001,516	2,765,803	54,048	7,573,996	10,393,847	74,395,360
PA	86,463,176	3,555,761	39,281,460	129,300,400	5,587,671	109,192	15,301,524	20,998,386	150,298,784
RI	6,138,459	252,441	2,788,790	9,179,690	396,697	7,752	1,086,333	1,490,782	10,670,472
SC	44,571,048	1,832,965	20,249,266	66,653,284	2,880,398	56,287	7,887,809	10,824,494	77,477,776
SD	13,501,331	555,236	6,133,848	20,190,416	872,522	17,050	2,389,352	3,278,924	23,469,340
TN	74,435,160	3,061,114	33,816,960	111,313,240	4,810,362	94,002	13,172,906	18,077,270	129,390,512
TX	413,969,760	17,024,328	188,072,400	619,066,496	26,752,734	522,789	73,260,872	100,536,400	719,602,880
UT	14,994,447	616,640	6,812,192	22,423,280	969,014	18,936	2,653,591	3,641,541	26,064,820
VT	7,286,481	299,653	3,310,353	10,896,487	470,888	9,202	1,289,500	1,769,590	12,666,077
VA	81,023,800	3,332,069	36,810,276	121,166,152	5,236,152	102,322	14,338,909	19,677,384	140,843,536
WA	45,637,164	1,876,809	20,733,618	68,247,592	2,949,295	57,634	8,076,480	11,083,409	79,331,000
WV	52,149,652	2,144,632	23,692,336	77,986,624	3,370,164	65,858	9,229,006	12,665,028	90,651,648
WI	52,452,052	2,157,068	23,829,718	78,438,840	3,389,706	66,240	9,282,521	12,738,468	91,177,312
WY	11,208,879	460,960	5,092,355	16,762,195	724,372	14,155	1,983,653	2,722,181	19,484,376
TOTAL	3,043,339,520	125,156,032	1,382,632,830	4,551,128,580	196,675,376	3,843,337	538,584,576	739,103,296	5,290,231,810

Table 16. Estimates of state and local governments motor fuel use for year 2000 -- Method 1

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
AL	49,377,052	2,030,610	22,432,702	73,840,368	3,190,985	62,357	8,738,334	11,991,676	85,832,048
AK	7,189,303	295,657	3,266,203	10,751,163	464,608	9,079	1,272,302	1,745,989	12,497,152
AZ	23,715,666	975,297	10,774,367	35,465,332	1,532,622	29,950	4,196,999	5,759,570	41,224,904
AR	26,935,886	1,107,727	12,237,359	40,280,972	1,740,728	34,016	4,766,886	6,541,630	46,822,600
CA	327,514,304	13,468,885	148,794,432	489,777,632	21,165,564	413,607	57,960,716	79,539,888	569,317,504
CO	29,367,906	1,207,743	13,342,261	43,917,912	1,897,897	37,088	5,197,285	7,132,269	51,050,180
CT	25,954,624	1,067,373	11,791,558	38,813,556	1,677,314	32,777	4,593,231	6,303,322	45,116,880
DE	6,063,461	249,357	2,754,717	9,067,535	391,850	7,657	1,073,060	1,472,568	10,540,103
DC	3,432,033	141,141	1,559,222	5,132,396	221,795	4,334	607,372	833,501	5,965,897
FL	258,117,888	10,614,988	117,266,656	385,999,552	16,680,832	325,969	45,679,528	62,686,332	448,685,888
GA	87,779,640	3,609,900	39,879,548	131,269,088	5,672,746	110,854	15,534,499	21,318,100	152,587,184
HI	9,787,492	402,506	4,446,598	14,636,597	632,515	12,360	1,732,108	2,376,984	17,013,580
ID	24,048,840	988,998	10,925,733	35,963,572	1,554,153	30,371	4,255,961	5,840,485	41,804,056
IL	67,747,056	2,786,069	30,778,458	101,311,584	4,378,144	85,556	11,989,302	16,453,002	117,764,584
IN	68,642,656	2,822,900	31,185,344	102,650,904	4,436,022	86,687	12,147,799	16,670,508	119,321,408
IA	42,790,004	1,759,721	19,440,112	63,989,840	2,765,298	54,038	7,572,614	10,391,950	74,381,792
KS	23,971,856	985,832	10,890,758	35,848,448	1,549,178	30,273	4,242,337	5,821,788	41,670,236
KY	77,290,272	3,178,529	35,114,076	115,582,880	4,994,873	97,607	13,678,180	18,770,660	134,353,536
LA	39,133,656	1,609,355	17,778,980	58,521,992	2,529,007	49,421	6,925,544	9,503,972	68,025,968
ME	17,362,738	714,035	7,888,141	25,964,916	1,122,065	21,927	3,072,711	4,216,703	30,181,618
MD	36,229,728	1,489,932	16,459,685	54,179,348	2,341,341	45,753	6,411,632	8,798,727	62,978,076
MA	31,945,502	1,313,745	14,513,299	47,772,548	2,064,473	40,343	5,653,446	7,758,262	55,530,808
MI	123,347,920	5,072,630	56,038,728	184,459,280	7,971,342	155,772	21,829,074	29,956,188	214,415,472
MN	42,355,188	1,741,839	19,242,568	63,339,596	2,737,198	53,489	7,495,664	10,286,351	73,625,944
MS	30,056,804	1,236,073	13,655,237	44,948,116	1,942,417	37,958	5,319,200	7,299,575	52,247,692
MO	31,678,998	1,302,785	14,392,223	47,374,008	2,047,251	40,006	5,606,282	7,693,539	55,067,548
MT	13,639,591	560,922	6,196,662	20,397,176	881,457	17,225	2,413,820	3,312,502	23,709,678
NE	24,237,046	996,738	11,011,238	36,245,024	1,566,316	30,608	4,289,268	5,886,192	42,131,216
NV	13,323,030	547,904	6,052,844	19,923,778	860,999	16,825	2,357,798	3,235,622	23,159,400
NH	11,954,577	491,627	5,431,136	17,877,340	772,563	15,097	2,115,620	2,903,280	20,780,620
NJ	134,614,544	5,535,965	61,157,316	201,307,824	8,699,445	170,000	23,822,946	32,692,392	234,000,224
NM	19,999,274	822,462	9,085,957	29,907,694	1,292,450	25,256	3,539,303	4,857,010	34,764,704
NY	145,764,976	5,994,522	66,223,120	217,982,624	9,420,041	184,082	25,796,256	35,400,380	253,383,008

Table 16. Estimates of state and local governments motor fuel use for year 2000 -- Method 1 (continued)

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
NC	125,381,104	5,156,245	56,962,436	187,499,792	8,102,736	158,340	22,188,892	30,449,968	217,949,760
ND	11,621,350	477,923	5,279,746	17,379,020	751,028	14,676	2,056,649	2,822,353	20,201,372
OH	114,009,952	4,688,611	51,796,356	170,494,928	7,367,877	143,980	20,176,520	27,688,378	198,183,312
OK	66,371,444	2,729,497	30,153,498	99,254,440	4,289,245	83,818	11,745,858	16,118,922	115,373,360
OR	43,776,088	1,800,273	19,888,104	65,464,468	2,829,024	55,283	7,747,123	10,631,430	76,095,896
PA	95,665,216	3,934,191	43,462,080	143,061,488	6,182,351	120,813	16,930,022	23,233,186	166,294,672
RI	6,211,897	255,462	2,822,154	9,289,513	401,443	7,845	1,099,329	1,508,617	10,798,130
SC	46,412,752	1,908,705	21,085,980	69,407,440	2,999,418	58,613	8,213,738	11,271,769	80,679,208
SD	13,556,210	557,493	6,158,781	20,272,484	876,068	17,120	2,399,064	3,292,252	23,564,736
TN	80,616,352	3,315,313	36,625,164	120,556,832	5,209,820	101,808	14,266,802	19,578,430	140,135,264
TX	457,894,944	18,830,732	208,028,224	684,753,920	29,591,394	578,261	81,034,384	111,204,040	795,957,952
UT	15,204,419	625,275	6,907,586	22,737,280	982,583	19,201	2,690,750	3,692,535	26,429,814
VT	7,385,091	303,709	3,355,153	11,043,953	477,260	9,326	1,306,951	1,793,538	12,837,491
VA	84,478,232	3,474,131	38,379,672	126,332,040	5,459,394	106,685	14,950,245	20,516,324	146,848,368
WA	47,798,300	1,965,685	21,715,452	71,479,440	3,088,959	60,363	8,458,940	11,608,262	83,087,704
WV	52,335,600	2,152,279	23,776,814	78,264,696	3,382,181	66,093	9,261,913	12,710,187	90,974,880
WI	55,502,692	2,282,525	25,215,668	83,000,888	3,586,854	70,093	9,822,398	13,479,345	96,480,232
WY	11,262,016	463,146	5,116,496	16,841,658	727,806	14,222	1,993,057	2,735,086	19,576,744
TOTAL	3,210,853,120	132,044,960	1,458,736,640	4,801,634,820	207,500,928	4,054,885	568,229,696	779,785,536	5,581,420,540

6. ESTIMATION OF MOTOR FUEL USE: METHOD TWO - A POPULATION-BASED METHOD

6.1 INTRODUCTION

This chapter describes the use of a population-based method to estimate the SCM government motor fuel use by fuel type and by highway use and nonhighway use for each State. The method began with the development of relationships between total government fuel use and population. The rest of the procedures which estimate highway and nonhighway use and break down fuel use by fuel type are essentially the same as those used in the vehicle-based method.

This chapter is organized as follows. Section 6.2 gives an outline of the estimation method. Section 6.3 presents the detailed estimation procedure, the sample data selected for the estimation, and the results from the estimation. The sampling errors of the estimates are also assessed using the methods described in Appendix E. The last section summarizes the chapter with a discussion on the quality of the estimates, with particular emphasis on the potential nonsampling errors associated with the estimates.

6.2 OUTLINE OF THE ESTIMATION METHOD

The population-based method can be outlined as follows.

1. Those sample governments which could provide reliable information on total fuel use, including highway and nonhighway use, were first identified and their population and land area data were extracted.
2. Regression models were developed to describe the relationships between the reported total fuel uses and two predictors: population and land areas. These regression models were developed by government type.
3. The regression models developed in the last step were then used in conjunction with the predictors to estimate the total fuel use of each government.
4. Based on the sample data, the shares of highway use and nonhighway use were computed. Note that, as indicated in the vehicle-based method, the share of nonhighway use was not found to be related to population size.
5. The shares of fuel use by fuel type were estimated from the sample data. These estimated shares were obtained separately for highway use and nonhighway use. The final estimates of fuel use by fuel type were obtained by multiplying the highway use and nonhighway use with the corresponding estimated shares.

6.3 ESTIMATION PROCEDURE

Step 1 Estimate total SCM government motor fuel uses, including highway and nonhighway uses.

Step 1.1 Establish statistical relationships between fuel uses and population/land area.

Table 17 shows the sample data selected to establish the relationships. The fuel use was reported approximately for year 1992. Figures 2-4 show that log-log linear regression models can depict the fuel use-population relationships quite well. Again, in this report "log" represents natural logarithms. In general, the regression models have the following form:

$$\log(y_i) = \alpha + \beta \log(Pop_i) + \gamma \log(Land_i) + \varepsilon_i \qquad i=1,2,...,n \tag{8}$$

where y_i is the total fuel use of the ith government, Pop_i is the estimated 1992 population of the ith government, and $Land_i$ is the land area of the ith government, α, β, γ are unknown regression parameters to be estimated from sample data, and ε_i, i=1,2,...,n, are normal and independently distributed model residuals with zero mean and constant variance, σ^2. Other assumptions include: (1) ε_i is independent of Pop_i and $Land_i$; and (2) Pop_i and $Land_i$ are measured without errors.

Three regression models, one for each government type, were developed as shown in Table 18. For those State governments which only provided State Department of Transportation (DOT) data, an additional parameter (δ) and a dummy variable (=log(Pop) if State DOT data only, otherwise = 0) were included to adjust for the potential underestimation. This table shows that the regression parameters for population are highly statistically significant for all government types, while the parameters for land area are found to have very weak relationships with fuel use. Therefore, the models were reestimated without land areas and are also presented in Table 18. The coefficients of determination, R^2, ranges from 0.44 for county governments to 0.78 for municipal governments. The estimated regression parameters, β, suggest that a 1 percent increase in State, county, and municipal populations would be associated with about a 0.73 percent, 0.56 percent, and 0.92 percent increase, respectively, in government total fuel use. Because the sample sizes are too small, further breakdowns of the models by State or by Census Division were not considered.

Step 1.2 Estimate SCM government total fuel use by State.

Using the regression models presented in Table 18 and the population data obtained for each government, total fuel use for each government within a State was estimated and summed to produce a State estimate. The estimates were made for 1992, 1995, and 2000 based on estimated population and are shown in Tables 19, 20, and 21.

Step 2 Estimate the shares of highway use and nonhighway use.

Table 11 shows the sample data used to compute the shares of highway and nonhighway uses. As discussed in the vehicle-based method, these shares were not found to be related to population

size. The final estimates of the shares are: (1) highway use - 88 percent; and (2) nonhighway use - 12 percent.

Step 3 Estimate the percentages of highway fuel use by fuel type.

This step is the same as that used in the vehicle-based method. The estimates of percentages of highway fuel use for the three fuel types were 66.87 percent, 2.75 percent, and 30.38 percent, respectively. The estimated standard deviations of these estimates were, respectively, 27.69 percent, 11.89 percent, and 24.19 percent. These estimated standard deviations were quite large when compared to their means, especially those estimates for gasohol and diesel. These percentages were applied to the total highway use estimate obtained in Step 1 to estimate highway use by fuel type.

Step 4 Estimate the percentages of nonhighway fuel use by fuel type.

This step is the same as that used in the vehicle-based method. The estimates were 26.61 percent, 0.52 percent, and 72.87 percent for gasoline, gasohol, and diesel, respectively. About 73 percent of the fuel used for nonhighway purposes was diesel fuel. These percentages were applied to the total nonhighway use estimate obtained in Step 2 to estimate nonhighway use by fuel type.

Step 5 Estimate the uncertainty of the estimates due to sampling errors.

The basic theories used in this report to quantify the sampling errors are described in Appendix E. Note that the effects of nonsampling errors on the estimates will be discussed in the last section.

6.4 ESTIMATION RESULTS

Following the procedure described above, the SCM government fuel uses were estimated by State, by usage type, and by fuel type for years 1992, 1995, and 2000, and are presented in Tables 19, 20, and 21. The estimated sampling errors of the estimates are presented for 1992 using the estimated relative standard errors (RSE) (Table 19). The following observations from these tables can be made:

1. The estimated total SCM government motor fuel uses in the U.S. are 1.95, 1.98, and 2.03 billion gallons in 1992, 1995, and 2000. These estimates amount to an average annual growth rate of about 0.55 percent between 1992 and 2000. (Note that nonsampling errors of these estimates will be discussed in the last section.)
2. These estimates suggest that the breakdowns of highway and nonhighway use are 88 percent and 12 percent, respectively. In addition, it indicated that the following three fuel use categories have the largest shares: (1) highway gasoline use (about 59 percent); (2) highway diesel use (about 27 percent); and (3) nonhighway diesel use (about 9 percent). Although not shown in these tables, the estimates also suggested that the shares of total SCM government fuel uses were about 24 percent for State, 34 percent for county, and 42 percent

for municipal governments. These estimated shares are consistent with those estimated from the vehicle-based method.

3. The sampling errors indicated in RSEs for highway use, nonhighway use, and total use are about 16 percent, 104 percent, and 7 percent, respectively. As in the vehicle-based method, the sampling errors for nonhighway use are very high, indicating that nonhighway use is highly variable from government to government and that the current sample size is simply too small to estimate such uses with reasonable accuracy. The uncertainty of the estimates are even higher when broken down by fuel type. Estimates of gasohol use have the largest RSEs.

6.5 QUALITY OF THE ESTIMATES

As indicated earlier, the sampling errors discussed above can be reduced by increasing the sample size and, if given a large enough sample size, through better stratification (by constructing models for each State or Census Division). The strength of this method is that population can be predicted with relatively good accuracy, while the limitation of this method was on the fuel use data. As indicated in Chapter 3, the sampled fuel use was about 50 percent understated due to the underreporting of school systems (about 25 percent) and some departments (about 5 percent) and fuels purchased at noncontract gasoline stations (20 percent).

After increasing the estimates in Tables 19, 20, and 21 by 50 percent, our best estimates for the total SCM government fuel use under the population-based method were 2.92, 2.97, and 3.05 billion gallons in 1992, 1995, and 2000, respectively. These estimates are lower than the adjusted estimates from the vehicle-based method (which were 4.60, 4.76, and 5.02 billion gallons, respectively) by about 36 percent. Again, the projections for years 1995 and 2000 are based on the assumption that the share of alternative fuels do not increase in the future. Because of the recent Federal legislation, such as the CAAA, ISTEA, and EPACT mentioned in Chapter 3, this assumption is not likely to be a good one.

Table 17. Data used to develop relationships between total fuel use and predictors

Government	State	Division	Fuel Use (Gal.)	Population	Land Area (mi^2)
STATE					
New York[1]		2	35,238,125	18,091,508	49,108
Indiana		3	9,270,000	5,580,948	36,185
Missouri[2]		4	7,225,928	5,178,164	69,697
North Dakota		4	2,500,000	647,239	70,703
Delaware		5	2,678,427	675,868	2,044
Maryland		5	7,000,000	4,885,979	10,460
Alabama		6	6,474,181	4,086,279	51,705
Tennessee		6	7,057,030	4,954,706	42,144
Arkansas		7	6,283,824	2,386,327	53,187
Louisiana		7	6,685,104	4,252,690	47,751
Arizona[2]		8	2,856,687	3,849,552	114,000
Colorado[2]		8	3,000,000	3,427,324	104,091
Idaho[2]		8	1,182,949	1,029,452	83,564
Montana[2]		8	2,169,343	811,312	147,046
Nevada		8	2,974,064	1,266,014	110,561
Utah		8	6,908,000	1,793,941	84,899
Alaska		9	2,588,000	547,218	591,004
Hawaii		9	1,375,000	1,150,998	6,471
South Carolina		5	24,599,500	3,570,352	31,113
Number of States			**19**	**19**	**19**
Mean			**7,266,640**	**3,588,730**	**89,775**
Standard Deviation			**8,526,001**	**3,928,626**	**127,428**
COUNTY					
Ardostook	ME	1	29,428	87,212	6,721
Piscataquis	ME	1	97,670	18,944	3,986
Somerset	ME	1	36,923	50,748	3,930
Rockingham	NH	1	51,307	259,445	699
Sullivan	NH	1	7,398	39,607	540
Cape May	NJ	2	260,000	97,824	263
Chenango	NY	2	351,871	52,363	897
Cortland	NY	2	247,500	49,498	500
Kankakee	IL	3	132,019	96,372	679
Pope	IL	3	26,187	4,365	374
Stephenson	IL	3	65,946	47,952	564
Orange	IN	3	66,900	18,537	408
Gogebic	MI	3	140,673	17,879	1,105
Fairfield	OH	3	119,016	106,678	506
Langlade	WI	3	214,883	19,579	873
Milwaukee	WI	3	1,031,675	958,008	241
Washington	WI	3	105,328	14,103	815
Cerro Gordo	IA	4	145,217	46,427	569

Table 17. Data used to develop relationships between total fuel use and predictors (continued)

Government	State	Division	Fuel Use (Gal.)	Population	Land Area (mi^2)
Delaware	IA	4	51,657	18,074	578
Woodbury	IA	4	403,089	97,931	873
Sedgwick	KS	4	571,555	409,864	1,007
Cook	MN	4	80,717	3,926	1,412
Hennepin	MN	4	566,774	1,047,007	541
Renville	MN	4	113,000	17,756	984
Jasper	MS	4	79,000	91,670	641
Pulaski	MS	4	118,606	41,206	550
Douglas	NE	4	308,020	420,505	333
Cass	ND	4	112,271	105,183	1,767
Morton	ND	4	124,938	24,350	1,921
Walsh	ND	4	50,548	13,836	1,290
Brown	SD	4	194,794	35,629	1,722
Gadsden	FL	5	307,000	41,794	518
Prince George's	MD	5	4,852,791	738,388	487
Dare	NC	5	274,895	23,793	391
Haywood	NC	5	101,271	47,655	555
Mecklenberg	NC	5	840,000	523,315	528
Pitt	NC	5	230,872	110,897	657
Georgetown	SC	5	202,070	47,710	822
Sumter	SC	5	332,316	104,728	665
Fairfax	VA	5	6,293,270	853,600	394
Page	VA	5	40,309	22,254	313
Kanawha	WV	5	66,000	206,135	901
Wood	WV	5	42,901	86,854	367
Bourbon	KY	6	36,564	19,350	292
Hardin	KY	6	106,058	90,762	629
Jefferson	KY	6	1,160,000	661,653	386
Pulaski	KY	6	646,666	50,748	660
Hinds	MS	6	484,754	257,203	875
Newton	MS	6	108,100	20,286	580
Roane	TN	6	261,876	48,270	357
Shelby	TN	6	808,966	832,303	772
Tangipahoa	LA	7	205,150	87,056	783
Washington	LA	7	61,000	43,110	676
Comal	TX	7	197,245	54,854	555
Gila	AZ	8	170,734	41,008	4,752
Graham	AZ	8	54,702	27,524	4,630
Logan	CO	8	202,862	17,624	1,818
Mesa	CO	8	266,517	97,572	3,309
Bingham	ID	8	239,860	38,069	2,096
Canyon	ID	8	117,200	92,229	584

Table 17. Data used to develop relationships between total fuel use and predictors (continued)

Government	State	Division	Fuel Use (Gal.)	Population	Land Area (mi^2)
Bannock	ID	8	121,000	66,903	1,112
Shoshone	ID	8	100,793	13,663	2,641
Douglas	NV	8	296,669	30,263	708
Elko	NV	8	59,094	34,821	17,135
Los Alamos	NM	8	147,386	18,592	109
Kane	UT	8	37,400	5,397	3,898
Salt Lake	UT	8	1,485,958	753,592	756
Utah	UT	8	218,447	276,448	2,018
Fremont	WY	8	191,059	33,971	9,181
Plumas	CA	9	189,718	20,405	2,573
Columbia	OR	9	55,292	38,453	651
Sherman	OR	9	42,359	1,924	827
Jefferson	WA	9	112,700	21,464	1,805
Fairbanks North	AK	9	93,462	68,265	7,404
Matanuska-Susit	AK	9	55,137	39,388	24,502
Number of Counties			75	75	75
Mean			370,978	146,370	1,906
Standard Deviation			915,050	244,609	3,624
MUNICIPALS					
Hartford	CT	1	366,000	144,255	
Milford	CT	1	285,034	51,610	
Bangor	ME	1	281,321	32,437	
Calais	ME	1	38,539	3,862	
Laconia	NH	1	125,000	18,107	
Manchester	NH	1	810,611	108,408	
Barre	VT	1	42,385	10,464	
Newport	VT	1	43,500	4,623	
Carteret	NJ	2	80,000	20,822	
Guttenberg	NJ	2	8,500	7,448	
North Wildwood	NJ	2	24,987	5,294	
Carlisle	PA	2	62,906	20,850	
Reading	PA	2	70,185	82,192	
Aurora	IL	3	370,555	93,326	
Hometown	IL	3	16,561	4,762	
Lasalle	IL	3	9,900	9,634	
Hammond	IN	3	371,545	82,897	
Kokomo	IN	3	223,033	42,781	
Lawrenceburg	IN	3	51,841	5,329	
Mount Clemens	MI	3	9,738	20,072	
Middleton	OH	3	199,773	50,407	
Parma	OH	3	265,000	21,298	
Green Bay	WI	3	810,269	99,240	

Table 17. Data used to develop relationships between total fuel use and predictors (continued)

Government	State	Division	Fuel Use (Gal.)	Population	Land Area (mi^2)
Marshfield	WI	3	180,655	19,192	
Milwaukee	WI	3	1,657,234	622,002	
Ames	IA	4	179,136	46,352	
Manchester	IA	4	17,894	4,613	
Dodge City	KS	4	108,656	20,988	
Ulysses	KS	4	26,425	5,116	
Bloomington	MN	4	242,305	90,872	
Columbia Heights	MN	4	57,297	22,139	
Morris	MN	4	33,395	4,888	
Kansas City	MO	4	650,000	440,697	
Normandy	MO	4	29,637	5,011	
Overland	MO	4	61,702	18,832	
University City	MO	4	185,112	42,499	
Grand Island	NE	4	135,519	39,519	
Lincoln	NE	4	1,036,907	192,447	
Bismarck	ND	4	70,149	50,065	
Dickinson	ND	4	37,323	15,940	
Grand Forks	ND	4	303,893	46,643	
Dover	DE	5	185,685	24,433	
New Castle	DE	5	13,387	5,294	
Atlanta	GA	5	3,028,192	443,667	
Warner Robins	GA	5	307,399	47,920	
Fayetteville	NC	5	274,617	81,506	
Rocky Mount	NC	5	307,500	52,614	
Spartanburg	SC	5	234,995	48,007	
Woodruff	SC	5	30,438	5,342	
Tazewell	VA	5	31,212	4,451	
Benwood	WV	5	11,193	1,721	
Enterprise	AL	6	150,544	19,936	
Gasden	AL	6	360,695	44,318	
Jeffersontown	KY	6	37,856	19,145	
Louisville	KY	6	1,500,000	278,435	
Biloxi	MS	6	16,500	46,024	
Johnson City	TN	6	820,052	44,939	
Knoxville	TN	6	740,000	179,408	
Sweetwater	TN	6	46,485	4,839	
Fort Smith	AR	7	200,000	75,771	
Maumelle	AR	7	38,311	4,807	
Russellville	AR	7	58,848	21,248	
Lafayette	LA	7	721,110	88,271	
Ada	OK	7	147,000	16,929	
Lawton	OK	7	400,000	77,106	

Table 17. Data used to develop relationships between total fuel use and predictors (continued)

Government	State	Division	Fuel Use (Gal.)	Population	Land Area (mi²)
Houston	TX	7	10,095,900	1,802,169	
Kerrville	TX	7	79,800	21,174	
Temple	TX	7	306,529	51,911	
Yuma	AZ	8	220,000	58,856	
Phoenix	AZ	8	4,891,258	1,059,637	
Commerce	CO	8	79,000	16,886	
Pocatello	ID	8	330,746	43,639	
Billings	MT	8	588,221	77,780	
Kalispell	MT	8	74,700	12,586	
Winnemucca	NV	8	36,000	6,089	
Elko	NV	8	76,209	18,525	
Las Vegas	NV	8	475,175	262,718	
Henderson	NV	8	240,000	64,408	
Las Vegas	NM	8	134,898	16,164	
Albuquerque	NM	8	3,085,224	386,946	
Juneau	AK	9	225,452	25,186	
Medford	OR	9	161,000	47,156	
Salem	OR	9	248,852	103,031	
Tigard	OR	9	59,169	23,300	
Bellevue	WA	9	320,000	91,981	
Puyallup	WA	9	72,958	22,170	
Tukwila	WA	9	94,636	5,430	
Number of Municipals			87	87	
Mean			472,853	97,492	
Standard Deviation			1,265,025	237,905	
STATE, COUNTY AND MUNICIPALS					
Number of Governments			181	181	94
Mean			1,143,799	484,478	19,667
Standard Deviation			3,577,948	1,652,897	66,422

[1] Fuel used by safety department and school system were estimated and added to the original data.
[2] Fuel consumed by state DOT only.

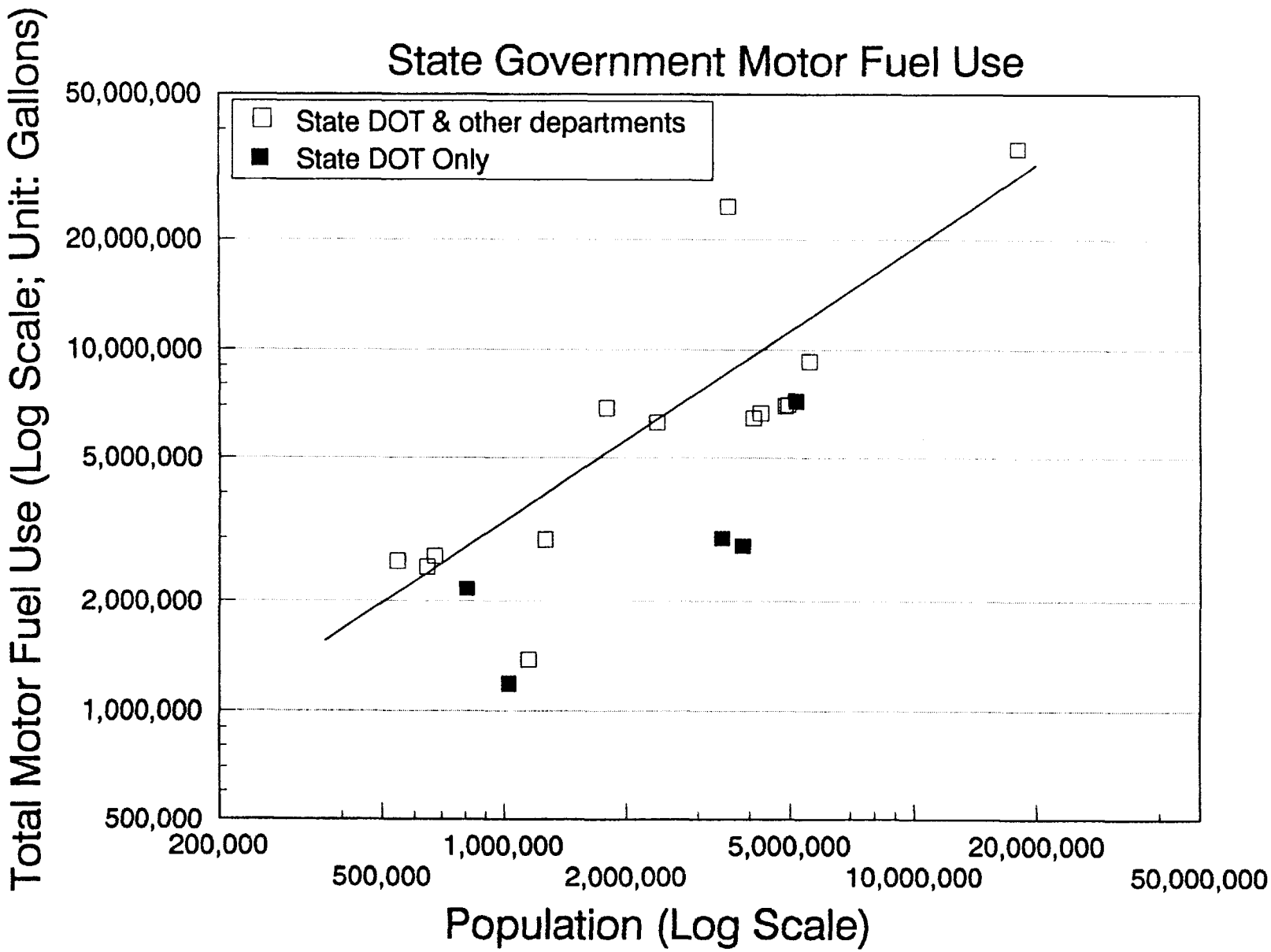

Figure 2. State government fuel use versus State population.

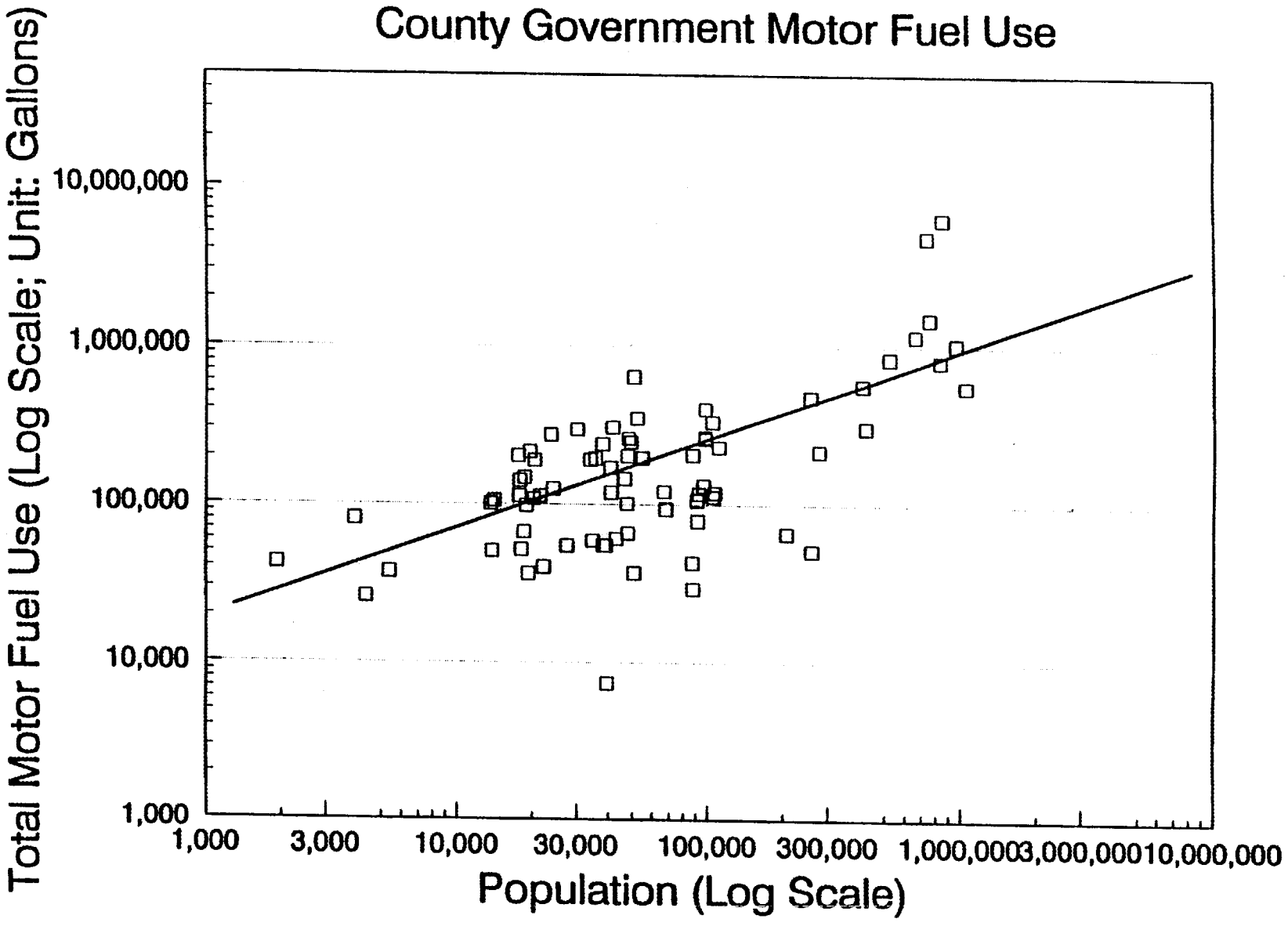

Figure 3. County government fuel use versus county population.

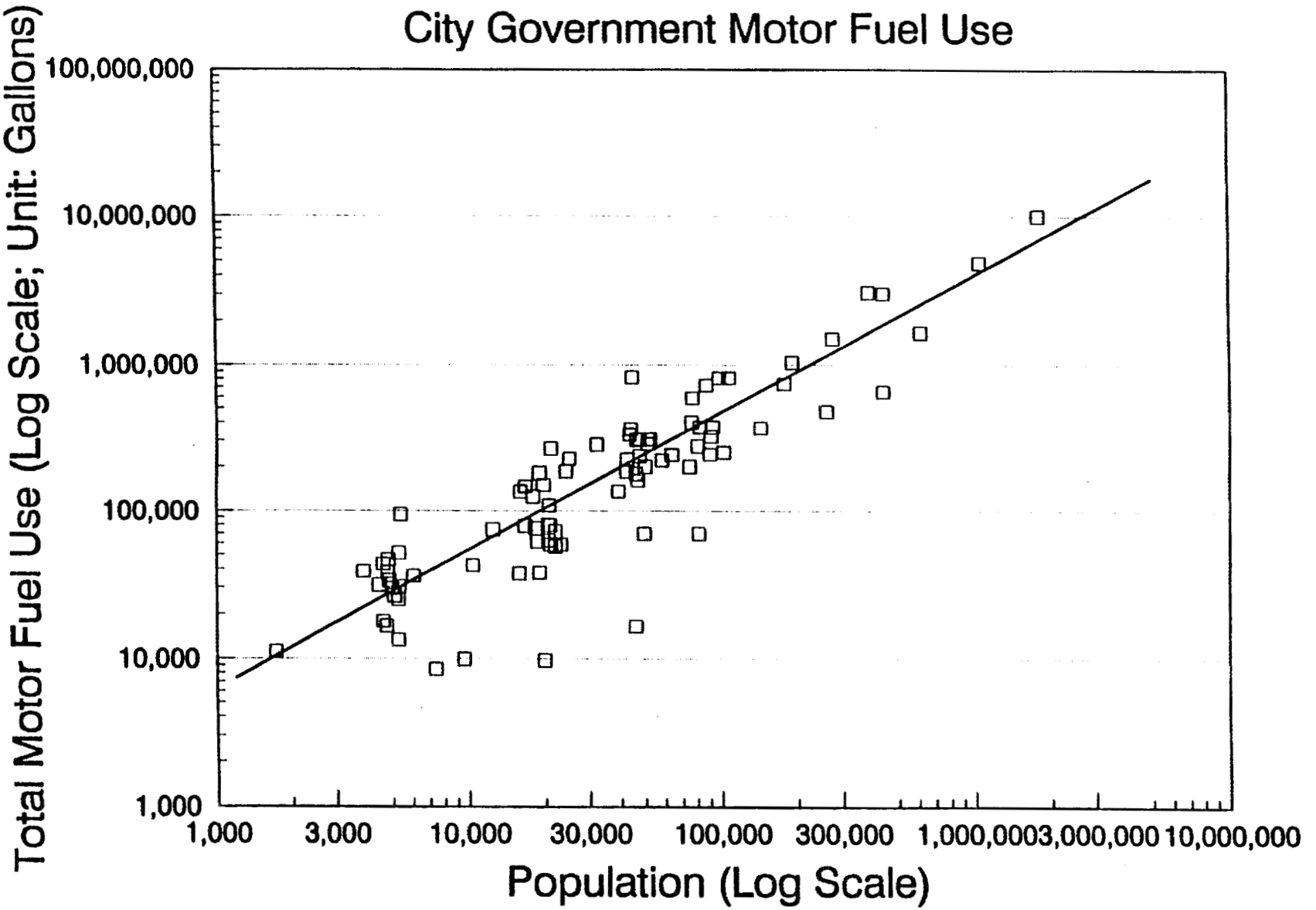

Figure 4. City government fuel use versus city population.

Table 18. Estimated regression parameters and associated statistics using Method 2 - a population-based method

Dependent Variable = log (Total Highway and Non-highway Use in Gallons)

Covariates and Statistics	State		County		Municipal
	Model 1	Model 2	Model 1	Model 2	Model 1
Intercept α	3.7135 (1.77)	4.8560 (2.79)	6.8546 (5.66)	5.7690 (6.95)	2.2920 (4.14)
Log (Pop) β	0.7391 (6.22)	0.7297 (6.17)	0.5439 (7.09)	0.5641 (7.50)	0.9228 (17.44)
Log (Land) γ	0.0950 (0.98)	- - - - - -	-0.1257 (-1.23)	- - - - -	- - - - - -
Log (Pop) δ (State DOT use only)	-0.0540 (-3.01)	-0.0479 (-2.85)	- - - - - -	- - - - - -	- - - - - -
Residual standard deviation, $\hat{\sigma}$	0.4733	0.4726	0.8622	0.8652	0.6835
Var ($\hat{\alpha}$)		3.0323		0.6895	0.3069
Var ($\hat{\beta}$)		0.0140		0.0057	0.0028
Cov ($\hat{\alpha}$, $\hat{\beta}$)		-0.2054		-0.0620	-0.0291
Sample Size, n	19	19	75	75	87
Number of parameters, p	4	3	3	2	2
R^2	0.76	0.74	0.45	0.44	0.78

Note: Values in parentheses are t-statistics of the estimates above.

Table 19. Estimates of State and local governments motor fuel use for year 1992 – Method 2

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
AL	33,430,768 (45%)	1,374,826 (438%)	15,188,077 (82%)	49,993,672 (15%)	1,779,808 (195%)	34,780 (796%)	4,873,905 (120%)	6,688,494 (104%)	56,682,164 (7%)
AK	6,179,161 (45%)	254,115 (439%)	2,807,282 (82%)	9,240,558 (17%)	328,970 (195%)	6,429 (797%)	900,866 (121%)	1,236,265 (104%)	10,476,823 (9%)
AZ	26,665,168 (45%)	1,096,594 (438%)	12,114,368 (82%)	39,876,132 (16%)	1,419,617 (195%)	27,741 (797%)	3,887,542 (120%)	5,334,901 (104%)	45,211,032 (8%)
AR	23,137,820 (45%)	951,533 (438%)	10,511,843 (82%)	34,601,196 (16%)	1,231,826 (195%)	24,072 (796%)	3,373,286 (120%)	4,629,184 (104%)	39,230,380 (7%)
CA	177,391,360 (45%)	7,295,144 (439%)	80,591,440 (83%)	265,277,952 (17%)	9,444,073 (196%)	184,552 (798%)	25,862,066 (121%)	35,490,692 (105%)	300,768,640 (10%)
CO	28,117,318 (45%)	1,156,313 (438%)	12,774,100 (82%)	42,047,732 (15%)	1,496,927 (195%)	29,252 (796%)	4,099,252 (120%)	5,625,432 (104%)	47,673,164 (6%)
CT	18,516,532 (45%)	761,484 (438%)	8,412,326 (82%)	27,690,342 (16%)	985,795 (195%)	19,264 (797%)	2,699,544 (120%)	3,704,603 (104%)	31,394,944 (8%)
DE	4,535,898 (46%)	186,537 (439%)	2,060,723 (83%)	6,783,158 (18%)	241,485 (196%)	4,719 (799%)	661,293 (121%)	907,497 (105%)	7,690,655 (11%)
DC	3,355,212 (47%)	137,982 (441%)	1,524,321 (84%)	5,017,514 (20%)	178,627 (197%)	3,491 (802%)	489,160 (122%)	671,277 (105%)	5,688,791 (14%)
FL	76,699,744 (45%)	3,154,244 (438%)	34,845,792 (82%)	114,699,784 (16%)	4,083,389 (195%)	79,796 (797%)	11,182,133 (121%)	15,345,318 (104%)	130,045,104 (9%)
GA	49,088,020 (45%)	2,018,724 (438%)	22,301,390 (82%)	73,408,136 (16%)	2,613,379 (195%)	51,069 (796%)	7,156,592 (120%)	9,821,040 (104%)	83,229,176 (7%)
HI	8,604,680 (46%)	353,864 (439%)	3,909,229 (83%)	12,867,773 (17%)	458,101 (196%)	8,952 (799%)	1,254,485 (121%)	1,721,538 (105%)	14,589,311 (11%)
ID	10,994,063 (45%)	452,126 (438%)	4,994,761 (82%)	16,440,950 (16%)	585,309 (195%)	11,438 (797%)	1,602,836 (120%)	2,199,582 (104%)	18,640,532 (8%)
IL	84,199,992 (45%)	3,462,689 (438%)	38,253,264 (82%)	125,915,944 (16%)	4,482,692 (195%)	87,599 (796%)	12,275,601 (120%)	16,845,892 (104%)	142,761,840 (7%)
IN	45,268,128 (45%)	1,861,632 (438%)	20,565,958 (82%)	67,695,720 (15%)	2,410,013 (195%)	47,095 (796%)	6,599,686 (120%)	9,056,794 (104%)	76,752,512 (7%)
IA	28,708,064 (45%)	1,180,607 (438%)	13,042,485 (82%)	42,931,156 (16%)	1,528,378 (195%)	29,867 (796%)	4,185,378 (120%)	5,743,623 (104%)	48,674,780 (7%)
KS	26,031,338 (45%)	1,070,528 (438%)	11,826,410 (82%)	38,928,276 (15%)	1,385,873 (195%)	27,082 (796%)	3,795,135 (120%)	5,208,090 (104%)	44,136,368 (7%)
KY	32,425,592 (45%)	1,333,489 (438%)	14,731,411 (82%)	48,490,492 (16%)	1,726,294 (195%)	33,734 (796%)	4,727,360 (120%)	6,487,388 (104%)	54,977,880 (7%)
LA	33,127,030 (45%)	1,362,335 (438%)	15,050,085 (82%)	49,539,452 (15%)	1,763,638 (195%)	34,464 (796%)	4,829,623 (120%)	6,627,725 (104%)	56,167,176 (7%)

Table 19. Estimates of State and local governments motor fuel use for year 1992 – Method 2 (continued)

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
ME	9,262,010 (45%)	380,896 (438%)	4,207,864 (82%)	13,850,770 (16%)	493,097 (195%)	9,636 (796%)	1,350,318 (120%)	1,853,050 (104%)	15,703,820 (8%)
MD	24,899,642 (45%)	1,023,987 (438%)	11,312,265 (82%)	37,235,896 (16%)	1,325,623 (195%)	25,905 (797%)	3,630,144 (120%)	4,981,672 (104%)	42,217,568 (9%)
MA	32,786,786 (45%)	1,348,343 (438%)	14,895,507 (82%)	49,030,636 (16%)	1,745,524 (195%)	34,110 (797%)	4,780,019 (121%)	6,559,653 (104%)	55,590,288 (9%)
MI	62,114,224 (45%)	2,554,421 (438%)	28,219,382 (82%)	92,888,032 (16%)	3,306,876 (195%)	64,621 (796%)	9,055,695 (120%)	12,427,193 (104%)	105,315,224 (8%)
MN	39,692,176 (45%)	1,632,324 (438%)	18,032,726 (82%)	59,357,228 (15%)	2,113,157 (195%)	41,294 (796%)	5,786,763 (120%)	7,941,214 (104%)	67,298,440 (6%)
MS	24,234,388 (45%)	996,629 (438%)	11,010,030 (82%)	36,241,048 (16%)	1,290,206 (195%)	25,213 (796%)	3,533,156 (120%)	4,848,575 (104%)	41,089,624 (7%)
MO	43,020,812 (45%)	1,769,213 (438%)	19,544,972 (82%)	64,335,000 (15%)	2,290,369 (195%)	44,757 (796%)	6,272,049 (120%)	8,607,175 (104%)	72,942,176 (7%)
MT	9,441,103 (45%)	388,261 (439%)	4,289,229 (82%)	14,118,593 (17%)	502,631 (195%)	9,822 (797%)	1,376,428 (121%)	1,888,882 (104%)	16,007,474 (9%)
NE	17,152,288 (45%)	705,381 (438%)	7,792,531 (82%)	25,650,200 (16%)	913,164 (195%)	17,845 (797%)	2,500,650 (120%)	3,431,659 (104%)	29,081,858 (8%)
NV	9,589,063 (45%)	394,346 (438%)	4,356,449 (82%)	14,339,858 (16%)	510,509 (195%)	9,976 (796%)	1,397,999 (120%)	1,918,484 (104%)	16,258,342 (7%)
NH	8,332,047 (45%)	342,652 (438%)	3,785,368 (82%)	12,460,067 (16%)	443,587 (195%)	8,668 (797%)	1,214,738 (120%)	1,666,993 (104%)	14,127,060 (8%)
NJ	46,318,444 (45%)	1,904,826 (438%)	21,043,134 (82%)	69,266,408 (16%)	2,465,931 (195%)	48,188 (797%)	6,752,813 (120%)	9,266,932 (104%)	78,533,344 (8%)
NM	14,279,389 (45%)	587,234 (438%)	6,487,331 (82%)	21,353,954 (15%)	760,215 (195%)	14,856 (796%)	2,081,807 (120%)	2,856,878 (104%)	24,210,832 (7%)
NY	98,316,504 (46%)	4,043,224 (440%)	44,666,600 (83%)	147,026,336 (18%)	5,234,236 (196%)	102,285 (799%)	14,333,663 (121%)	19,670,184 (105%)	166,696,512 (11%)
NC	48,224,492 (45%)	1,983,212 (438%)	21,909,078 (82%)	72,116,784 (16%)	2,567,406 (195%)	50,171 (796%)	7,030,697 (120%)	9,648,274 (104%)	81,765,056 (7%)
ND	8,175,054 (45%)	336,196 (439%)	3,714,044 (83%)	12,225,294 (17%)	435,229 (195%)	8,505 (798%)	1,191,849 (121%)	1,635,583 (104%)	13,860,877 (10%)
OH	77,413,720 (45%)	3,183,606 (438%)	35,170,160 (82%)	115,767,488 (16%)	4,121,400 (195%)	80,538 (796%)	11,286,224 (120%)	15,488,163 (104%)	131,255,648 (7%)
OK	30,035,820 (45%)	1,235,210 (438%)	13,645,704 (82%)	44,916,736 (15%)	1,599,066 (195%)	31,248 (796%)	4,378,953 (120%)	6,009,267 (104%)	50,926,004 (6%)

Table 19. Estimates of State and local governments motor fuel use for year 1992 – Method 2 (continued)

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
OH	77,413,720 (45%)	3,183,606 (438%)	35,170,160 (82%)	115,767,488 (16%)	4,121,400 (195%)	80,538 (796%)	11,286,224 (120%)	15,488,163 (104%)	131,255,648 (7%)
OK	30,035,820 (45%)	1,235,210 (438%)	13,645,704 (82%)	44,916,736 (15%)	1,599,066 (195%)	31,248 (796%)	4,378,953 (120%)	6,009,267 (104%)	50,926,004 (6%)
OR	22,498,590 (45%)	925,245 (438%)	10,221,432 (82%)	33,645,268 (15%)	1,197,794 (195%)	23,407 (796%)	3,280,092 (120%)	4,501,293 (104%)	38,146,560 (6%)
PA	70,453,552 (45%)	2,897,372 (438%)	32,008,060 (82%)	105,358,992 (16%)	3,750,851 (195%)	73,297 (797%)	10,271,495 (120%)	14,095,643 (104%)	119,454,632 (8%)
RI	7,607,013 (45%)	312,835 (438%)	3,455,975 (82%)	11,375,823 (16%)	404,987 (195%)	7,914 (797%)	1,109,034 (120%)	1,521,935 (104%)	12,897,758 (8%)
SC	25,001,852 (45%)	1,028,190 (438%)	11,358,700 (82%)	37,388,744 (16%)	1,331,064 (195%)	26,011 (796%)	3,645,045 (120%)	5,002,121 (104%)	42,390,864 (7%)
SD	9,058,911 (45%)	372,544 (439%)	4,115,593 (83%)	13,547,048 (17%)	482,284 (196%)	9,425 (798%)	1,320,708 (121%)	1,812,416 (105%)	15,359,464 (10%)
TN	39,557,404 (45%)	1,626,781 (438%)	17,971,494 (82%)	59,155,680 (15%)	2,105,982 (195%)	41,154 (796%)	5,767,114 (120%)	7,914,250 (104%)	67,069,928 (7%)
TX	128,689,472 (45%)	5,292,300 (438%)	58,465,472 (82%)	192,447,248 (16%)	6,851,251 (195%)	133,884 (797%)	18,761,768 (120%)	25,746,902 (104%)	218,194,144 (8%)
UT	16,138,856 (45%)	663,704 (438%)	7,332,114 (82%)	24,134,674 (15%)	859,211 (195%)	16,790 (796%)	2,352,900 (120%)	3,228,901 (104%)	27,363,576 (6%)
VT	5,196,905 (45%)	213,720 (439%)	2,361,028 (83%)	7,771,654 (17%)	276,676 (195%)	5,407 (798%)	757,662 (121%)	1,039,745 (104%)	8,811,398 (10%)
VA	46,092,484 (45%)	1,895,534 (438%)	20,940,476 (82%)	68,928,496 (16%)	2,453,901 (195%)	47,953 (796%)	6,719,870 (120%)	9,221,724 (104%)	78,150,224 (7%)
WA	31,811,440 (45%)	1,308,232 (438%)	14,452,394 (82%)	47,572,068 (16%)	1,693,598 (195%)	33,095 (796%)	4,637,823 (120%)	6,364,516 (104%)	53,936,584 (7%)
WV	15,952,778 (45%)	656,051 (438%)	7,247,576 (82%)	23,856,406 (16%)	849,304 (195%)	16,597 (796%)	2,325,772 (120%)	3,191,673 (104%)	27,048,078 (8%)
WI	40,923,408 (45%)	1,682,958 (438%)	18,592,092 (82%)	61,198,460 (15%)	2,178,706 (195%)	42,575 (796%)	5,966,266 (120%)	8,187,547 (104%)	69,386,008 (7%)
WY	5,947,056 (45%)	244,570 (439%)	2,701,833 (82%)	8,893,459 (17%)	316,613 (195%)	6,187 (798%)	867,027 (121%)	1,189,828 (104%)	10,083,286 (9%)
TOTAL	1,784,693,760 (45%)	73,394,768 (438%)	810,811,968 (82%)	2,668,900,610 (16%)	95,014,648 (195%)	1,856,731 (796%)	260,192,320 (120%)	357,063,712 (104%)	3,025,964,290 (7%)

Note: Values in parentheses are standard deviations of the estimates above (in percentages of the estimates).

Table 20. Estimates of State and local governments motor fuel use for year 1995 – Method 2

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
AL	33,718,336	1,386,652	15,318,724	50,423,716	1,795,118	35,079	4,915,831	6,746,028	57,169,744
AK	6,362,372	261,650	2,890,517	9,514,539	338,724	6,619	927,577	1,272,920	10,787,459
AZ	28,075,598	1,154,597	12,755,147	41,985,344	1,494,706	29,209	4,093,170	5,617,085	47,602,428
AR	23,405,796	962,553	10,633,589	35,001,940	1,246,092	24,351	3,412,355	4,682,798	39,684,736
CA	184,091,328	7,570,677	83,635,328	275,297,344	9,800,770	191,522	26,838,862	36,831,156	312,128,512
CO	29,196,554	1,200,696	13,264,413	43,661,664	1,554,385	30,375	4,256,596	5,841,355	49,503,020
CT	18,756,294	771,345	8,521,253	28,048,892	998,559	19,513	2,734,499	3,752,572	31,801,464
DE	4,595,133	188,973	2,087,635	6,871,741	244,639	4,781	669,929	919,348	7,791,089
DC	3,383,020	139,125	1,536,954	5,059,099	180,107	3,520	493,214	676,841	5,735,940
FL	80,259,608	3,300,642	36,463,092	120,023,344	4,272,911	83,499	11,701,129	16,057,540	136,080,880
GA	50,147,324	2,062,287	22,782,648	74,992,264	2,669,775	52,171	7,311,030	10,032,976	85,025,240
HI	8,840,888	363,578	4,016,542	13,221,008	470,677	9,198	1,288,922	1,768,796	14,989,804
ID	11,200,789	460,628	5,088,679	16,750,096	596,315	11,653	1,632,974	2,240,942	18,991,038
IL	84,335,984	3,468,281	38,315,044	126,119,312	4,489,932	87,740	12,295,428	16,873,100	142,992,416
IN	45,420,468	1,867,897	20,635,170	67,923,536	2,418,123	47,254	6,621,896	9,087,273	77,010,808
IA	28,716,002	1,180,933	13,046,091	42,943,028	1,528,801	29,875	4,186,535	5,745,211	48,688,240
KS	26,297,708	1,081,482	11,947,425	39,326,616	1,400,054	27,359	3,833,969	5,261,383	44,588,000
KY	32,677,806	1,343,861	14,845,996	48,867,664	1,739,722	33,997	4,764,131	6,537,849	55,405,512
LA	33,253,834	1,367,550	15,107,694	49,729,080	1,770,389	34,596	4,848,110	6,653,095	56,382,176
ME	9,435,360	388,025	4,286,620	14,110,005	502,326	9,816	1,375,591	1,887,733	15,997,738
MD	25,318,596	1,041,216	11,502,601	37,862,416	1,347,927	26,341	3,691,224	5,065,492	42,927,908
MA	33,246,794	1,367,260	15,104,495	49,718,552	1,770,014	34,589	4,847,084	6,651,687	56,370,240
MI	62,319,356	2,562,857	28,312,576	93,194,792	3,317,797	64,835	9,085,602	12,468,234	105,663,024
MN	40,461,252	1,663,952	18,382,126	60,507,332	2,154,102	42,094	5,898,887	8,095,083	68,602,416
MS	24,338,138	1,000,896	11,057,165	36,396,200	1,295,729	25,321	3,548,282	4,869,332	41,265,532
MO	43,404,276	1,784,982	19,719,184	64,908,444	2,310,784	45,156	6,327,954	8,683,894	73,592,336
MT	9,538,395	392,262	4,333,430	14,264,088	507,811	9,923	1,390,612	1,908,347	16,172,435
NE	17,228,232	708,504	7,827,033	25,763,768	917,207	17,924	2,511,721	3,446,852	29,210,620
NV	10,091,375	415,003	4,584,656	15,091,035	537,251	10,499	1,471,232	2,018,981	17,110,016
NH	8,657,190	356,023	3,933,086	12,946,299	460,897	9,007	1,262,140	1,732,044	14,678,343
NJ	46,655,940	1,918,706	21,196,462	69,771,112	2,483,899	48,539	6,802,017	9,334,455	79,105,568
NM	14,720,430	605,371	6,687,702	22,013,504	783,696	15,315	2,146,106	2,945,117	24,958,620
NY	98,655,536	4,057,167	44,820,624	147,533,328	5,252,286	102,638	14,383,090	19,738,014	167,271,344

Table 20. Estimates of State and local governments motor fuel use for year 1995 -- Method 2 (continued)

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
NC	49,146,336	2,021,122	22,327,884	73,495,344	2,616,483	51,130	7,165,094	9,832,707	83,328,048
ND	8,253,444	339,419	3,749,658	12,342,521	439,402	8,587	1,203,278	1,651,267	13,993,787
OH	77,515,648	3,187,798	35,216,472	115,919,920	4,126,827	80,645	11,301,085	15,508,557	131,428,480
OK	30,549,170	1,256,322	13,878,926	45,684,420	1,626,396	31,782	4,453,795	6,111,973	51,796,392
OR	23,015,452	946,501	10,456,250	34,418,204	1,225,311	23,944	3,355,446	4,604,702	39,022,904
PA	70,564,952	2,901,954	32,058,672	105,525,584	3,756,781	73,413	10,287,736	14,117,931	119,643,512
RI	7,697,532	316,558	3,497,099	11,511,189	409,806	8,008	1,122,231	1,540,045	13,051,234
SC	25,528,392	1,049,844	11,597,914	38,176,152	1,359,097	26,559	3,721,810	5,107,466	43,283,616
SD	9,094,173	373,994	4,131,613	13,599,780	484,161	9,461	1,325,849	1,819,471	15,419,251
TN	40,097,956	1,649,011	18,217,076	59,964,048	2,134,760	41,716	5,845,922	8,022,399	67,986,448
TX	132,473,648	5,447,922	60,184,676	198,106,256	7,052,715	137,821	19,313,468	26,504,004	224,610,256
UT	16,823,762	691,870	7,643,277	25,158,910	895,674	17,503	2,452,753	3,365,930	28,524,840
VT	5,316,354	218,633	2,415,296	7,950,283	283,035	5,531	775,077	1,063,643	9,013,926
VA	47,024,704	1,933,871	21,363,998	70,322,576	2,503,531	48,923	6,855,779	9,408,233	79,730,808
WA	32,800,486	1,348,906	14,901,731	49,051,124	1,746,253	34,124	4,782,016	6,562,394	55,613,516
WV	15,924,673	654,895	7,234,807	23,814,376	847,808	16,567	2,321,674	3,186,050	27,000,426
WI	41,410,632	1,702,995	18,813,444	61,927,072	2,204,645	43,082	6,037,298	8,285,026	70,212,096
WY	6,117,515	251,580	2,779,275	9,148,370	325,688	6,364	891,879	1,223,931	10,372,301
TOTAL	1,816,159,740	74,688,792	825,107,392	2,715,955,970	96,689,848	1,889,467	264,779,744	363,359,072	3,079,314,940

Table 21. Estimates of State and local governments motor fuel use for year 2000 – Method 2

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
AL	34,140,072	1,403,996	15,510,324	51,054,392	1,817,570	35,518	4,977,316	6,830,404	57,884,796
AK	6,697,868	275,447	3,042,937	10,016,252	356,585	6,968	976,489	1,340,042	11,356,294
AZ	29,942,930	1,231,390	13,603,502	44,777,824	1,594,121	31,152	4,365,410	5,990,683	50,768,508
AR	23,784,508	978,128	10,805,643	35,568,280	1,266,255	24,745	3,467,568	4,758,567	40,326,848
CA	193,174,944	7,944,237	87,762,152	288,881,344	10,284,369	200,972	28,163,170	38,648,512	327,529,856
CO	30,702,784	1,262,639	13,948,715	45,914,140	1,634,574	31,942	4,476,190	6,142,707	52,056,848
CT	19,082,130	784,744	8,669,285	28,536,160	1,015,906	19,852	2,782,003	3,817,762	32,353,922
DE	4,678,388	192,397	2,125,459	6,996,243	249,071	4,867	682,067	936,005	7,932,248
DC	3,434,073	141,225	1,560,149	5,135,447	182,825	3,573	500,657	687,055	5,822,502
FL	84,939,728	3,493,110	38,589,336	127,022,176	4,522,075	88,368	12,383,449	16,993,892	144,016,064
GA	51,528,000	2,119,067	23,409,908	77,056,976	2,743,280	53,608	7,512,319	10,309,207	87,366,184
HI	9,161,500	376,763	4,162,201	13,700,464	487,746	9,531	1,335,664	1,832,941	15,533,405
ID	11,504,455	473,116	5,226,639	17,204,210	612,481	11,969	1,677,246	2,301,696	19,505,906
IL	84,963,368	3,494,082	38,600,076	127,057,536	4,523,333	88,393	12,386,896	16,998,622	144,056,160
IN	45,725,620	1,880,447	20,773,804	68,379,872	2,434,369	47,571	6,666,385	9,148,325	77,528,200
IA	28,792,146	1,184,065	13,080,684	43,056,896	1,532,854	29,954	4,197,636	5,760,445	48,817,340
KS	26,660,338	1,096,395	12,112,174	39,868,908	1,419,360	27,736	3,886,838	5,333,935	45,202,844
KY	33,080,046	1,360,403	15,028,739	49,469,188	1,761,136	34,415	4,822,774	6,618,325	56,087,512
LA	33,892,616	1,393,819	15,397,902	50,684,340	1,804,396	35,261	4,941,239	6,780,896	57,465,236
ME	9,659,807	397,255	4,388,589	14,445,652	514,275	10,050	1,408,313	1,932,638	16,378,290
MD	25,917,226	1,065,835	11,774,567	38,757,628	1,379,798	26,963	3,778,499	5,185,260	43,942,888
MA	33,872,196	1,392,980	15,388,624	50,653,800	1,803,309	35,239	4,938,262	6,776,811	57,430,612
MI	62,952,656	2,588,901	28,600,294	94,141,856	3,351,513	65,494	9,177,931	12,594,938	106,736,792
MN	41,483,728	1,706,001	18,846,652	62,036,384	2,208,537	43,158	6,047,955	8,299,650	70,336,032
MS	24,566,072	1,010,269	11,160,718	36,737,060	1,307,864	25,558	3,581,513	4,914,935	41,651,996
MO	43,993,412	1,809,210	19,986,838	65,789,460	2,342,149	45,769	6,413,844	8,801,762	74,591,224
MT	9,707,947	399,235	4,410,460	14,517,642	516,838	10,100	1,415,331	1,942,269	16,459,911
NE	17,346,662	713,374	7,880,837	25,940,874	923,512	18,047	2,528,987	3,470,547	29,411,420
NV	10,790,392	443,750	4,902,230	16,136,372	574,466	11,226	1,573,142	2,158,834	18,295,206
NH	9,063,711	372,741	4,117,774	13,554,226	482,540	9,430	1,321,408	1,813,377	15,367,603
NJ	47,208,464	1,941,428	21,447,482	70,597,376	2,513,314	49,114	6,882,570	9,444,998	80,042,376
NM	15,368,946	632,041	6,982,333	22,983,320	818,222	15,989	2,240,654	3,074,865	26,058,184
NY	99,377,776	4,086,868	45,148,748	148,613,392	5,290,736	103,389	14,488,386	19,882,512	168,495,904

Table 21. Estimates of State and local governments motor fuel use for year 2000 – Method 2 (continued)

	HIGHWAY USE				NON-HIGHWAY				
STATE	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
NC	50,253,444	2,066,651	22,830,860	75,150,960	2,675,425	52,282	7,326,501	10,054,207	85,205,168
ND	8,372,273	344,306	3,803,644	12,520,223	445,728	8,710	1,220,602	1,675,041	14,195,264
OH	77,916,256	3,204,273	35,398,472	116,519,008	4,148,155	81,061	11,359,490	15,588,706	132,107,712
OK	31,310,090	1,287,614	14,224,623	46,822,328	1,666,906	32,574	4,564,730	6,264,210	53,086,536
OR	23,703,556	974,799	10,768,865	35,447,220	1,261,945	24,660	3,455,765	4,742,371	40,189,592
PA	70,975,528	2,918,838	32,245,200	106,139,568	3,778,640	73,840	10,347,594	14,200,074	120,339,640
RI	7,820,432	321,612	3,552,934	11,694,978	416,349	8,136	1,140,149	1,564,634	13,259,612
SC	26,171,762	1,076,303	11,890,207	39,138,272	1,393,349	27,228	3,815,608	5,236,185	44,374,456
SD	9,151,159	376,338	4,157,503	13,685,000	487,195	9,521	1,334,157	1,830,873	15,515,872
TN	40,760,280	1,676,249	18,517,978	60,954,508	2,170,021	42,406	5,942,482	8,154,909	69,109,416
TX	138,457,856	5,694,020	62,903,388	207,055,264	7,371,306	144,047	20,185,910	27,701,264	234,756,528
UT	17,736,256	729,396	8,057,836	26,523,488	944,254	18,452	2,585,787	3,548,493	30,071,982
VT	5,464,773	224,736	2,482,725	8,172,234	290,937	5,685	796,715	1,093,337	9,265,571
VA	48,223,584	1,983,174	21,908,664	72,115,424	2,567,358	50,170	7,030,565	9,648,093	81,763,520
WA	34,137,780	1,403,902	15,509,283	51,050,968	1,817,449	35,516	4,976,982	6,829,947	57,880,916
WV	16,024,324	658,993	7,280,080	23,963,398	853,113	16,671	2,336,202	3,205,987	27,169,384
WI	42,084,764	1,730,718	19,119,712	62,935,196	2,240,535	43,783	6,135,581	8,419,899	71,355,096
WY	6,373,553	262,110	2,895,596	9,531,259	339,319	6,631	929,207	1,275,157	10,806,416
TOTAL	1,862,135,420	76,579,520	845,994,816	2,784,709,890	99,137,536	1,937,299	271,482,624	372,557,472	3,157,267,460

7. COMPARISONS OF ESTIMATES AND RECOMMENDATIONS

Without adjusting for nonsampling errors, Table 22 gives a comparison of the estimated total SCM government fuel use from the vehicle-based and population-based methods for year 1992. The comparison is made by fuel type and by highway and nonhighway use. Overall, the estimate from the vehicle-based method was about 162 percent higher than that from the population-based method. After adjusting for the nonsampling errors indicated in Chapters 5 and 6, i.e., scaling the estimates down by 10 percent for the vehicle-based method and scaling the estimates up by 50 percent for the population-based method, the estimates from the population-based method were still about 36 percent lower than those from the vehicle-based method.

Without adjusting for nonsampling errors, Table 23 compares the 1991 estimates of **gasoline and gasohol** using the vehicle- and population-based methods with those published in *Highway Statistics*. Overall, the estimate from the vehicle-based method was about 48 percent higher than the estimate presented in *Highway Statistics*, and the estimate from the population-based method was about 43 percent lower. Both methods showed lower estimates of nonhighway use than those published in *Highway Statistics*. After adjusting for nonsampling errors, the estimates from the vehicle-based method were about 33 percent higher than the *Highway Statistics* estimates and the estimates from the population-based method were about 15 percent lower.

Our current recommendation is to use the estimates from the population-based method since population can be estimated and predicted with relatively good accuracy. These estimates, however, need to be adjusted for nonsampling errors due, mainly, to the underreporting of fuels used by school systems and fuels purchased at noncontract gasoline stations. That is, our final recommended estimates are those estimates presented in Tables 19, 20, and 21 multiplied by a factor of 1.50. The total fuel use estimates are 2.92, 2.97, and 3.05 billion gallons in years 1992, 1995, and 2000, respectively.

To make the estimation of government motor fuel use complete, Appendix F gives fuel use estimates for the Federal government. The estimate is about 0.28 billion gallons for 1992.

Based on the discussion in Chapter 3, our suggestions for future data collections are summarized as follows:

1. In view of the nonsampling errors and the low response rate (44 percent) found in this study, the next few data collections should be carried out every 3 years with emphasis on correcting nonsampling errors and improving response rate.
2. In future data collection, school districts and county- and city-dependent school systems should be sampled separately.

3. The questionnaire should allow respondents to report other fuel types, such as propane, natural gas, and methanol.
4. We need to ask the respondents to distinguish fuels pumped from the following three types of fueling facilities: government-operated on-site fueling facilities, contract local gasoline stations, and noncontract gasoline stations.

Table 22. Comparison of total State and local governments fuel use estimates for 1992 from Methods 1 and 2

(millions of gallons)

	Highway Use				Non-highway Use				
	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	Total
Method 1	2,939.9	120.9	1,335.7	4,396.5	190.0	3.7	520.3	714.0	5,110.5
	(57.5%)	(2.4%)	(26.1%)	(86.0%)	(3.7%)	(0.1%)	(10.2%)	(14.0%)	(100%)
Method 2	1,784.7	73.4	810.8	2,668.9	95.0	1.9	260.2	357.1	3,026.0
	(59.0%)	(2.4%)	(26.8%)	(88.2%)	(3.1%)	(0.1%)	(8.6%)	(11.8%)	(100%)
Method 1 / Method 2	1.65	1.65	1.65	1.65	2.0	1.95	2.0	2.0	1.69

Notes: Method 1 = vehicle-based method.
Method 2 = population-based method.

Table 23. Comparison of State and local governments gasoline use estimates for year 1991

(thousands of gallons)

	Highway Statistics			Method 1 (Vehicle-based)			Method 2 (Population-based)			% Difference Method 1/Hwy Statistics			% Difference Method 2/Hwy Statistics		
STATES	Hwy	Non-Hwy	Total	Hwy	Non-Hwy	Total	Hwy	Non-Hwy	Total	Hwy	Non-Hwy	Total	Hwy	Non-Hwy	Total
AL	20,441	6,814	27,255	43,353	2,744	46,096	34,705	1,809	36,515	112.1	-59.7	69.1	69.8	-73.4	34.0
AK	4,044	2,653	6,697	5,730	363	6,092	6,369	332	6,701	41.7	-86.3	-9.0	57.5	-87.5	0.1
AZ	13,539	4,513	18,052	23,433	1,483	24,915	27,268	1,422	28,690	73.1	-67.1	38.0	101.4	-68.5	58.9
AR	10,330	3,443	13,773	23,907	1,513	25,420	23,996	1,251	25,247	131.4	-56.1	84.6	132.3	-63.7	83.3
CA	207,147	69,049	276,196	319,359	20,211	339,570	182,348	9,507	191,855	54.2	-70.7	22.9	-12.0	-86.2	-30.5
CO	30,850	9,726	40,576	29,843	1,889	31,731	28,895	1,506	30,402	-3.3	-80.6	-21.8	-6.3	-84.5	-25.1
CT	18,462	6,154	24,616	28,029	1,774	29,803	19,195	1,001	20,195	51.8	-71.2	21.1	4.0	-83.7	-18.0
DE	4,350	1,450	5,800	6,473	410	6,883	4,702	245	4,947	48.8	-71.7	18.7	8.1	-83.1	-14.7
DC	2,445	815	3,260	3,554	225	3,779	3,484	182	3,665	45.4	-72.4	15.9	42.5	-77.7	12.4
FL	118,663	39,554	158,217	240,884	15,244	256,128	78,606	4,098	82,704	103.0	-61.5	61.9	-33.8	-89.6	-47.7
GA	39,673	13,224	52,897	87,332	5,527	92,859	50,735	2,645	53,381	120.1	-58.2	75.5	27.9	-80.0	0.9
HI	6,241	2,080	8,321	10,504	665	11,169	8,876	463	9,339	68.3	-68.0	34.2	42.2	-77.8	12.2
ID	13,474	4,491	17,965	25,500	1,614	27,114	11,374	593	11,967	89.3	-64.1	50.9	-15.6	-86.8	-33.4
IL	47,225	15,742	62,967	63,233	4,002	67,234	87,615	4,568	92,183	33.9	-74.6	6.8	85.5	-71.0	46.4
IN	29,792	9,931	39,723	72,295	4,575	76,870	47,076	2,454	49,531	142.7	-53.9	93.5	58.0	-75.3	24.7
IA	23,036	7,678	30,714	47,318	2,995	50,313	29,886	1,558	31,444	105.4	-61.0	63.8	29.7	-79.7	2.4
KS	13,057	4,352	17,409	23,365	1,479	24,843	27,009	1,408	28,417	78.9	-66.0	42.7	106.9	-67.6	63.2
KY	40,815	13,605	54,420	80,095	5,069	85,163	33,671	1,755	35,426	96.2	-62.7	56.5	-17.5	-87.1	-34.9
LA	23,704	7,901	31,605	42,339	2,679	45,018	34,445	1,796	36,241	78.6	-66.1	42.4	45.3	-77.3	14.7
ME	6,865	2,288	9,153	16,128	1,021	17,148	9,582	500	10,082	134.9	-55.4	87.4	39.6	-78.2	10.1
MD	15,142	5,047	20,189	31,410	1,988	33,398	25,777	1,344	27,121	107.4	-60.6	65.4	70.2	-73.4	34.3
MA	21,998	7,333	29,331	31,971	2,023	33,994	33,975	1,771	35,746	45.3	-72.4	15.9	54.4	-75.8	21.9
MI	64,352	21,451	85,803	122,003	7,721	129,724	64,597	3,368	67,964	89.6	-64.0	51.2	0.4	-84.3	-20.8
MN	17,154	5,718	22,872	43,982	2,783	46,765	41,056	2,140	43,197	156.4	-51.3	104.5	139.3	-62.6	88.9
MS	10,407	3,469	13,876	31,395	1,987	33,382	25,195	1,314	26,508	201.7	-42.7	140.6	142.1	-62.1	91.0
MO	9,688	3,229	12,917	31,142	1,971	33,113	44,656	2,328	46,985	221.5	-39.0	156.4	360.9	-27.9	263.7
MT	8,032	2,677	10,709	15,150	959	16,109	9,795	511	10,306	88.6	-64.2	50.4	22.0	-80.9	-3.8
NE	12,842	4,281	17,123	28,185	1,784	29,969	17,831	930	18,761	119.5	-58.3	75.0	38.9	-78.3	9.6
NV	9,995	3,332	13,327	13,383	847	14,230	9,807	511	10,318	33.9	-74.6	6.8	-1.9	-84.7	-22.6
NH	7,063	2,354	9,417	11,549	731	12,280	8,561	446	9,007	63.5	-69.0	30.4	21.2	-81.0	-4.4
NJ	79,735	26,578	106,313	119,296	7,550	126,846	48,106	2,508	50,614	49.6	-71.6	19.3	-39.7	-90.6	-52.4
NM	14,446	4,815	19,261	21,451	1,358	22,809	14,712	767	15,479	48.5	-71.8	18.4	1.8	-84.1	-19.6
NY	79,113	26,371	105,484	140,293	8,878	149,172	102,242	5,330	107,572	77.3	-66.3	41.4	29.2	-79.8	2.0
NC	65,510	15,896	81,406	129,549	8,199	137,747	49,886	2,601	52,487	97.8	-48.4	69.2	-23.8	-83.6	-35.5
ND	5,627	1,876	7,503	11,767	745	12,512	8,484	442	8,926	109.1	-60.3	66.8	50.8	-76.4	19.0
OH	48,998	16,333	65,331	116,631	7,381	124,012	80,561	4,200	84,761	138.0	-54.8	89.8	64.4	-74.3	29.7

Table 23. Comparison of State and local governments gasoline use estimates for year 1991 (continued)

(thousands of gallons)

	Highway Statistics			Method 1 (Vehicle-based)			Method 2 (Population-based)			% Difference Method 1/Hwy Statistics			% Difference Method 2/Hwy Statistics		
STATES	Hwy	Non-Hwy	Total	Hwy	Non-Hwy	Total	Hwy	Non-Hwy	Total	Hwy	Non-Hwy	Total	Hwy	Non-Hwy	Total
ND	5,627	1,876	7,503	11,767	745	12,512	8,484	442	8,926	109.1	-60.3	66.8	50.8	-76.4	19.0
OH	48,998	16,333	65,331	116,631	7,381	124,012	80,561	4,200	84,761	138.0	-54.8	89.8	64.4	-74.3	29.7
OK	26,005	9,861	35,866	65,597	4,151	69,748	31,092	1,621	32,713	152.2	-57.9	94.5	19.6	-83.6	-8.8
OR	22,251	7,417	29,668	47,800	3,025	50,825	23,243	1,212	24,455	114.8	-59.2	71.3	4.5	-83.7	-17.6
PA	54,238	18,079	72,317	83,113	5,260	88,373	73,312	3,822	77,134	53.2	-70.9	22.2	35.2	-78.9	6.7
RI	4,665	1,555	6,220	6,583	417	6,999	7,888	411	8,300	41.1	-73.2	12.5	69.1	-73.6	33.4
SC	15,260	5,087	20,347	44,817	2,836	47,654	25,846	1,347	27,194	193.7	-44.2	134.2	69.4	-73.5	33.6
SD	6,915	2,305	9,220	16,172	1,023	17,195	9,419	491	9,910	133.9	-55.6	86.5	36.2	-78.7	7.5
TN	31,443	10,481	41,924	73,690	4,663	78,353	40,996	2,137	43,133	134.4	-55.5	86.9	30.4	-79.6	2.9
TX	207,677	69,226	276,903	397,892	25,181	423,072	132,660	6,916	139,576	91.6	-63.6	52.8	-36.1	-90.0	-49.6
UT	10,476	3,492	13,968	15,995	1,012	17,007	16,563	864	17,426	52.7	-71.0	21.8	58.1	-75.3	24.8
VT	3,511	1,170	4,681	10,006	633	10,640	5,369	280	5,649	185.0	-45.9	127.3	52.9	-76.1	20.7
VA	46,042	11,836	57,878	79,094	5,005	84,099	47,662	2,485	50,147	71.8	-57.7	45.3	3.5	-79.0	-13.4
WA	23,299	7,766	31,065	32,038	2,028	34,066	32,774	1,709	34,482	37.5	-73.9	9.7	40.7	-78.0	11.0
WV	33,577	11,192	44,769	54,346	3,439	57,786	16,618	866	17,485	61.9	-69.3	29.1	-50.5	-92.3	-60.9
WI	27,701	9,234	36,935	50,574	3,201	53,775	42,437	2,212	44,649	82.6	-65.3	45.6	53.2	-76.0	20.9
WY	6,209	2,070	8,279	11,610	735	12,344	6,132	320	6,452	87.0	-64.5	49.1	-1.2	-84.6	-22.1
TOTAL	1,663,524	546,994	2,210,518	3,081,158	194,922	3,276,150	1,847,090	96,298	1,943,388	85.2	-64.4	48.2	11.0	-82.4	-12.1

Notes: 1. Including gasohol use.
2. % Difference = (Method 1 or 2 Estimates - Highway Statistics Estimates)/Highway Statistics Estimates.

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APPENDIX A

QUESTIONNAIRE USED IN THE FULL DATA COLLECTION

GOVERNMENT USE OF MOTOR FUEL QUESTIONNAIRE

Oak Ridge National Laboratory
Oak Ridge, Tennessee 37831

This questionnaire contains questions pertaining to the government use of motor fuel (gasoline, gasohol, and diesel fuel). It was prepared by the Oak Ridge National Laboratory in support of research projects sponsored by the U.S. Department of Transportation. The purpose of this questionnaire is to gather information about the government use of motor fuel by vehicles and equipment (both on-road and off-road). This information will be used by the U.S. Department of Transportation to assist them in understanding the annual amount and the type of motor fuel used by State and local governments in 1992. Your cooperation is highly appreciated and needed.

Data for Calendar Year 1992 are preferred. However, if your data are kept by fiscal year, please complete the form with that information and indicate the beginning date of your fiscal year in the space provided. Also, if the data are not available for 1992, please provide information for the latest year possible and indicate that on the questionnaire.

Please complete the questionnaire and return to us as soon as possible. If you have any questions, please call **Stacy Davis at (615) 574-5957 (or Fax: (615) 574-3851).** Our address is:

Attn: Stacy C. Davis
Oak Ridge National Laboratory
P.O. Box 2008
MS 6366, Building 5500A
Oak Ridge, TN 37831

Please complete as many questions as you can. If you are unable to answer some of the questions and know someone who may be able to answer them, please forward this questionnaire to that person.

RESPONDENT INFORMATION

Your Name: _____
Title: _____
Phone Number: _____
Government Name: _____
Address: _____
_____
_____
_____

Please fill in all questions completely. Use zeros and/or N/A for not available where appropriate.

GENERAL INFORMATION

1. **Number of vehicles publicly-owned or -leased by the government in 1992:**
(If possible, please include those operated by your associated agencies, e.g., fire and police departments, universities, schools, public transits, public utilities. Please exclude, if possible, the National Guard.)

Cars: _____
Vans/Station Wagons/Jeep-Like Vehicles:_____
Buses: _____ (If known, how many of these vehicles use diesel fuel:_____)
Light Trucks (e.g., pickups; less than 10,000 lb.):_____
Medium/Heavy Trucks (greater than 10,000 lb.):_____ (If known, how many of these vehicles use diesel fuel:_____)
Other On-Road Vehicles:_____ (please indicate type of vehicle:_____)

Which of the following departments have you included in calculating the number of vehicles above (please circle)?

FIRE POLICE EDUCATIONAL INSTITUTIONS PUBLIC TRANSIT AUTHORITIES

PUBLIC UTILITIES[1] NATIONAL GUARD

2. **On average, how many miles did each vehicle travel in 1992?**

Cars: _____ Vans/Station Wagons/Jeep-Like Vehicles: _____
Buses: _____ Light Trucks (e.g., pickups; less than 10,000 lb.):_____
Medium/Heavy Trucks (greater than 10,000 lb.): _____
Other On-Road Vehicles: _____

3. **On average, what is the fuel economy of each vehicle (in miles per gallon)?**

Cars: _____ Vans/Station Wagons/Jeep-Like Vehicles: _____
Buses: _____ Light Trucks (e.g., pickups; less than 10,000 lb.):_____
Medium/Heavy Trucks (greater than 10,000 lb.): _____
Other On-Road Vehicles: _____

4. ***If this information was completed on a Fiscal Year basis,*** **what was the beginning date of the Fiscal Year?** _____

[1] Includes waste disposal and publicly-owned electric/water/sewer services.

GOVERNMENT USE OF MOTOR FUEL IN 1992

_____ State/County/City Government

5. How many gallons of motor fuel were purchased in bulk and used both on-road and off-road by your government in 1992? (If you cannot break the motor fuel use down by fuel types or on-road versus off-road use, please complete total and indicate that the breakdown is not available. Estimates are acceptable.)

ON-ROAD USE OR OFF-ROAD USE (by government owned or leased vehicles and equipment)	MOTOR-FUEL TYPE			
	(1) Gasoline (in gallons)	(2) Gasohol (in gallons)	(3) Diesel (in gallons)	(4) Total (1)+(2)+(3)
TOTAL (ON-ROAD[1] + OFF-ROAD USES[2])				
ON-ROAD USE[1] (If absolute numbers are not available, please indicate the percent of each fuel type that is on-road use.)				
OFF-ROAD USE[2] (See footnote) (If absolute numbers are not available, please indicate the percent of each fuel type that is off-road use.)				

Please fill in all boxes completely. Use zeros and/or N/A for not available where appropriate.

6. What is the percentage of these motor fuels used by the following departments in 1992 (if any)?

Safety Departments (fire & police departments): _____ %
Educational Institutions (universities/schools): _____ %
Public Transit Authorities: _____ %
Public Utilities (gas and electricity companies): _____ %
National Guard: _____ %

Thank you for your time and effort in completing this table.

---

[1]This includes use on public highways, roads, and streets.
[2]This may include the following uses:
agriculture use - off-highway farm equipment and vehicles.
aviation use - government owned, leased, or chartered airplanes, helicopters, etc.
construction use - off-highway construction equipment and vehicles
marine use - boats, ships, vessels, etc.
mining use - off-highway mining equipment and vehicles.
other use - off-highway equipment and vehicles, e.g., lawn mowers, garden tractors, snowmobiles, all-terrain vehicles, etc.

APPENDIX B

DETAILED RESPONSES TO EACH QUESTION - FULL SCALE DATA COLLECTION

RESPONSES TO ORNL QUESTIONNAIRE
STATE GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
REGION 1														
CONNECTICUT														
MAINE														
MASSACHUSETTS														
NEW HAMPSHIRE														
RHODE ISLAND														
VERMONT														
REGION 2														
NEW JERSEY														
NEW YORK[1]	2400	4100	U	U	U	U	U	U	13500	10000	U	U	U	U
PENNSYLVANIA														
REGION 3														
ILLINOIS														
INDIANA[2]	T41500	-	-	9843	-	-	-	-	U	U	U	U	U	U
MICHIGAN	4838	1571	1845[3]	-	-	-	-	30	10800	U	U	U	U	U
OHIO														
WISCONSIN														

[1]Vehicle and fuel use information are for state central agencies only.

RESPONSES TO ORNL QUESTIONNAIRE
STATE GOVERNMENTS
FUEL ECONOMY

State	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
REGION 1							
CONNECTICUT							
MAINE							
MASSACHUSETTS							
NEW HAMPSHIRE							
RHODE ISLAND							
VERMONT							
REGION 2							
NEW JERSEY							
NEW YORK	25	16	U	U	U	U	04/01/92
PENNSYLVANIA							
REGION 3							
ILLINOIS							
INDIANA	U	U	U	U	U	U	
MICHIGAN	U	U	U	U	U	U	10/01/92
OHIO							
WISCONSIN							

RESPONSES TO ORNL QUESTIONNAIRE
STATE GOVERNMENTS
MOTOR FUEL USES

State	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
REGION 1												
CONNECTICUT												
MAINE												
MASSACHUSETTS												
NEW HAMPSHIRE												
RHODE ISLAND												
VERMONT												
REGION 2												
NEW JERSEY												
NEW YORK[1]	U	U	U	U	U	U	U	U	20427300	N/A	7763200	28190500
PENNSYLVANIA												
REGION 3												
ILLINOIS												
INDIANA	U	U	U	U	U	U	U	U	6430000	200000	2640000	9270000
MICHIGAN	3506650	0	70000	3576650	0	0	0	0	3506650	0	70000	3576650
OHIO												
WISCONSIN												

[1]Vehicle and fuel use information are for state central agencies only. Police and school systems are not included.

RESPONSES TO ORNL QUESTIONNAIRE
STATE GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
REGION 4														
IOWA														
KANSAS														
MINNESOTA														
MISSOURI[1]	690	172	1	1	690	2012	1006	320	16500	14000	10000	22000	19000	U
NEBRASKA[2]														
NORTH DAKOTA	800	150	8	0	350	500	475	12	14000	12000	8000	12000	15000	500
SOUTH DAKOTA											000			
REGION 5														
DELAWARE	1203	425	500	0	1211	700	0	0	9800	9800	U	9800	N/A	N/A
FLORIDA														
GEORGIA														
MARYLAND[3]	5800	800	950	903	900	200	U	U	14000	10000	U	U	U	U
NORTH CAROLINA														
SOUTH CAROLINA	4800	2500	5475	3140	3500	3500	U	N/A	18000	18000	14000	15000	12000	N/A
VIRGINIA														
WEST VIRGINIA[4]	448	344	U	U	66	U	U	U	U	U	U	U	U	U

[1]Missouri Highway and Transportation Dept. only.
[2]Total number of vehicles registered under state, county, municipal, and school district plates are, respectively, 5463, 6414,9422, and 4703 in 1992.
[3]Excluding university systems.

RESPONSES TO ORNL QUESTIONNAIRE
STATE GOVERNMENTS
FUEL ECONOMY

State	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
REGION 4							
IOWA							
KANSAS							
MINNESOTA							
MISSOURI	25	12	6	10	7	U	
NEBRASKA							
NORTH DAKOTA	22	14	8	14	7	5	
SOUTH DAKOTA							
REGION 5							
DELAWARE	20	18	U	14	N/A	N/A	07/01/91
FLORIDA							
GEORGIA							
MARYLAND	20	16	U	U	U	U	
NORTH CAROLINA							
SOUTH CAROLINA	25	18	6	18	12	N/A	07/01/92
VIRGINIA							
WEST VIRGINIA	U	U	U	U	U	U	07/01/92

RESPONSES TO ORNL QUESTIONNAIRE
STATE GOVERNMENTS
MOTOR FUEL USES

State	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
REGION 4												
IOWA												
KANSAS												
MINNESOTA												
MISSOURI	U	U	U	U	U	U	U	U	3122203.2	0	4103725	7225928.2
NEBRASKA												
NORTH DAKOTA	U	U	U	U	U	U	U	U	1500000	0	1000000	2500000
SOUTH DAKOTA												
REGION 5												
DELAWARE[1]	1708861	0	461409	2170270	732369	0	248451	980820	2441230	0	709860	3151090
FLORIDA												
GEORGIA												
MARYLAND[2]	5445000	0	1275000	6720000	55000	0	225000	280000	5500000	0	1500000	7000000
NORTH CAROLINA												
SOUTH CAROLINA	18366500	0	6233000	24599500	U	0	U	U	18366500	0	6233000	24599500
VIRGINIA												
WEST VIRGINIA[3]	U	U	U	U	U	U	U	U	811862	U	U	811862

[1]Including fuels used by National Guard (15%).
[2]Excluding university systems.
[3]Also use 4,926 gallons of natural gas.

RESPONSES TO ORNL QUESTIONNAIRE
STATE GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
REGION 6														
ALABAMA	2634	435	35	U	4325	U	U	U	U	U	U	U	U	U
KENTUCKY														
MISSISSIPPI														
TENNESSEE [1]														
(Transportation)	252	334	0	0	1018	1124	775	137	U	U	N/A	U	U	U
(All Other)	1239	878	63	27	1101	319	214	332	U	U	U	U	U	U
REGION 7														
ARKANSAS	T6770	-	-	-	-	-	-	-	T11591	-	-	-	-	-
LOUISIANA	3073	1331	0	0	3810	150	U	0	11386.0	7639.1	N/A	7529.0	5344.5	N/A
OKLAHOMA														
TEXAS														
REGION 9														
ALASKA	741	849	26	U	1531	606	538	953	7500	7600	U	7200	U	U
CALIFORNIA														
HAWAII	2000	U	U	U	3000	U	U	U	U	U	U	U	U	U
OREGON														
WASHINGTON	1855	5453	11	U	2960	U	U	U	8808	10020	5832	6780	U	U

RESPONSES TO ORNL QUESTIONNAIRE
STATE GOVERNMENTS
FUEL ECONOMY

State	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
REGION 6							
ALABAMA	U	U	U	U	U	U	10/01/91
KENTUCKY							
MISSISSIPPI							
TENNESSEE							
(Transportation)	U	U	N/A	U	U	U	
(All Other)	U	U	U	U	U	U	07/01/92
REGION 7							
ARKANSAS	T12.48	-	-	-	-	-	04/01/92
LOUISIANA	16.6	12.5	N/A	10.3	7.0	N/A	07/01/92
OKLAHOMA							
TEXAS							
REGION 9							
ALASKA	U	U	U	U	U	U	07/01/91
CALIFORNIA							
HAWAII	20	U	U	15	U	U	07/01/92
OREGON							
WASHINGTON	26	10	U	26	U	U	

RESPONSES TO ORNL QUESTIONNAIRE
STATE GOVERNMENTS
MOTOR FUEL USES

State	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
REGION 6												
ALABAMA	90%	U	U	U	10%	U	U	U	U	U	U	6474181
KENTUCKY												
MISSISSIPPI												
TENNESSEE[1]												
(Transportation)	U	0	U	U	U	0	U	U	3438620	0	795598	4234218
(All Other)	U	0	U	U	U	0	U	U	2292414	0	530398	2822812
REGION 7												
ARKANSAS	U	U	U	U	U	U	U	U	U	U	U	6283824
LOUISIANA	U	U	U	5818899	U	U	U	866205	U	U	U	6685104
OKLAHOMA												
TEXAS												
REGION 9												
ALASKA	1053000	0	1535000	2588000	0	0	0	0	1053000	0	1535000	2588000
CALIFORNIA												
HAWAII	U	0	U	U	U	0	U	U	959000	0	416000	1375000
OREGON												
WASHINGTON	U	U	U	U	U	U	U	U	U	U	U	U

[1]Excluding university systems.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, County	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
REGION 1														
MAINE														
Ardostook	18	2	0	0	0	0	0	0	30000	30000	N/A	N/A	N/A	N/A
Cumberland														
Hancock[1]	14	1	0	0	1	0	0	0	40000	40000	N/A	U	N/A	N/A
Piscataquis	3	0	0	0	0	0	0	0	37440	N/A	N/A	N/A	N/A	N/A
Somerset	13	4	1	0	0	0	0	0	40000	40000	40000	N/A	N/A	N/A
York	21	2	0	0	1	0	0	0	U	U	N/A	U	N/A	N/A
MASSACHUSETTS														
Dukes														
Essex	31	22	3	0	8	2	0	U	24000	5100	2400	2400	3000	U
Franklin	0	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A
Middlesex														
Norfolk														
Worcester														
NEW HAMPSHIRE														
Belknap	8	0	0	0	0	0	0	0	20000	N/A	N/A	N/A	N/A	N/A
Coos														
Hillsborough														
Rockingham	20	8	4	0	6	5	0	0	30000	5000	35000	5000	5000	N/A
Strafford (Sheriff)	8	0	0	0	0	0	0	0	24120	N/A	N/A	N/A	N/A	N/A
(All Others)	1	2	1	0	0	1	0	0	2615	6089	3286	N/A	2629	N/A
Sullivan	9	3	1	U	1	2	1	3	15000	5000	500	10000	5000	2000
VERMONT														
Chittenden														
Essex														
Lamoille	8	1	0	0	0	0	0	0	28000	15000	N/A	N/A	N/A	N/A
Rutland														
Windham														
REGION 2														
NEW JERSEY														
Bergen														
Cape May	113	136	10	10	72	43	43	61	22000	60000	25000	30000	22000	10000
Essex														
Hunterdon														
Warren														

[1] Police Department only.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
FUEL ECONOMY

State, County	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
REGION 1							
MAINE							
Ardostook	18	14	N/A	N/A	N/A	N/A	
Cumberland							
Hancock	13	16	N/A	U	N/A	N/A	
Piscataquis	16.5	N/A	N/A	N/A	N/A	N/A	
Somerset	22	20	17	N/A	N/A	N/A	
York	U	U	N/A	U	N/A	N/A	
MASSACHUSETTS							
Dukes							
Essex	13.0	12.5	10.5	13.0	9.5	U	
Franklin	N/A	N/A	N/A	N/A	N/A	N/A	
Middlesex							
Norfolk							
Worcester							
NEW HAMPSHIRE							
Belknap	17	N/A	N/A	N/A	N/A	N/A	
Coos							
Hillsborough							
Rockingham	15	15	9	12	9	N/A	
Strafford (Sheriff)	19.1	N/A	N/A	N/A	N/A	N/A	
(All Others)	21	11	8	N/A	3	N/A	
Sullivan	20	23	12	15	15	U	07/01/91
VERMONT							
Chittenden							
Essex							
Lamoille	14	15	N/A	N/A	N/A	N/A	
Rutland							
Windham							
REGION 2							
NEW JERSEY							
Bergen							
Cape May	28	20	20	20	15	15	
Essex							
Hunterdon							
Warren							

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
MOTOR FUEL USES

State, County	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
REGION 1												
MAINE												
Ardostook	29428	0	0	29428	0	0	0	0	29428	0	0	29428
Cumberland												
Hancock	100%	0	0	100%	0	0	0	0	100%	0	0	100%
Piscataquis	97669.5	0	0	97669.5	0	0	0	0	97669.5	0	0	97669.5
Somerset	36923	0	0	36923	0	0	0	0	36923	0	0	36923
York	100%	0	0	U	U	U	U	U	U	U	U	U
MASSACHUSETTS												
Dukes												
Essex[1]	65255	0	0	65255	1721	0	0	1721	66976	0	0	66976
Franklin	0	0	0	0	0	0	0	0	0	0	0	0
Middlesex												
Norfolk												
Worcester												
NEW HAMPSHIRE												
Belknap	8325	0	0	8325	U	U	U	U	U	U	U	U
Coos												
Hillsborough												
Rockingham	47905.3	0	0	47905.3	300	0	3101.7	3401.7	48205.3	0	3101.7	51307
Strafford (Sheriff)	10086	U	U	U	0	U	U	U	10086	U	U	U
(All Others)	U	U	U	U	U	U	U	U	2725.78	U	U	U
Sullivan	6088.5	0	0	6088.5	0	0	1309.22	1309.22	6088.5	0	1309.22	7397.72
VERMONT												
Chittenden												
Essex												
Lamoille[2]	U	0	0	U	0	0	0	0	U	0	0	U
Rutland												
Windham												
REGION 2												
NEW JERSEY												
Bergen												
Cape May	U	U	U	U	U	U	U	U	200000	0	60000	260000
Essex												
Hunterdon												
Warren												

[1]Police department only.
[2]Most of the vehicles run on propane.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, County	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
NEW YORK														
Chenango	15	30	13	4	24	38	35	24	128400	47000	35000	38200	19700	U
Cortland	126	18	0	0	38	94	70	0	8000	8500	N/A	22000	16000	N/A
Hamilton														
Nassau														
Schuyler														
Steuben														
Suffolk														
PENNSYLVANIA														
Alleghany														
Forest	5	5	0	0	0	0	0	0	10000	13000	N/A	N/A	N/A	N/A
Jefferson														
Northumberland														
(All other)	10	17	3	0	3	6	0	0	U	U	U	U	U	N/A
(Transportation)	0	19	4	0	0	0	0	0	N/A	24366	26872	N/A	N/A	N/A
Potter	0	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A
REGION 3														
ILLINOIS														
Cook														
Douglas														
Du Page														
Kankakee	35	11	0	0	9	14	14	1	5000	12000	N/A	10000	14000	7500
Mercer														
Pope	3	0	0	0	3	0	0	0	23000	N/A	N/A	U	N/A	N/A
Stephenson	4	3	0	0	2	20	20	U	U	U	N/A	U	U	U

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
FUEL ECONOMY

State, County	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
NEW YORK							
Chenango	18.5	13.5	7.5	10.6	6.2	U	
Cortland	27.5	24.5	N/A	18.5	5	N/A	
Hamilton							
Nassau							
Schuyler							
Steuben							
Suffolk							
PENNSYLVANIA							
Alleghany							
Forest	25	11	N/A	N/A	N/A	N/A	
Jefferson							
Northumberland							
(All other)	U	U	U	U	U	N/A	
(Transportation)	N/A	10	7	N/A	N/A	N/A	
Potter	N/A	N/A	N/A	N/A	N/A	N/A	
REGION 3							
ILLINOIS							
Cook							
Douglas							
Du Page							
Kankakee	13	14	N/A	12	8	9	
Mercer							
Pope	13	N/A	N/A	17	N/A	N/A	
Stephenson	U	U	N/A	U	U	U	12/01/91

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
MOTOR FUEL USES

State, County	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
NEW YORK												
Chenango	U	0	U	U	U	0	U	U	174523.3	0	197113.0	351871.3
Cortland[1]	134640	0	83625	218265	1360	0	27875	29235	136000	0	111500	247500
Hamilton												
Nassau												
Schuyler												
Steuben												
Suffolk												
PENNSYLVANIA												
Alleghany												
Forest	15181	U	U	U	U	U	U	U	U	U	U	U
Jefferson												
Northumberland			0	U	0	0	0	0	U	U	0	U
(All other)	U	U										
(Transportation)	U	0	0	U	U	0	0	U	87000	0	0	87000
Potter	0	0	0	0	0	0	0	0	0	0	0	0
REGION 3												
ILLINOIS												
Cook												
Douglas												
Du Page												
Kankakee	U	U	U	U	U	U	U	U	6001	94699	31319	132019
Mercer												
Pope	26187	0	0	26187	0	0	0	0	26187	0	0	26187
Stephenson	46391	0	13680	60071	5155	0	720	5875	51546	0	14400	65946

[1]Fire and police departments only.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, County	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
INDIANA														
Carroll	12	3	0	0	9	29	28	0	22558	24000	N/A	11865	10814	N/A
Hamilton														
Hancock														
Lake														
Orange	0	0	0	0	8	16	4	1	N/A	N/A	N/A	8632	11208	3092
Warrick														
MICHIGAN														
Cass														
Eaton														
Gogebic	1	2	0	0	23	52	41	0	12000	4000	N/A	20000	15000	N/A
Keweenaw														
Wayne														
OHIO														
Crawford														
Cuyahoga	66	50	1	0	14	7	0	0	8000	7000	1200	2500	1200	N/A
Fairfield	0	1	0	0	15	27	12	0	N/A	13000	N/A	6600	12500	N/A
Harrison														
Knox														
Monroe														
Morgan														
WISCONSIN														
Florence														
Kewaunee														
La Crosse														
Langlade	10	4	2	0	11	43	42	U	U	U	U	U	U	U
Milwaukee	234	78	6	0	247	201	144	451	12809	6021	7717	7679	7558	689
St. Croix														
Washington	3	4	U	70	25	56	U	U	20000	15000	U	10000	15000	U

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
FUEL ECONOMY

State, County	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
INDIANA							
Carroll	14.7	16	N/A	8	5.8	N/A	
Hamilton							
Hancock							
Lake							
Orange	N/A	N/A	N/A	U	U	U	
Warrick							
MICHIGAN							
Cass							
Eaton							
Gogebic	20	22	N/A	14	10	N/A	
Keweenaw							
Wayne							
OHIO							
Crawford							
Cuyahoga	20	20	8	10	7	N/A	01/04/92
Fairfield	N/A	15	N/A	9	6.5	N/A	
Harrison							
Knox							
Monroe							
Morgan							
WISCONSIN							
Florence							
Kewaunee							
La Crosse							
Langlade	U	U	U	U	U	U	
Milwaukee	18.9	11.8	9.0	9.9	3.5	22.0	
St. Croix							
Washington	U	U	U	U	U	U	

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
MOTOR FUEL USES

State, County	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
INDIANA												
Carroll[1]	48211	0	40634	88845	U	0	8585	U	U	0	49219	U
Hamilton												
Hancock												
Lake												
Orange	39000	0	8900	47900	0	0	19000	19000	39000	0	27900	66900
Warrick												
MICHIGAN												
Cass												
Eaton												
Gogebic[2]	28639	0	83292	111931	1374	0	27368	28742	30013	0	110660	140673
Keweenaw												
Wayne												
OHIO												
Crawford												
Cuyahoga	88825	16150	0	104975	4675	850	0	5525	93500	17000	0	110500
Fairfield	U	0	U	U	U	0	U	U	87511	0	31505	119016
Harrison												
Knox												
Monroe												
Morgan												
WISCONSIN												
Florence												
Kewaunee												
La Crosse												
Langlade	48099.3	0	102585.7	150685	2235.4	0	61962.2	64197.6	50334.7	0	164547.9	214882.6
Milwaukee	614313	0	309435	923748	107927	0	0	107927	722240	0	309435	1031675
St. Croix												
Washington	16498.0	0	71358.2	87856.2	2767.7	0	14703.8	17471.5	19265.7	0	86062.0	105327.7

[1]Police department only.
[2]Road maintenance only.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, County	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
REGION 4														
IOWA														
Cerro Gordo														
(Conservation)	0	1	0	0	9	4	0	0	N/A	3000	N/A	12000	5000	N/A
(County Engineer)	2	0	0	0	13	19	18	12	U	N/A	N/A	U	U	U
(County Care Facility)	0	3	0	0	2	0	0	0	N/A	12000	N/A	10000	N/A	N/A
(Sheriff)	14	0	0	0	0	0	0	0	24341.6	N/A	N/A	N/A	N/A	N/A
Delaware[1]	2	2	0	0	10	21	19	17	4790	6978	N/A	6886	3895	U
Jones														
Polk														
Washington														
Woodbury[2]	3	2	0	0	20	26	20	21	20000	25000	N/A	9000	15000	1100 Hrs.
KANSAS														
Butler														
Dickinson														
Douglas														
Jewell[3]	1	0	0	0	9	6	4	0	5500	N/A	N/A	1820	9100	N/A
Reno														
Saline														
Sedgwick	144	47	0	0	44	69	29	35	803	15270	N/A	13834	6572	1534
Seward[4]	1	0	0	0	7	9	5	0	21000	N/A	N/A	15000	21000	N/A
Stevens														
MINNESOTA														
Clay														
Cook	14	9	0	0	13	8	8	0	20000	5000	N/A	3600	5000	N/A
Hennepin	116	97	2	0	86	93	64	0	16890	14925	1350	8880	10582	N/A
Olmsted														
Red Lake														
Renville	22	3	0	0	11	23	13	U	20000	20000	N/A	10000	30000	U
MISSOURI														
Jackson														
Jasper	38	7	0	0	12	9	6	6	35000	30000	N/A	U	10000	U
Knox														
Pulaski	10	0	0	0	10	5	5	15	34000	N/A	N/A	29000	36000	30000
St. Louis														
Vernon	0	1	0	0	1	2	0	0	N/A	U	N/A	U	U	N/A

[1]Road department only.
[2] County Highway Department only. Represents 56% of all county-owned vehicles.
[3]Public transit only

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
FUEL ECONOMY

State, County	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
REGION 4							
IOWA							
Cerro Gordo							
(Conservation)	N/A	16	N/A	14	10	N/A	07/01/92
(County Engineer)	U	N/A	N/A	U	U	U	
(County Care Facility)	N/A	19	N/A	9	N/A	N/A	07/01/92
(Sheriff)	18.15	N/A	N/A	N/A	N/A	N/A	
Delaware	21	16	N/A	9	8	U	
Jones							
Polk							
Washington							
Woodbury	15	11	N/A	15	8	4.5 Gal/Hr	07/01/92
KANSAS							
Butler							
Dickinson							
Douglas							
Jewell	22	N/A	N/A	13	6	N/A	
Reno							
Saline							
Sedgwick	16	18	N/A	14	14	7	
Seward	16	N/A	N/A	12	6.75	N/A	
Stevens							
MINNESOTA							
Clay							
Cook	22	15	N/A	15	10	N/A	
Hennepin	17	10	5	U	U		
Olmsted							
Red Lake						N/A	
Renville	18	14	N/A	12	6	U	
MISSOURI							
Jackson							
Jasper	18	17	N/A	12	5	U	
Knox							
Pulaski	15	N/A	N/A	12	9	9	
St. Louis							
Vernon	N/A	U	N/A	U	U	N/A	

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
MOTOR FUEL USES

State, County	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
REGION 4												
IOWA												
Cerro Gordo												
(Conservation)	4050	2700	3375	10125	450	300	1125	1875	4500	3000	4500	12000
(County Engineer)	U	U	U	U	U	U	U	U	0	20789.08	88904.83	109693.05
(County Care Facility)	U	U	U	U	U	U	U	U	1949	492	800	3241
(Sheriff)	20282.68	0	0	20282.68	0	0	0	0	20282.68	0	0	20282.68
Delaware[1]	389	8729	39705	48823	8	0	2826	2834	397	8729	42531	51657
Jones												
Polk												
Washington												
Woodbury	0	34260	152700	186960	0	0	38770	38770	0	34260	191470	225730
KANSAS												
Butler												
Dickinson												
Douglas												
Jewell[2]	U	U	U	U	U	U	23500	23500	U	U	U	U
Reno												
Saline												
Sedgwick	308476	0	91563	400039	2138	0	169378	171516	310614	0	260941	571555
Seward	16402	0	19401	35803	863	0	49747	50610	17265	0	69148	86413
Stevens												
MINNESOTA												
Clay												
Cook	30917	0	19000	49917	0	0	30800	30800	30917	0	49800	80717
Hennepin	0	U	U	U	0	U	U	U	0	352039	214735	566774
Olmsted												
Red Lake												
Renville	0	15000	60000	75000	0	8000	30000	38000	0	23000	90000	113000
MISSOURI												
Jackson												
Jasper	55000	0	6000	61000	0	0	18000	18000	55000	0	24000	79000
Knox												
Pulaski[3]	22670	0	0	22670	25941	0	69995	95936	48611	0	69995	118606
St. Louis												
Vernon	U	U	U	U	U	U	U	U	U	U	U	U

[1]Road department only.
[2]Public transit only.
[3]Police department and road and bridge department only.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, County	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
NEBRASKA														
Douglas	146	0	0	0	88	43	34	0	14152	N/A	N/A	9849	11306	N/A
Hall														
Johnson														
Lancaster														
Sarpy														
Saunders														
Scotts Bluff														
NORTH DAKOTA														
Cass[1]	1	3	2	1	19	17	17	16	5479	7720	3	5884	16118	U
Grand Forks														
Morton	0	1	1	1	28	27	14	35	N/A	64	7210	6407	1891	444 Hrs
Nelson														
Walsh[2]	0	0	0	0	10	20	5	0	N/A	N/A	N/A	10000	50000	N/A
Williams														
SOUTH DAKOTA														
Brown[1]	1	0	0	0	20	27	19	17	10566	N/A	N/A	11071	12172	U
Clark[1]	0	0	0	0	7	11	10	0	N/A	N/A	N/A	U	U	N/A
Edmunds														
Lawrence														
Minnehaha[3]	23	7	1	1	1	0	0	2	46644	23000	200	3600	N/A	500
Pennington														

[1] County Highway Department only.
[2] Public transit only.
[3] Police Dept. only.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
FUEL ECONOMY

State, County	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
NEBRASKA							
Douglas	17	N/A	N/A	13	6	N/A	07/01/92
Hall							
Johnson							
Lancaster							
Sarpy							
Saunders							
Scotts Bluff							
NORTH DAKOTA							
Cass	U	U	U	U	U	U	
Grand Forks							
Morton	N/A	6.4	10.5	13.18	10.0	4.32 Gal/hr	
Nelson							
Walsh	N/A	N/A	N/A	14	5.5	N/A	
Williams							
SOUTH DAKOTA							
Brown	20	N/A	N/A	17.5	7.5	U	07/01/92
Clark	N/A	N/A	N/A	18	8	N/A	
Edmunds							
Lawrence							
Minnehaha[1]	14.5	18	U	20	N/A	15	
Pennington							

[1]Police Dept. only.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
MOTOR FUEL USES

State, County	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
NEBRASKA												
Douglas	0	175167	96264	271431	0	502	36087	36589	0	175669	132351	308020
Hall												
Johnson												
Lancaster												
Sarpy												
Saunders												
Scotts Bluff												
NORTH DAKOTA												
Cass[1]	0	11200	101071	112271	0	0	0	0	0	11200	101071	112271
Grand Forks												
Morton	15746	0	109192	124938	0	0	0	0	15746	0	109192	124938
Nelson[2]												
Walsh[2]	12762	0	35258.8	48020.8	671.5	0	1855.7	2527.2	13433.5	0	37114.5	50548
Williams												
SOUTH DAKOTA												
Brown	U	U	U	U	U	U	U	U	79935	0	114859	194794
Clark	0	U	U	U	0	U	U	U	0	11900.5	53536	65436.5
Edmunds												
Lawrence												
Minnehaha	0	40018	37	40055	U	U	U	U	U	U	U	U
Pennington[3]												

[1]County Highway Department only.
[2]Public transit only.
[3]Police Dept. only.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, County	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
REGION 5														
DELAWARE														
Kent														
New Castle														
Sussex														
FLORIDA														
Clay														
Dade														
Gadsden	11	4	0	0	19	26	10	0	10000	10000	N/A	15000	15000	N/A
Lafayette														
Liberty														
Taylor														
GEORGIA														
Baker														
Bartow														
De Kalb														
Fayette														
Fulton														
Hall														
Peach														
MARYLAND														
Calvert														
Charles														
Kent														
Prince George's	2159	422	45	18	58	56	24	U	16617	10467	15104	8154	13929	U
Somerset														
NORTH CAROLINA														
Dare	79	24	0	0	51	41	43	15	U	U	N/A	U	8650	U
Haywood	30	6	0	0	18	4	4	0	U	U	N/A	U	U	N/A
Mecklenberg	920	78	22	22	43	62	41	U	A12864	-	-	-	-	U
Pitt	113	17	0	0	21	7	7	0	15624	9433	N/A	11214	13414	N/A
Randolph														
Tyrrell	5	9	0	0	1	15	U	0	U	U	N/A	U	U	N/A
SOUTH CAROLINA														
Georgetown	63	8	1	1	30	25	10	U	40000	15000	20000	40000	40000	U
Greenville														
Hampton														
Sumter	125	17	2	1	52	69	20	U	25000	18000	12000	20000	12000	U

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
FUEL ECONOMY

State, County	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
REGION 5							
DELAWARE							
Kent							
New Castle							
Sussex							
FLORIDA							
Clay							
Dade							
Gadsden	U	U	N/A	U	U	N/A	10/01/91
Lafayette							
Liberty							
Taylor							
GEORGIA							
Baker							
Bartow							
De Kalb							
Fayette							
Hall							
Peach							
MARYLAND							
Calvert							
Charles							
Kent							
Prince George's	14.13	10.40	8.40	19.70	9.35	U	
Somerset							
NORTH CAROLINA							
Dare	17	U	N/A	14	4	U	
Haywood	U	U	N/A	U	U	N/A	07/01/92
Mecklenberg	17	12	8	13	8	U	
Pitt	22	12	6	15	U	U	
Randolph	11.8	8.0	N/A	10.7	5.3	N/A	07/01/91
Tyrell	U	U	N/A	U	U	N/A	
SOUTH CAROLINA							
Georgetown	20	18	15	20	12	U	
Greenville							
Hampton							
Sumter							

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
MOTOR FUEL USES

State, County	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
REGION 5												
DELAWARE												
Kent												
New Castle												
Sussex												
FLORIDA												
Clay												
Dade												
Gadsden	U	0	U	U	U	0	U	U	190000	0	1170000	307000
Lafayette												
Liberty												
Taylor												
GEORGIA												
Baker												
Bartow												
De Kalb												
Fayette												
Fulton												
Hall												
Peach												
MARYLAND												
Calvert												
Charles												
Kent												
Prince George's	2935196	0	1738750	4673946	3000	0	175845	178845	2938196	0	1914595	4852791
Somerset												
NORTH CAROLINA												
Dare	93322.8	0	157973.1	251295.9	0	0	23599	23599	93322.8	0	181572.1	274894.9
Haywood	66149	0	15922	82071	0	0	19200	19200	66149	0	35122	101271
Mecklenberg	0	714000	126000	840000	0	0	0	0	0	714000	126000	840000
Pitt	174239	0	17633	191872	0	0	39000	39000	174239	0	56633	230872
Randolph												
Tyrrell	U	U	U	23298.8	U	U	U	U	U	U	U	U
SOUTH CAROLINA												
Georgetown	80578	0	23658	104236	26859	0	70975	97834	107437	0	94633	202070
Greenville												
Hampton												
Sumter	259504	0	33758	293262	5296	0	33758	39054	264800	0	67516	332316

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, County	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
VIRGINIA														
Craig														
Fairfax	1010	500	1233	1160	866	369	349	37	10000	9300	15000	9000	19000	4500
Page (All other)	21	4	0	0	4	3	0	0	25000	10000	N/A	10000	U	N/A
(Social Services)	2	1	0	0	0	0	0	0	10000	5000	N/A	N/A	N/A	N/A
(Schools)														
Roanoke														
Washington														
WEST VIRGINIA														
Barbour														
Kanawha[1]	57	26	0	0	5	0	0	0	55000	10000	N/A	5000	N/A	N/A
Lewis[2]	8	4	U	U	1	1	0	7	22800	19200	U	13500	100	5000
Logan														
McDowell														
Wirt														
Wood[3]	30	3	0	0	1	1	U	U	U	U	N/A	U	U	U
REGION 6														
ALABAMA														
Cherokee														
Jackson														
Jefferson														
Morgon														
Randolph														
KENTUCKY														
Bourbon	6	2	0	0	4	12	2	0	30000	5000	N/A	15000	12000	N/A
Gallatin														
Hardin	17	7	U	U	13	17	15	1	26000	25350	U	22000	26000	5000
Jefferson	602	58	2	1	95	94	64	0	9800	11100	U	11400	6800	N/A
Pulaski	0	0	0	0	7	12	7	10	N/A	N/A	N/A	U	U	U

[1] July 1, 1992 - May 1, 1993.
[2] Fire and police department only.
[3] Police department only.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
FUEL ECONOMY

State, County	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
VIRGINIA							
Craig							
Fairfax	U	U	U	U	U	U	
Page (All other)	U	U	N/A	U	U	N/A	
(Social Services)	U	U	N/A	N/A	N/A	N/A	06/01/92
(Schools)							
Roanoke							
Washington							
WEST VIRGINIA							
Barbour							
Kanawha[1]	27.5	27.5	N/A	22.5	N/A	N/A	07/01/92-05/01/93
Lewis	14	11	U	15	7	7	07/01/92[2]
Logan							
McDowell							
Wirt							
Wood	U	U	N/A	U	U	U	
REGION 6							
ALABAMA							
Cherokee							
Jackson							
Jefferson							
Morgon							
Randolph							
KENTUCKY							
Bourbon	10	10	N/A	15	10	N/A	
Gallatin							
Hardin	12	11	U	11	7	6	
Jefferson	15.5	16.8	8	14.6	8.0	N/A	
Pulaski	N/A	N/A	N/A	U	U	U	06/01/92

[1] July 1, 1992 - May 1, 1993.
[2] May-June data estimated.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
MOTOR FUEL USES

State, County	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
VIRGINIA												
Craig												
Fairfax	2519976	0	3560448	6080424	25454	0	187392	212846	2545430	0	3747840	6293270
Page (All other)	26663.1	0	0	26663.1	0	0	12964.5	12964.5	26663.1	0	12964.5	39627.6
(Social Services)	681	0	0	681	0	0	0	0	681	0	0	681
(Schools)												
Roanoke												
Washington												
WEST VIRGINIA												
Barbour												
Kanawha[1]	U	0	0	U	U	0	0	U	66000	0	0	66000
Lewis[2]	16060	0	4320	20380	U	0	U	U	U	0	U	U
Logan												
McDowell												
Wirt												
Wood[3]	39401	0	0	39401	3500	0	0	3500	42901	0	0	42901
REGION 6												
ALABAMA												
Cherokee												
Jackson												
Jefferson												
Morgon												
Randolph												
KENTUCKY												
Bourbon	33424.8	0	690	34114.8	1759.2	0	690	2449.2	35184	0	1380	36564
Gallatin												
Hardin	66143	0	8061	74204	600	0	31254	31854	66743	0	39315	106058
Jefferson	1029000	0	85800	1114800	21000	0	24200	45200	1050000	0	110000	1160000
Pulaski	U	U	U	U	U	U	U	U	U	U	U	646666

[1] July 1, 1992 - May 1, 1993.
[2] Fire and police departments only.
[3] Police department only.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, County	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
MISSISSIPPI														
Bolivar														
Hinds	107	45	0	0	103	85	25	183	24000	24000	N/A	24000	36000	1440 HRS
Issaquena														
Lauderdale														
Newton	5	0	0	0	10	U	U	U	U	N/A	N/A	U	U	U
Rankin														
TENNESSEE														
Overton														
Roane	42	11	65	24	25	17	10	5	U	U	U	U	U	U
Shelby	828	102	21	U	208	142	U	0	10520	4664	4536	7977	5047	N/A
Sumner														
Van Buren														
Washington														
REGION 7														
ARKANSAS														
Clay														
Conway														
Desha														
Jefferson														
Pulaski														
Sebastian														
Union														
LOUISIANA														
Caddo														
Claiborne														
Jefferson														
St. Martin														
Tangipahoa	4	2	0	0	13	14	5	0	50000	30000	N/A	50000	60000	N/A
Washington[1]	0	4	0	0	7	14	0	7	N/A	5000	N/A	7000	12000	U

[1] Police Department only.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
FUEL ECONOMY

State, County	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
MISSISSIPPI							
Bolivar							
Hinds	20	15	N/A	15	7	6 Hrs/Gal	
Issaquena							
Lauderdale							
Newton	U	N/A	N/A	U	U	U	10/01/91
Rankin							
TENNESSEE							
Overton							
Roane	U	U	U	U	U	U	07/01/92
Shelby	16.8	10.6	4.0	12.2	6.7	N/A	07/01/91
Sumner							
Van Buren							
Washington							
REGION 7							
ARKANSAS							
Clay							
Conway							
Desha							
Jefferson							
Pulaski							
Sebastian							
Union							
LOUISIANA							
Caddo							
Claiborne							
Jefferson							
St. Martin							
Tangipahoa	22	22	N/A	20	3	N/A	
Washington	N/A	10	N/A	12	8	U	

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
MOTOR FUEL USES

State, County	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
MISSISSIPPI												
Bolivar												
Hinds	321676	0	15946.9	337623	56766.3	0	90365.6	147131.9	378441.9	0	106312.5	484754.4
Issaquena												
Lauderdale												
Newton	U	0	U	U	U	0	U	U	9900	0	98200	108100
Rankin												
TENNESSEE												
Overton												
Roane	203805	0	42035	245840	0	0	16036	16036	203805	0	58071	261876
Shelby	U	U	U	U	U	U	U	U	U	U	U	808966
Sumner												
Van Buren												
Washington												
REGION 7												
ARKANSAS												
Clay[1]												
Conway												
Desha												
Jefferson												
Pulaski												
Sebastian												
Union												
LOUISIANA												
Caddo												
Claiborne												
Jefferson												
St. Martin												
Tangipahoa	55201	0	42675	97876	8480	0	98795	107275	63680	0	141470	205150
Washington	42000	0	19000	61000	0	0	0	0	42000	0	19000	61000

[1]Police and public transit .

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, County	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
OKLAHOMA														
Adair														
Canadian														
Carter														
Harper														
Muskogee														
Oklahoma														
Tulsa														
Washington														
TEXAS														
Chambers														
Comal[1]	64	4	0	0	14	31	9	0	24000	20000	N/A	15000	25000	N/A
Harris														
Grayson														
Scurry														
Somervell														
REGION 9														
ALASKA														
Fairbanks North Star	4	33	10	10	65	35	34	U	U	U	U	U	U	U
Kenai Penisula	4	53	20	11	27	32	13	U	15000	15000	15000	8000	6000	U
Kodiak Island	1	8	0	0	4	5	U	U	2407	4201.25	N/A	2783.67	U	U
Matanuska-Susitna	9	6	0	0	84	42	27	0	6000	5860	0	18000	1500	0
North Slope														
CALIFORNIA														
Kings														
Lake														
Los Angeles (Fire)[2]	154	40	60	60	244	300	300	U	24000	25000	11000	27000	11000	U
(Public Works)	300	75	50	40	700	400	400	0	15000	18000	30000	18000	16000	N/A
Plumas[3]	0	1	0	0	25	64	44	60	N/A	15000	N/A	15000	10000	1000 HRS
Sierra														
Tehama														

[1]Police and public transit.
[2]Also uses Methanol.
[3]Public works and road department only.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
FUEL ECONOMY

State, County	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
OKLAHOMA							
Adair							
Canadian							
Carter							
Harper							
Muskogee							
Oklahoma							
Tulsa							
Washington							
TEXAS							
Chambers							
Comal	14	15	N/A	14	8	N/A	
Harris							
Grayson							
Scurry							
Somervell							
REGION 9							
ALASKA							
Fairbanks North Star	U	U	U	U	U	U	07/01/92
Kenai Penisula	15	10	8	10	8	U	
Kodiak Island	10	13	N/A	12	U	U	
Matanuska-Susitna	18	18	N/A	11	U	N/A	07/01/92
North Slope							
CALIFORNIA							
Kings							
Lake							
Los Angeles (Fire)[1]	18	10	10	15	10.5	U	07/01/91
(Public Works)	U	U	U	U	U	N/A	07/01/91
Plumas	N/A	18	N/A	15	5	8 Gal/Hr	07/01/91
Sierra							
Tehama							

[1] Also uses Methanol.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
MOTOR FUEL USES

State, County	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
OKLAHOMA												
Adair												
Canadian												
Carter												
Harper												
Muskogee												
Oklahoma												
Tulsa												
Washington												
TEXAS												
Chambers												
Comal[1]	172045	0	25200	197245	0	0	0	0	172045	0	25200	197245
Harris												
Grayson												
Scurry												
Somervell												
REGION 9												
ALASKA												
Fairbanks North Star	U	0	U	U	U	0	U	U	42184	0	51278	93462
Kenai Penisula	106000	0	25500	131500	500	0	1000	1500	106500	0	26500	13300
Kodiak Island[2]	1798	0	0	1798	0	0	U	U	1798	0	U	1798
Matanuska-Susitna	50552	0	4585.3	55137.3	0	0	0	0	50552	0	4585.3	55137.3
North Slope												
CALIFORNIA												
Kings												
Lake												
Los Angeles (Fire)[3]	970000	0	396000	1366000	415714	0	264000	679714	1385714	0	660000	2045714
(Public Works)	1100000	0	600000	1700000	0	0	100000	100000	1100000	0	700000	1800000
Plumas[4]	65738	0	58338	124076	7304	0	58338	65642	73042	0	116676	189718
Sierra												
Tehama												

[1]Police and public transit.
[2]Does not include gasoline purchased for medium/heavy trucks.
[3]Also uses Methanol.
[4]Public works and road department only.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, County	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
HAWAII														
Hawaii														
Kauai[1]	82	2	0	0	8	0	0	0	18000	12000	N/A	U	N/A	N/A
Maui														
OREGON														
Columbia[2]	24	4	0	0	27	22	11	35	6911.5	7898.9	N/A	5430.5	2962.1	2468.4
Curry														
Douglas														
Multnomah														
Polk														
Sherman	1	4	2	0	9	5	5	4	U	20000	U	15000	18000	U
WASHINGTON														
Chelan														
Columbia														
Cowlitz														
Island (Motor Pool)	21	3	0	0	18	1	1	0	12000	15000	N/A	13000	13000	N/A
(Road Department)	7	3	0	0	38	21	21	17	12500	8500	N/A	8900	16000	U
(Solid Waste)	0	0	0	0	5	4	3	0	N/A	N/A	N/A	7500	750	N/A
(Sheriff)	25	3	1	1	2	0	0	0	25000	25000	U	15000	N/A	N/A
Jefferson	36	10	0	0	17	33	20	U	12900	11050	N/A	14056	11305	U
King														
Skagit														

[1]Police depatment only. Approximately 9 vehicles fuel up at a different station using a card. They use approximately 100 gallons per day.
[2]Public works only.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
FUEL ECONOMY

State, County	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
HAWAII							
Hawaii							
Kauai	10	10	N/A	8	N/A	N/A	07/01/92
Maui							
OREGON							
Columbia	14	16	N/A	11	6	5	
Curry							
Douglas							
Multnomah							
Polk							
Sherman	16	15	10	13	4	U	
WASHINGTON							
Chelan							
Columbia							
Cowlitz							
Island (Motor Pool)	20	12	N/A	18	14	N/A	
(Road Department)	U	U	N/A	U	U	U	
(Solid Waste)	N/A	N/A	N/A	16	6	N/A	
(Sheriff)	15	17	10	12	N/A	N/A	
Jefferson	21	16.8	N/A	17.3	5.4	U	
King							
Skagit							

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
MOTOR FUEL USES

State, County	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
HAWAII												
Hawaii												
Kauai[1]	157200	0	0	157200	0	0	0	0	157200	0	0	157200
Maui												
OREGON												
Columbia[2]	24782.1	0	30509.9	55292	0	0	0	0	24782.1	0	30509.9	55292
Curry												
Douglas												
Multnomah												
Polk												
Sherman	10594	0	30075.1	40669.1	107	0	1582.9	1689.9	10701	0	31658	42359
WASHINGTON												
Chelan												
Columbia												
Cowlitz												
Island (Motor Pool)	29350	U	980	30330	0	0	0	0	29350	U	980	30330
(Road Department)	U	0	U	U	U	0	U	U	39036	0	71984	111020
(Solid Waste)	1146	0	0	1146	127	0	4240	4367	1273	0	4240	5513
(Sheriff)	U	U	U	U	U	U	U	U	U	U	U	U
Jefferson	49500	0	2885	52385	5500	0	54815	60315	55000	0	57700	112700
King												
Skagit												

[1]Police department only. Approximately 9 vehicles fuel up at a different station using a card. They use approximately 100 gallons per day.
[2]Public works only.

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, City	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
REGION 1														
CONNECTICUT														
Ansonia [1]	1	7	0	0	6	18	U	U	U	U	0	U	U	U
Bridgeport														
Danielson														
Hartford	300	100	U	U	60	50	50	U	40000	12000	U	8000	9000	U
Milford	92	45	4	4	40	50	U	21	35000	10000	25000	10000	10000	U
Norwalk														
MAINE														
Bangor	40	10	11	11	27	60	54	12	9905	3468	28344	6290	5360	5000
Calais	2	0	6	U	7	14	U	U	36572	0	10139	5955	3338	0
Lewiston														
Portland														
Waterville	17	3	10	2	22	30	25	12	U	U	U	U	U	U
MASSACHUSETTS														
Boston														
Gardner														
New Bedford														
Newburyport														
North Adams														
Pittsfield														
Worcester														
NEW HAMPSHIRE														
Claremont														
Concord														
Laconia	18	5	0	0	20	22	U	24	U	U	0	U	U	U
Manchester (Water)	5	6	0	0	17	14	10	6	4000	11500	0	9500	5700	517 Hrs
(Transit Authority)	40	0	109	74	2	20	19	0	36659	0	9974	1896	U	0
(All others)	T317	-	-	-	-	-	-	-	U	U	U	U	U	U
Nashua														

[1]Public works only (50% of all city vehicles).

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
FUEL ECONOMY

State, City	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
REGION 1							
CONNECTICUT							
Ansonia	U	U	N/A	U	U	U	10/14/91
Bridgeport							
Danielson							
Hartford	22	14	U	11	12	U	07/01/92
Milford	15	11	6	10	5	U	07/01/92
Norwalk							
MAINE							
Bangor	14	12	4.8	10	4	4	07/01/92
Calais	U	N/A	U	U	U	U	
Lewiston							
Portland							
Waterville	U	U	U	U	U	U	07/01/92
MASSACHUSETTS							
Boston							
Gardner							
New Bedford							
Newburyport							
North Adams							
Pittsfield							
Worcester							
NEW HAMPSHIRE							
Claremont							
Concord							
Laconia	U	U	N/A	U	U	U	07/01/92
Manchester (Water)	18.2	16.5	N/A	12.2	5.4	U	
(Transit Authority)	9	N/A	6	5.5	U	N/A	
(All others)	U	U	U	U	U	U	
Nashua							

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
MOTOR FUELS

State, City	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
REGION 1												
CONNECTICUT												
Ansonia [1]	57508	0	0	57508	U	0	U	U	U	0	U	U
Bridgeport												
Danielson												
Hartford	228000	0	138000	366000	0	0	0	0	228000	0	138000	366000
Milford	U	0	U	U	U	0	U	U	187034	0	98000	285034
Norwalk												
MAINE												
Bangor	86738.8	0	161514.5	248253.3	4565.2	0	28502.5	33067.7	91304	0	190017	281321
Calais	U	0	U	U	U	0	U	U	19117.4	0	19421.4	38538.8
Lewiston												
Portland												
Waterville	95%	0	95%	U	5%	0	5%	U	U	0	U	U
MASSACHUSETTS												
Boston												
Gardner												
New Bedford												
Newburyport												
North Adams												
Pittsfield												
Worcester												
NEW HAMPSHIRE												
Claremont												
Concord												
Laconia	U	0	U	93750	U	0	U	31250	75000	0	50000	125000
Manchester (Water)	42287	0	15454	57741	500	0	500	1000	42787	0	15954	58741
(Transit Authority)	62910	0	198960	261870	0	0	0	0	62910	0	198960	261870
(All others)	U	0	U	U	U	0	U	U	200000	0	290000	490000
Nashua												

[1]Public works only (50% of all city vehicles).

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, City	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
RHODE ISLAND														
Central Falls														
Cranston														
Newport														
Providence														
Warwick														
Woonsocket														
VERMONT														
Barre	10	8	0	0	11	28	10	12	U	U	0	U	U	U
Burlington														
Newport	15	1	0	0	6	12	5	1	12000	10000	0	12000	8000	600
Rutland														
South Burlington														
REGION 2														
NEW JERSEY														
Carteret[1]	28	3	3	3	18	8	4	0	10000	5000	5000	6000	10000	0
Guttenberg	9	3	2	0	2	3	1	1	10000	8000	3000	4000	3000	500
Newark														
North Wildwood[2]	13	2	0	0	1	1	1	0	18810.1	5114	0	2577	416	0
Trenton														
NEW YORK														
Albany														
Island Park														
Lynbrook Village														
New York City														
White Plains														
PENNSYLVANIA														
Carlisle [3]	16	9	0	0	22	28	U	17	15000	U	0	4000	4000	U
Philadelphia														
Port Vue														
Reading[3]	118	28	0	0	31	35	0	20	U	U	0	U	U	U
Scranton														
Wilkes Barre														

[1]Fire and police only.
[2]Police department only.
[3]Projected annual amounts from January through June 1993 figures.

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
FUEL ECONOMY

State, City	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
RHODE ISLAND							
Central Falls							
Cranston							
Newport							
Providence							
Warwick							
Woonsocket							
VERMONT							
Barre	20	15	N/A	15	5	U	07/01/92
Burlington							
Newport	10	10	N/A	8	6	5	07/01/92
Rutland							
South Burlington							
REGION 2							
NEW JERSEY							
Carteret	20	10	10	8	6	N/A	
Guttenberg	15	U	8	10	7	10	
Newark							
North Wildwood	10.29	10.99	N/A	10.93	8.32	N/A	
Trenton							
NEW YORK							
Albany							
Island Park							
Lynbrook Village							
New York City							
White Plains							
PENNSYLVANIA							
Carlisle	U	U	N/A	U	U	U	01/01/93
Philadelphia							
Port Vue							
Reading	U	U	N/A	U	U	U	01/01/93
Scranton							
Wilkes Barre							

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
MOTOR FUELS

State, City	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
RHODE ISLAND												
Central Falls												
Cranston												
Newport												
Providence												
Warwick												
Woonsocket												
VERMONT												
Barre	U	0	U	U	U	0	U	U	31300	0	11085	42385
Burlington												
Newport	34500	0	5000	39500	2000	0	2000	4000	36500	0	7000	43500
Rutland												
South Burlington												
REGION 2												
NEW JERSEY												
Carteret[1]	55000	0	25000	80000	0	0	0	0	55000	0	25000	80000
Guttenberg	N/A	0	N/A	N/A	N/A	0	N/A	N/A	8000	0	500	8500
Newark												
North Wildwood[2]	24961.8	0	26.0	24987.8	0	0	0	0	24961.8	0	26.0	24987.8
Trenton												
NEW YORK												
Albany												
Island Park												
Lynbrook Village												
New York City												
White Plains												
PENNSYLVANIA												
Carlisle[3]	U	0	U	U	U	0	U	U	U	0	U	62906
Philadelphia												
Port Vue												
Reading[3]	45483.8	0	13753	59236.88	5053.8	0	5894.2	10947.92	50537.6	0	19647.2	70184.8
Scranton												
Wilkes Barre												

[1]Fire and police only.
[2]Police department only.
[3]Projected annual amounts from January through June 1993 figures.

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, City	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
REGION 3														
ILLINOIS														
Aurora	132	19	U	U	63	84	80	U	17900	16000	U	10000	11000	U
Chicago														
Decatur														
East St. Louis														
Hometown	5	1	0	0	4	5	5	1	55000	3000	N/A	1200	1300	150
Jacksonville														
LaSalle[1]	8	3	0	0	19	6	6	1	U	U	N/A	U	U	U
Mokena														
INDIANA														
Hammond	100	26	0	0	79	89	89	0	18339	11018	0	11852	9531	0
Indianapolis														U
Kokomo	100	26	3	U	91	76	U	2	U	U	U	U	U	0
Lawrenceburg	15	6	0	0	20	24	21	0	18000	10000	0	8000	12000	
New Castle														
MICHIGAN														
Brighton														
Dearborn														
Detroit														
Mount Clemens	23	7	9	5	26	9	4	21	24632.4	4372.80	13732.8	11941.2	19747.2	10878
Rochester Hills														
OHIO														
Columbus														
Mayfield Heights														
Middleton	107	11	6	6	31	28	20	8	9000	8000	35000	13000	250 hrs	200 hrs
Newton Falls														
Parma	101	11	4	0	40	73	42	U	U	U	U	U	U	U
Wellsville														

[1]Public works only.

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
FUEL ECONOMY

State, City	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
REGION 3							
ILLINOIS							
Aurora	15	15	U	13	14	U	
Chicago							
Decatur							
East St. Louis							
Hometown	9.5	12	N/A	9.5	6.5	4	
Jacksonville							
LaSalle	U	U	N/A	U	U	U	
Mokena							
INDIANA							
Hammond	15	12	N/A	10	5	N/A	
Indianapolis							
Kokomo	U	U	U	U	U	U	
Lawrenceburg	12	10	N/A	10	6	N/A	
New Castle							
MICHIGAN							
Brighton							
Dearborn							
Detroit							
Mount Clemens	7.29	5.85	5.39	10.90	18.78	1.40	
Rochester Hills							
OHIO							
Columbus							
Mayfield Heights							
Middleton	13	11	3	9	7	3	
Newton Falls							
Parma	12	U	7	10	6	U	
Wellsville							

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
MOTOR FUELS

State, City	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
REGION 3												
ILLINOIS												
Aurora	279103	0	77180	356283	5696	0	8576	14272	284799	0	85756	370555
Chicago												
Decatur												
East St. Louis												
Hometown	U	0	U	U	U	0	U	U	16061	0	1500	16561
Jacksonville												
Lasalle[1]	3500	0	6400	9900	0	0	0	0	3500	0	6400	9900
Mokena												
INDIANA												
Hammond	201488	0	150871	352359	0	0	19186	19186	201488	0	170057	371545
Indianapolis												
Kokomo	U	0	U	U	U	0	U	U	148272.3	0	74760.4	223032.7
Lawrenceburg	36700	0	11311	48011	600	0	3230	3830	37300	0	14541	51841
New Castle												
MICHIGAN												
Brighton												
Dearborn												
Detroit												
Mount Clemens	U	U	U	U	U	U	U	U	11708	50225	35447	9738
Rochester Hills												
OHIO												
Columbus												
Mayfield Heights												
Middleton	111039.1	0	79157.1	190196.2	6457.9	0	3118.7	9576.6	117497	0	82275.8	199772.8
Newton Falls												
Parma	U	0	U	U	U	0	U	U	209000	0	56000	265000
Wellsville												

[1]Public works only.

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, City	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
WISCONSIN														
Green Bay														
(Water)	23	21	0	0	34	35	33	31	U	U	U	U	U	U
(Fire Dept)	5	2	1	1	4	21	20	1	7000	35000	1000	6000	1500	200
(Public Transit)	3	0	34	34	1	1	1	0	5148	0	35746	5232	342	0
(Public Utilities)	0	3	0	0	3	0	0	0	0	11811	0	6764	0	0
(Police)	49	11	U	U	0	0	0	2	25000	8000	U	0	0	3000
Marshfield[1]	2	9	0	0	13	24	20	U	3372	5148	0	7037	4874	0
Milwaukee	733	355	2	0	311	614	U	269	11127	8654	1541	7649	11873	1070
Richland Center														
Wauwatosa														
REGION 4														
IOWA														
Ames	39	19	0	0	63	29	23	12	21500	8000	0	9000	8500	U
Anamosa														
Davenport														
Des Moines														
Manchester	5	1	0	0	7	11	4	U	17819	88	0	4792	1290	U
Urbandale														
KANSAS														
Dodge City	27	4	2	U	68	9	8	63	U	U	U	U	U	U
Overland Park														
Salina														
Ulysses	3	2	0	0	9	13	8	0	U	U	0	U	U	0
Wichita														
MINNESOTA														
Bloomington[1]	92	15	4	0	125	36	20	U	6000	6000	23000	4000	3000	U
Columbia Heights	28	5	1	1	12	25	7	0	6859	3758	1218	3760	2731	0
Minneapolis														
Morris	7	3	5	U	11	9	0	0	U	4500	12303	5500	2800	0
Plymouth														

[1]Figures include public works, parks and recreation, and administration only.
[2]Fire and police department only.

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
FUEL ECONOMY

State, City	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
WISCONSIN							
Green Bay							
(Water)	U	U	N/A	U	U	U	
(Fire Dept)	15	14	4	14	4	U	
(Public Transit)	10.9	N/A	4.1	7.8	8.0	N/A	
(Public Utilities)	N/A	9.6	N/A	5.8	N/A	N/A	
(Police)	U	U	U	N/A	N/A	U	
Marshfield	19.4	17.5	N/A	8.6	4.6	U	
Milwaukee	11.31	9.11	5.54	9.56	3.26	2.217	07/01/92
Richland Center							
Wauwatosa							
REGION 4							
IOWA							
Ames	15	10	N/A	7.5	5	15	07/01/91
Anamosa							
Davenport							
Des Moines							
Manchester	11.5	5.6	N/A	8.3	3.7	U	
Urbandale							
KANSAS							
Dodge City	U	U	U	U	U	U	
Overland Park							
Salina							
Ulysses	20	18	N/A	13	9.5	N/A	01/01/92
Wichita							
MINNESOTA							
Bloomington	21	12	8	14	4	6	
Columbia Heights	9.2	6.6	5	8.2	3.9	N/A	
Minneapolis							
Morris	U	U	6.9	15	7	N/A	
Plymouth							

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
MOTOR FUELS

State, City	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
WISCONSIN												
Green Bay												
(Water)	119262	0	155787	275049	13251	0	66766	80017	132513	0	222553	335066
(Fire Dept)	U	U	U	U	U	U	U	U	U	U	U	U
(Public Transit)	487.2	0	291488	291975.2	0	0	0	0	487.2	0	291488	291975.2
(Public Utilities)	6938.6	0	0	6938.6	124	0	165.2	289.2	7062.6	0	165.2	7227.8
(Police)	176000	0	0	176000	0	0	0	0	176000	0	0	176000
Marshfield[1]	16985	0	22629	39614	1587	0	25573	27160	69124	0	59322	128451
(Safety)	U	0	U	U	U	0	U	U	26366	0	2435	28801
(Education)	U	0	U	U	U	0	U	U	4749	0	326	5075
(Public Utilities)	U	0	U	U	U	0	U	U	9272	0	9056	18328
Milwaukee	686649	0	941601	1628250	28984	0	0	28984	715633	0	941601	1657234
Richland Center												
Wauwatosa												
REGION 4												
IOWA												
Ames	U	0	U	U	U	0	U	U	108376	0	70760	179136
Anamosa												
Davenport												
Des Moines												
Manchester	12620	0	1018.7	13638.7	1997.6	0	2257.6	4255.2	14617.6	0	3276.3	17893.9
Urbandale												
KANSAS												
Dodge City	U	U	U	U	U	U	U	U	76925.5	0	31730.8	108656.3
Overland Park												
Salina												
Ulysses	0	15662	9578	25240	0	137	1048	1185	0	15799	10626	26425
Wichita												
MINNESOTA												
Bloomington[2]	151083	0	48179	199262	9417	0	33626	43043	160500	0	81805	242305
Columbia Heights	44483	0	7387	51870	1190	0	4237	5427	45673	0	11624	57297
Minneapolis												
Morris	U	0	U	U	U	0	U	U	29384	0	4011	33395
Plymouth												

[1]Figures include public works, parks and recreation, and administration only.
[2]Fire and police only.

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, City	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
MISSOURI														
Kansas City	361	120	2	1	147	287	0	U	12000	12000	U	10000	U	U
Normandy	11	U	0	0	3	5	1	2	30000	U	0	25000	10000	1500
Overland	25	5	0	0	16	10	1	U	U	U	0	U	U	U
St. Joseph														
University City	29	3	2	0	21	33	17	6	21884	7202	12376	6925	4029	5687
NEBRASKA														
Columbus														
Falls City														
Grand Island	41	6	0	0	91	69	U	23	U	U	0	U	U	U
Lincoln	242	36	52	52	120	152	72	0	7368	20148	35000	6448	4406	N/A
Omaha														
NORTH DAKOTA														
Bismarck[1]	1	2	0	0	60	65	19	U	4000	5000	0	5000	4000	U
Dickinson	13	6	0	0	25	30	U	U	U	U	0	U	U	U
Fargo														
Grand Forks[2]	47	6	15	15	56	69	0	0	U	U	26463	U	U	N/A
Hazen														
SOUTH DAKOTA														
Aberdeen														
Belle Fourche														
Brookings														
Hot Springs														
Rapid City														
Sioux Falls														
Watertown														
REGION 5														
DELAWARE														
Dover	74	67	0	0	U	U	U	125	U	U	0	U	U	U
Elsmere														
New Castle	7	0	0	0	2	6	3	0	20176.4	0	0	U	9487	0
Newark														
Wilmington														
DISTRICT OF COLUMBIA														
Washington														

[1]Public works only.
[2]Does not include data for the school system.

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
FUEL ECONOMY

State, City	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
MISSOURI							
Kansas City	U	U	U	U	U	U	05/01/91
Normandy	18	U	N/A	18.3	8	U	07/01/91
Overland	U	U	N/A	U	U	U	07/09/92
St. Joseph							
University City	12.01	7.29	4.83	8.63	2.78	2.54	07/01/92
NEBRASKA							
Columbus							
Falls City							
Grand Island	U	U	N/A	U	U	U	
Lincoln	16.6	9.4	3.5	8.6	6.9	N/A	09/01/91
Omaha							
NORTH DAKOTA							
Bismarck	15	10	N/A	10	4	U	
Dickinson	U	U	N/A	U	U	U	
Fargo							
Grand Forks	U	U	4.1	U	U	N/A	
Hazen							
SOUTH DAKOTA							
Aberdeen							
Belle Fourche							
Brookings							
Hot Springs							
Rapid City							
Sioux Falls							
Watertown							
REGION 5							
DELAWARE							
Dover	11	10	N/A	10	4	U	07/01/91
Elsmere							
New Castle	14	N/A	N/A	12	20	N/A	
Newark							
Wilmington							
DISTRICT OF COLUMBIA							
Washington							

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
MOTOR FUELS

State, City	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
MISSOURI												
Kansas City	U	0	U	U	U	0	U	U	350000	0	300000	650000
Normandy	25702	0	3491.9	29193.9	259.6	0	183.8	443.4	25961.6	0	3675.7	29637.3
Overland	U	0	U	U	U	0	U	U	60502	0	1200	61702
St. Joseph												
University City	106220	0	30090	136310	20286	0	28516	48802	126506	0	58606	185112
NEBRASKA												
Columbus												
Falls City												
Grand Island	U	0	U	U	U	0	U	U	106976	0	28543	135519
Lincoln	460607	0	513150	973757	12630	0	50520	63150	473237	0	563670	1036907
Omaha												
NORTH DAKOTA												
Bismarck[1]	38789.7	0	14658.65	53448.4	2041.6	0	14658.65	16700.2	40831.3	0	29317.3	70148.6
Dickinson	7805	0	0	7805	12774	0	16744	29518	20579	0	16744	37323
Fargo												
Grand Forks	U	0	U	U	U	0	U	U	102740	0	201153	303893
Hazen												
SOUTH DAKOTA												
Aberdeen												
Belle Fourche												
Brookings												
Hot Springs												
Rapid City												
Sioux Falls												
Watertown												
REGION 5												
DELAWARE												
Dover	U	0	U	U	U	0	U	U	111703	0	73982	185685
Elsmere												
New Castle	9968.1	0	3200	13168.1	118.7	0	100	218.7	10086.8	0	3300	13386.8
Newark												
Wilmington												
DISTRICT OF COLUMBIA												
Washington												

[1]Public works only.

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, City	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
FLORIDA														
Bay Harbor Islands														
Clearwater														
Jacksonville														
Naples														
Pembroke Pines														
GEORGIA														
Albany														
Atlanta	920	615	10	10	287	1100	1100	U	8095	8200	15000	8600	8500	9720
Brunswick														
Cochran														
Warner Robins	64	10	0	0	72	58	44	22	50000	10000	0	12000	8000	U
MARYLAND														
Baltimore														
Bowie														
Riverdale														
Rockville														
Salisbury														
NORTH CAROLINA														
Charlotte														
Fayetteville	201	48	21	19	82	86	U	28	U	U	U	U	U	U
Mount Olive														
Rocky Mount	77	22	7	7	90	103	50	59	20000	20000	30000	20000	20000	10000
Statesville														
SOUTH CAROLINA														
Charleston														
Columbia														
Hilton Head Island	18	0	0	0	1	0	0	0	10000	0	0	20000	0	0
Spartanburg	84	17	15	15	28	70	61	0	25000	9000	2000	19000	8000	0
Woodruff	9	2	0	0	5	12	3	0	U	U	N/A	U	U	N/A
VIRGINIA														
Danville														
Lawrenceville														
Lynchburg														
Tazewell	7	0	0	0	7	9	4	0	35000	0	0	15000	17000	0
Virginia Beach														

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
FUEL ECONOMY

State, City	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
FLORIDA							
Bay Harbor Islands							
Clearwater							
Jacksonville							
Naples							
Pembroke Pines							
GEORGIA							
Albany							
Atlanta	18.78	16.52	9.12	15.19	10.15	9.0	
Brunswick							
Cochran							
Warner Robins	12	10	N/A	11	6	U	
MARYLAND							
Baltimore							
Bowie							
Riverdale							
Rockville							
Salisbury							
NORTH CAROLINA							
Charlotte							
Fayetteville	U	U	U	U	U	U	07/01/92
Mount Olive							
Rocky Mount	12	15	3	17	8	5	
Statesville							
SOUTH CAROLINA							
Charleston							
Columbia							
Hilton Head Island	18	N/A	N/A	18	N/A	N/A	07/01/91
Spartanburg	15	17	7	15	4	N/A	07/01/91
Woodruff	U	U	N/A	U	U	U	
VIRGINIA							
Danville							
Lawrenceville							
Lynchburg							
Tazewell	12	N/A	N/A	15	8	N/A	
Virginia Beach							

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
MOTOR FUELS

State, City	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
FLORIDA												
Bay Harbor Islands												
Clearwater												
Jacksonville												
Naples												
Pembroke Pines												
GEORGIA												
Albany												
Atlanta	1502201.7	0	543631.6	2045833.3	166911.3	0	815447.4	982358.7	1669113	0	1359079	3028192
Brunswick												
Cochran												
Warner Robins	193342	0	76554	269896	1838	0	35665	37503	195180	0	112219	307399
MARYLAND												
Baltimore												
Bowie												
Riverdale												
Rockville												
Salisbury												
NORTH CAROLINA												
Charlotte												
Fayetteville[1]	143612	0	115476	259088	0	0	15529	15529	143612	0	131005	274617
Mount Olive												
Rocky Mount[2]	116500	0	160000	276500	11000	0	20000	31000	127500	0	180000	307500
Statesville												
SOUTH CAROLINA												
Charleston												
Columbia												
Hilton Head Island	U	0	U	U	U	0	U	U	U	0	U	U
Spartanburg	154529	0	69581	224110	3154	0	7731	10885	157683	0	77312	234995
Woodruff	22080.92	0	8357.2	30438.12	U	0	U	U	22080.92	0	8357.2	30438.12
VIRGINIA												
Danville												
Lawrenceville												
Lynchburg												
Tazewell	24221.4	0	5553.8	29775.2	0	0	1437	1437	24221.4	0	6990.8	31212.2
Virginia Beach												

[1]Also use Propane (313185 gallons).
[2]Also use Compressed Natural Gas (70692 gallons).

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, City	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
WEST VIRGINIA														
Benwood	3	0	0	0	1	1	1	4	11667	0	0	20000	10000	7500
Charleston														
Clarksburg														
Huntington														
Parkersburg														
Wheeling														
REGION 6														
ALABAMA														
Birmingham														
Brighton														
Enterprise	30	3	2	0	30	31	24	U	U	U	U	U	U	U
Gasden	115	29	6	0	31	128	37	46	11335	5577	19478	8368	7029	U
Tuscaloosa														
KENTUCKY														
Covington														
Jeffersontown	46	2	0	0	8	3	0	2	22000	6000	0	10000	3500	2500
Louisville	700	50	0	0	150	200	170	150	15000	10000	0	10000	8000	8000
Newport														
Owensboro														
Shepherdsville														
MISSISSIPPI														
Biloxi	2	7	3	0	49	4	4	U	10000	15000	12000	12000	8000	U
Clinton														
Crystal Springs														
Gulfport														
Jackson														
Moss Point														
TENNESSEE														
Clarksville														
Forest Hills														
Johnson City	200	50	60	50	130	100	75	30	16000	12000	33000	15000	9000	6000
Knoxville	430	60	1	U	120	140	U	50	15000	12000	11000	15000	10000	5000
Memphis														
Morristown	8	1	0	0	2	5	U	U	24000	U	N/A	U	U	U
Sweetwater														

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
FUEL ECONOMY

State, City	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
WEST VIRGINIA							
Benwood	16	N/A	N/A	12	10	5	07/01/91
Charleston							
Clarksburg							
Huntington							
Parkersburg							
Wheeling							
REGION 6							
ALABAMA							
Birmingham							
Brighton							
Enterprise	12	11	9	11	7	U	10/01/91
Gasden	12.44	9.93	5.55	9.74	5.16	U	
Tuscaloosa							
KENTUCKY							
Covington							
Jeffersontown	12	17	N/A	14	10	U	07/01/93
Louisville	17	12	N/A	12	7	10	07/01/91
Newport							
Owensboro							
Shepherdsville							
MISSISSIPPI							
Biloxi	U	U	U	U	U	U	10/01/91
Clinton							
Crystal Springs							
Gulfport							
Jackson							
Moss Point							
TENNESSEE							
Clarksville							
Forest Hills							
Johnson City	10	15	5	8	6	4	07/01/91
Knoxville	15	12	6	11	9	15	07/01/90
Memphis							
Morristown	11	U	N/A	U	U	U	07/01/92
Sweetwater							

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
MOTOR FUELS

State, City	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
WEST VIRGINIA												
Benwood	10193	0	1000	11193	0	0	0	0	10193	0	1000	11193
Charleston												
Clarksburg												
Huntington												
Parkersburg												
Wheeling												
REGION 6												
ALABAMA												
Birmingham												
Brighton												
Enterprise	83090.8	0	50464	133554.8	4373.2	0	12616	16989.2	87464	0	63080	150544
Gasden	U	0	U	U	U	0	U	U	275655	0	85040	360695
Tuscaloosa												
KENTUCKY												
Covington												
Jeffersontown	35150	0	0	35150	1850	0	856	2706	37000	0	856	37856
Louisville	U	0	U	U	U	0	U	U	1200000	0	300000	1500000
Newport												
Owensboro												
Shepherdsville												
MISSISSIPPI												
Biloxi[1]	5520	0	3650	9170	3680	0	3650	7330	9200	0	7300	16500
Clinton												
Crystal Springs												
Gulfport												
Jackson												
Moss Point												
TENNESSEE												
Clarksville												
Forest Hills												
Johnson City	370152	0	381900	752052	18000	0	50000	68000	388152	0	431900	820052
Knoxville	523000	0	184000	707000	7000	0	26000	33000	530000	0	210000	740000
Memphis												
Morristown	U	0	U	U	U	0	U	U	31941	0	14544	46485
Sweetwater												

[1]Also use Propane (49325 gallons).

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, City	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
REGION 7														
ARKANSAS														
Fayetteville														
Fort Smith	71	19	2	0	95	110	56	8	U	U	U	U	U	U
Heber Springs														
Little Rock														
Maumelle	14	6	0	0	7	5	1	U	40000	10000	0	20000	20000	U
Russellville	17	3	0	0	10	12	2	U	U	U	0	U	U	U
LOUISIANA														
Berwick														
Hammond														
Lafayette	212	14	19	17	274	50	50	4	8000	6000	40000	12000	18000	12500
New Iberia														
New Orleans														
OKLAHOMA														
Ada	16	4	0	0	44	32	14	U	12000	12000	0	12000	12000	U
Lawton	155	8	2	0	64	68	60	2	28000	12000	4000	14000	20000	1000
McAlester														
Moore														
Muskogee														
Oklahoma City														
Purcell														
Spencer														
TEXAS														
Houston	3753	0	20	20	2426	1581	1200	1895	10000	0	U	12000	14000	12000
Kerrville	42	2	0	0	33	26	7	16	12000	12000	0	12000	750	100
New Boston														
Temple	83	4	0	0	86	40	29	12	20000	4000	0	12000	15000	3000
Wichita Falls														
REGION 9														
ALASKA														
Anchorage														
Fairbanks														
Juneau	32	29	22	22	50	26	U	U	U	U	12000	U	3000	U
Sitka														
Wasilla														

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
FUEL ECONOMY

State, City	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
REGION 7							
ARKANSAS							
Fayetteville							
Fort Smith	U	U	U	U	U	U	
Heber Springs							
Little Rock							
Maumelle	16	17	N/A	14	6	U	
Russellville	U	U	N/A	U	U	U	
LOUISIANA							
Berwick							
Hammond							
Lafayette	18	15	3.9	15.6	5.6	U	
New Iberia							
New Orleans							
OKLAHOMA							
Ada	8	10	N/A	10	5	U	
Lawton	13.5	11.5	6	10	5.5	22	07/01/91
McAlester							
Moore							
Muskogee							
Oklahoma City							
Purcell							
Spencer							
TEXAS							
Houston	17	N/A	U	15	9	7	07/01/91
Kerrville	15	12	N/A	15	12	6	
New Boston							
Temple	14	10	N/A	12	8	8	10/01/91
Wichita Falls							
REGION 9							
ALASKA							
Anchorage							
Fairbanks							
Juneau	U	U	5	U	U	U	07/01/92
Sitka							
Wasilla							

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
MOTOR FUELS

State, City	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
REGION 7												
ARKANSAS												
Fayetteville												
Fort Smith	90000	0	70000	160000	0	0	40000	40000	90000	0	110000	200000
Heber Springs												
Little Rock												
Maumelle	34438	0	193.65	34631.65	0	0	3679.35	3679.35	34438	0	3873	38311
Russellville	49398	0	U	U	2600	0	U	U	51998	0	6850	58848
LOUISIANA												
Berwick												
Hammond												
Lafayette	439384	0	247082	686466	0	0	34644	34644	439384	0	281726	721110
New Iberia												
New Orleans												
OKLAHOMA												
Ada	85000	0	25000	110000	0	0	37000	37000	85000	0	62000	147000
Lawton	220000	0	72000	292000	60000	0	48000	108000	280000	0	120000	400000
McAlester												
Moore												
Muskogee												
Oklahoma City												
Purcell												
Spencer												
TEXAS												
Houston	U	0	U	U	U	0	U	U	7185520	0	2910380	10095900
Kerrville	69000	0	0	69000	0	0	10800	10800	69000	0	10800	79800
New Boston												
Temple	172998	0	97000	269998	3531	0	33000	36531	176529	0	130000	306529
Wichita Falls												
REGION 9												
ALASKA												
Anchorage												
Fairbanks												
Juneau	104279	0	101188	205467	2128	0	17857	19985	106407	0	119045	225452
Sitka												
Wasilla												

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
NUMBER OF VEHICLES AND ANNUAL VEHICLE MILES

State, City	Number of Vehicles Owned								Annual Miles Per Vehicle					
	Cars	Vans/ Wagons/ Jeeps	Buses	Buses Diesel	Lt Trucks	Med & Hvy Trucks	Med & Hvy Trucks Diesel	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Veh
CALIFORNIA														
Chino	60	1	1	0	46	17	6	5	7000	4000	10000	8000	6000	U
Guadalupe														
Lomita														
Los Angeles														
Oceanside														
Sacramento	440	288	0	0	292	349	39	U						
HAWAII														
Honolulu														
OREGON														
Medford	69	20	0	0	52	54	25	14	U	U	0	U	U	U
Portland														
Salem[1]	184	73	0	0	121	121	95	35	3631	3630	0	3631	3135	3393
Tigard	36	7	0	0	23	12	5	4	U	U	0	U	U	U
Vale														
WASHINGTON														
Bellevue	132	99	0	0	81	83	65	U	10600	5500	0	8500	4800	U
Colville														
Puyallup	50	11	0	N/A	34	27	27	5	8000	6000	N/A	6000	4000	U
Seattle														
Tukwila	50	10	0	N/A	50	16	15	15	12000	20000	N/A	3000	2000	1000
Yakima														

[1] July 1, 1992 - March 31, 1993.

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
FUEL ECONOMY

State, City	Fuel Economy (mpg)						Beginning Date of Fiscal Year
	Cars	Vans/Wagons/Jeeps	Buses	Lt Trucks	Med & Heavy Trucks	Other Hwy Vehicles	
CALIFORNIA							
Chino	18	U	10	10	8	8	07/01/92
Guadalupe							
Lomita							
Los Angeles							
Oceanside							
Sacramento							
HAWAII							
Honolulu							
OREGON							
Medford	U	U	N/A	U	U	U	07/01/91
Portland							
Salem	12.1	8.3	N/A	7.5	5.4	4.7	07/01/92-03/31/93
Tigard	U	U	N/A	U	U	U	07/01/91
Vale							
WASHINGTON							
Bellevue	20.5	17	N/A	13	8	U	
Colville							
Puyallup	15	12	N/A	20	10	30	
Seattle							
Tukwila	15	15	N/A	12	4	1	
Yakima							

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
MOTOR FUELS

State, City	Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
CALIFORNIA												
Chino	0	0	U	U	0	0	U	U		0	1324	1324
Guadalupe												
Lomita												
Los Angeles												
Oceanside												
Sacramento									1349298	0	56450	1405748
HAWAII												
Honolulu												
OREGON												
Medford	119700	0	34300	154000	6300	0	700	7000	126000	0	35000	161000
Portland												
Salem[1]	U	0	U	U	U	0	U	U	176779	0	72073	248852
Tigard	U	0	U	U	U	0	U	U	52239.96	0	6929	59168.96
Vale												
WASHINGTON												
Bellevue	240000	0	65000	305000	10000	0	5000	15000	250000	0	70000	320000
Colville												
Puyallup	51286	0	19039	70325	518	0	2115	2633	51804	0	21154	72958
Seattle												
Tukwila	51354	0	27398	78752	12839	0	3045	15884	64193	0	30443	94636
Yakima												

[1] July 1, 1992 - March 31, 1993.

APPENDIX C

DETAILED RESPONSES TO EACH QUESTION - PILOT STUDY DATA COLLECTION

RESPONSES TO ORNL QUESTIONNAIRE
STATE GOVERNMENTS
NUMBER OF VEHICLES, ANNUAL VEHICLE MILES, AND FUEL ECONOMY

State (FY, Depts)	Number of Vehicles Owned						Annual Miles Per Vehicle						Fuel Economy (mpg)					
	Cars	Vans/ Wagons/ Jeeps	Buses	LT Trucks	Med& Hvy Trucks	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	LT Trucks	Med& Hvy Trucks	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	LT Trucks	Med/ Hvy Trucks	Other Hwy Veh
ARIZONA DOT	329	117	0	850	611	0	13677.8	11111.1	0	13176.5	14566.3	0	23.5	20.3		14.5	7.5	
COLORADO DOT (7/1/91)	156	345	0	400	1500		14000	12000	0	15000	20000		25	12		10	7	
IDAHO DOT	108	124	0	418	630	20	14000	15000	0	14500	20000	5000	25	15		15	8	5
MONTANA (7/1) DOT (91)	250	250	0	600	620		25000	14000		14000	14300		32	13.9		18.8	7.5	
NEVADA (7/1)																		
Highway Patrol (91)	293	59	1	7	0	16	a2353						a20.8					
U. of NV (LV) (91)	10	11		11			10000	11500		9000			22	15		11		
U. of NV (Reno)	23	38	1	121	0	0	4000	2000	7000	3500	0	0	21.5	15	9	10		
State Parks (91)	0	4	3	81	9	0	0	9300	230	6622	1900	0		13.2		11.4	6.4	
Motor Pool (91)	450	25	0	50	0	0	11000	9000	0	9000	0	0	24	18		15		
Highway Dept. (91)	102	14	0	315	694	684	11500	11600	0	15521	15100		19.3	15.1		15.0	7.3	
NEW MEXICO																		
UTAH (1/1) Central+Safety+Educ	c4225	c	31	c	400		c22152	c		c	9600	14400	c23	c	14	c	11	
WYOMING (7/1) *Game&Fish (91)*	5	60	0	275	40	0	a15510											

a: average over all vehicles
c: combined (reported together)

RESPONSES TO ORNL QUESTIONNAIRE
STATE GOVERNMENTS
NUMBER OF EMPLOYEES AND MOTOR FUEL USES

State	No. of Full-Time Employees							Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Central	Fire	Police	Educat	Transit	Utility	Guards	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
ARIZONA DOT	4600*							1781138	365536	1010191	3156865	0	0	284926	284926	1781138	365536	1295117	3441791
COLORADO DOT	1600															c1000000	c	2000000	3000000
IDAHO DOT																116128	424813	642008	1182949
MONTANA DOT	x							1111260	0	1058083	2169343	0	0	0	0	1111260	0	1058083	2169343
NEVADA																			
Highway Patrol	0	0		0	0	0	0	42128.8			42128.8					42128.8			42128.8
U. of NV (LV)	0	0	0	1900	0	0	0	25000	0	0	25000	0	0	0	0	25000	0	0	25000
U. of NV (Reno)	0	0	8	325	0	0	0	55242	0	0	55242	18414	0	0	18414	73656	0	0	73656
State Parks	130							32680	0			14550	0			47230	0	1396	48626
Motor Pool	13	0	0	0	0	0	0	240000	0	0	240000	0	0	0	0	240000	0	0	240000
Highway Dept.	2500**	0	0	0	0	0	0	c1376488	0	c1168165	c2544653	c	0	c	c	1376488	0	1168165	2544653
NEW MEXICO																			
UTAH Cntral+Safe+Edu	x	x	x	x				3825000	0	2630000	6455000	23000	0	430000	453000	3848000	0	3060000	6908000
WYOMING Game&Fish (7/1/91)																			

a: average over all vehicles
c: combined (reported together)
x: the agency is included
* A.D.O.T.
** N.D.O.T.

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
NUMBER OF VEHICLES, ANNUAL VEHICLE MILES, AND FUEL ECONOMY

State (County, FY)	Number of Vehicles Owned						Annual Miles Per Vehicle						Fuel Economy (mpg)					
	Cars	Vans/ Wagons/ Jeeps	Buses	LT Trucks	Med & Hvy Trucks	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	LT Trucks	Med & Heavy Trucks	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	LT Trucks	Med & Hvy Trucks	Other Hwy Veh
ARIZONA																		
La Paz																		
Gila (7/1/91)	44	10	0	70	68	0												
Maricopa																		
Pinal (7/1/91)	208	18	18	223	209	55												
Graham	10	5		24	22		15000	10000		7000	9000		19.8	11.1		12.3	5.4	
COLORADO																		
Logan (92)	10	0	0	0	11	0	10000	0	0	0	20000	0						
Mesa (1/1/91)	50	42	0	51	59	0	9815	25518		33219	41339		15.48	15.50		17.30	7.27	
Jefferson																		
IDAHO																		
Lewis (10/1/90)	5	2					20000	20000					18	10				
Bingham (10/1/90)	21	13	1	35	35	3	32000	24000	14000	15000	28000	1000	13	18	4	15	6	3
Canyon (10/1/91)	59	13	0	22	4	0	22000	28000	0	15000	5000	0	18	15		18	8	
Bannock (10/1/91)	37	8	0	27	9	17	30000	15000	0	15000	10000	6000	15	11		12.5	8	6
Shoshone (10/1/91)	0	0	0	31	33	31												
MONTANA																		
Musselshell																		
Gallatin																		
Cascade	1	1	0	46	0	0	2373	11820	0	3197	0	0	29	14				
NEVADA																		
Lyon																		
Clark																		
Douglas (7/1/91)	100	51	67	109	17		9500	11000	13000	9000	9000							
Elko	3	0	0	12	3		10000	0	0	12000	7000		21			10	6	
NEW MEXICO																		
Los Alamos (7/1/91)	16	9	0	93	15	3	12750	11421	0	8908	4300		18.32	14.73		12.91	3.86	
San Juan																		
Bernalillo																		
Mora	3	4	0	3	3	9	25000	15000	0	12000	10000		23	16		18	9	7
UTAH																		
Kane	7	6		5	7								20	15		12	5	
Salt Lake (1/1/91)	450	165	15	176	241	42*	a16544						a11.66					
Utah	25	70	1	35		15	15000	35000	10000	10000		30000	21	15	10	15	6	6
WYOMING																		
Niobrara																		
Fremont (7/91)	22	44	0	29	33	48												

* Sweepers, trailers

a: average over all vehicles

RESPONSES TO ORNL QUESTIONNAIRE
COUNTY GOVERNMENTS
NUMBER OF EMPLOYEES AND MOTOR FUEL USES

State	No. of Full-Time Employees							Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Central	Fire	Police	Educat	Transit	Utility	Guards	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
ARIZONA																			
La Paz																			
Gila								73843	0	58468	132311	0	0	38423	38423	73843	0	96891	170734
Maricopa																			
Pinal	1013		227	131				463865	0	?27487	491352	0	0	?47688	47688	463865	0	?122863	539040
Graham																13299.7	0	41402	54701.7
COLORADO																			
Logan								8000	0	0	8000	35285.5	0	159576	194861.5	43285.5	0	159576	202861.5
Mesa	473		171*					121516.9	0	145000	266516.9	0	0	0	0	121516.5	0	145000	266516.9
Jefferson																			
IDAHO																			
Lewis		x	6*					8000											
Bingham	76	21	41					72910	0	142950	215860	2000	0	22000	24000	74910	0	164950	239860
Canyon	200		115					114700	0	0	114700	1500	0	1000	2500	116200	0	1000	117200
Bannock								45000	0	12000	57000	0	0	64000	64000	45000	0	76000	121000
Shoshone	36	0	0	0	0	0	0	28543	0	57800	86343	0	0	14450	14450	28543	0	72250	100793
MONTANA																			
Musselshell																			
Gallatin																			
Cascade	6															14308.4			
NEVADA																			
Lyon																			
Clark																			
Douglas	0	18	115	670	0	4	0									164960	0	131709	296669
Elko	18**															36244	22850	0	59094
NEW MEXICO																			
Los Alamos	250	126	52	0	0	70	0	87139c	0	60247c	147386c	c	0	c	c	87139	0	60247	147386
San Juan																			
Bernalillo																			
Mora	5		8					5252.24		4479	9731.25								
UTAH																			
Kane	6		6						0				0				0		37400
Salt Lake	x	x	x*						0				0				0		1485958
Utah						89										176908	0	41539	218447
WYOMING																			
Niobrara																			
Fremont	155		56													100311	0	90748	191,059

* Sheriff
x: the agency is included
** County roads (16) & Landfills (2)
? questionable answers

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
NUMBER OF VEHICLES, ANNUAL VEHICLE MILES, AND FUEL ECONOMY

State (City, FY)	Number of Vehicles Owned						Annual Miles Per Vehicle						Fuel Economy (mpg)					
	Cars	Vans/ Wagons/ Jeeps	Buses	LT Trucks	Med & Hvy Trucks	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	LT Trucks	Med & Heavy Trucks	Other Hwy Veh	Cars	Vans/ Wagons/ Jeeps	Buses	LT Trucks	Med & Hvy Trucks	Other Hwy Veh
ARIZONA																		
Goodyear																		
Yuma (92)	62	9	0	78	49	17	18700	10000	0	12000	12000		17	18.5		14.5	4.5	
Phoenix (7/1/91)	1442	226	6	1013	1060	124	12355	7520	7739	9720	8554	9039	15.3	10.1	6.6	10.6	5.2	33.0
COLORADO																		
Manitou Springs																		
Commerce (1/1/91)	50	3	0	30	15	10	30000	10000		8000	8000	3000	15	14		12	8	7
Denver (1/1/91)	1000	250	10	450	1000													
IDAHO																		
Ammon (10/1/90)				3	10					a5000	a					a8	a	
Pocatello (10/1/91)			14							12000					4-6	14-16	5-7	
Boise (10/1)	177	49	0	148	67	0	10119	5330	0	4896	4424	0						
MONTANA																		
Whitefish																		
Missoula (7/1/91)	38	10	1	69	51	8	28000	6850		15200	7200	5000	27	18		22	11	30+
Billings (7/1/91)	92	12	30	101	137	0	10250	3650	30200	9270	4880	0	17.1	9.4	4.2	15.3	4.6	
Kalispell (7/1)	20	11	0	19	24	2	21000	8000	0	7000	7000	4000	14	10		6	6	10
NEVADA																		
Winnemucca	7	3		23	13		30000	2000		7000	3000		8?	16		8	10	
Elko (7/91)	18	5	0	42	5	20							18-20	18-20		8-12	8-12	8-12
Las Vegas (1/1/91)	60	31	8	222	114	0	a3793						15	12	4	15	8	
Henderson	80	46	2	87	53	28*	25000	10000	12000	10000	6000	4000	12	10	8	10	8	
NEW MEXICO																		
Bosque Farms Village																		
Las Vegas (7/90)	50	4		50	15						15		17-25	12-17		12-18	4-8	
Albuquerque (7/1/91)	1309	235	141	558	438	278	9374	7505	32720	8449	9041	4967	15	11	4	12	4	10
UTAH																		
Roosevelt																		
West Jordan Town																		
Salt Lake																		
WYOMING																		
Wheatland Town (1/1/91)	7	7		9	6		6300				4700			20		15	5	
Sheridan																		
Cheyenne																		

a: average over all vehicles
* trailers

RESPONSES TO ORNL QUESTIONNAIRE
MUNICIPAL GOVERNMENTS
NUMBER OF EMPLOYEES AND MOTOR FUEL USES

State	No. of Full-Time Employees							Highway Use (gallons)				Nonhighway Use (gallons)				Total Use (Highway + Nonhighway)			
	Central	Fire	Police	Educat	Transit	Utility	Guards	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total	Gasoline	Gasohol	Diesel	Total
ARIZONA																			
Goodyear																			
Yuma		88	95					115000	0	80850	195850	15000	0	9150	24150	130000	0	90000	220000
Phoenix	x	x	x					1016130	1944204	1365911	4326245	5972	11944	547097	565013	1022102	1956148	1913008	4891258
COLORADO																			
Manitou Springs																			
Commerce	40		55			40#		48000	0	23000	71000	2000	0	6000	8000	50000	0	29000	79000
Denver	x	x	x													1769074	0	1040454	2809528
IDAHO																			
Ammon						5										10018	0	4329	14347
Pocatello																126732	0	204014	330746
Boise																			
MONTANA																			
Whitefish																			
Missoula	244	65	66	0	0			68055	0	40554	108609								
Billings																176917	0	411304	588221
Kalispell	60	21	32	0	0	0	0									48700	0	26000	74700
NEVADA																			
Winnemucca	18	2	17					27000		2000	29000	2500		4500	7000	29500		6500	36000
Elko	16*	17	35			42		54207	0	22002	76209	0	0	0	0	54207	0	22002	76209
Las Vegas	1500															308410	0	166765	475175
Henderson								200000	0	20000	220000	0	0	20000	20000	200000	0	40000	240000
NEW MEXICO																			
Bosque Farms Village																			
Las Vegas	259	13	52					89082	0	38943.6	128025.6	0	0	6872.4	6872.4	89082	0	45816	134898
Albuquerque	x	523	1112		243	903		1898194	0	1147847	3046041	39183	0	0	39183	1937377	0	1147847	3085224
UTAH																			
Roosevelt																			
West Jordan Town																			
Salt Lake																			
WYOMING																			
Whestland Town	x	1	11			20			?24000	?12000	?36000						?24000	?12000	?36000
Sheridan																			
Cheyenne																			

Public Works
x: the agency is included.
* parks
? questionable answers

APPENDIX D

PROJECTED NUMBERS OF GOVERNMENT-OWNED VEHICLES BY VEHICLE TYPE AND GOVERNMENT TYPE

The fuel use estimations in Chapter 5 required that the number of State, county, and municipal (SCM) government-owned vehicles be estimated by vehicle type and government type. In addition, projections of these numbers were needed for future years. This appendix describes the methods used in this study to obtain such estimates and projections. Given the quality of existing data as discussed in Chapter 4, these methods were intentionally kept simple for the purpose of not "over-interpreting" the data.

The number of SCM government-owned vehicles published in *Highway Statistics* are currently broken down by three vehicle types: cars/vans, buses, and trucks. The most current data available are for year 1991. The first method was designed to project these numbers for year 1992 and future years. A dummy variable regression model describing the relationship between the total number of SCM government-owned vehicles (including cars/vans, buses, and trucks) and population was developed:

$$NV_{s,i} = \alpha_s + (\sum_{d=1}^{9} \beta_d Pop_{d,s,i}) + \varepsilon_{s,i} \qquad \text{(D.1)}$$

where $NV_{s,i}$ is the total number of vehicles owned by State s in year i; $Pop_{d,s,i}$ is the population of State s in year i if State s is in Census Division d, otherwise $Pop_{d,s,i}$ is set equal to 0; ε is the model residual assumed to be independent and normally distributed with zero mean and constant variance; α_s, s=1,2,.., 50, are model intercepts varying by State; and β_d, d=1,2,...,9, are regression parameters associated with population and are allowed to vary by Division. These regression parameters were estimated using historical data from 1987 to 1991, as published in *Highway Statistics*. These developed models, together with the estimated State populations, were used to estimate and project total number of government-owned vehicles. The estimates and projections are presented in the last column of Tables 24, 25, and 26, for years 1992, 1995, and 2000. The breakdowns by vehicle type were made using the average shares between 1989 and 1991.

The second method was devised to break these numbers down by government type. First, sample respondents which were believed to have good data on total number of government-owned vehicles were selected. The Poisson regression models were then used to develop relationships between total number of government-owned vehicles and population for each government type. A brief description of the Poisson regression models can be found in the LIMDEP User's Manual [Econometric Software, Inc., 1991]. This particular type of regression model was used because number of vehicles takes only integer values and some small governments have very few vehicles. Three models in total were developed, one for each government type. Based on the developed models, the number of government-owned vehicles was estimated for each government using population as a predictor. For each State, these estimated numbers of total government-owned vehicles were added for county governments and for municipal governments. Based on these

estimates, the relative percentages of vehicles owned by State government, county government, and municipal government could be derived. These relative percentages were then applied to the projected numbers obtained from the first method. The final estimates and projections are given in Tables 24, 25, and 26, for years 1992, 1995, and 2000.

Table 24. Projections of the number of public-owned vehicles based on 1987-1991 data

1992

	State Government				County Governments				Municipal Governments				All Governments			
STATE	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Total
AL	4,172	2,172	6,931	13,275	3,654	1,902	6,071	11,626	4,687	2,440	7,788	14,915	12,512	6,514	20,790	39,816
AK	996	117	2,545	3,657	454	53	1,160	1,667	528	62	1,349	1,938	1,977	232	5,053	7,262
AZ	4,638	932	2,876	8,446	2,134	429	1,324	3,887	6,494	1,305	4,027	11,825	13,266	2,666	8,226	24,158
AR	2,722	1,550	2,958	7,230	2,388	1,360	2,596	6,345	2,347	1,336	2,551	6,234	7,457	4,246	8,105	19,808
CA	27,436	2,736	32,953	63,125	25,147	2,508	30,204	57,859	98,998	9,872	118,903	227,773	151,582	15,115	182,059	348,756
CO	2,539	1,375	5,218	9,131	1,777	962	3,651	6,390	3,159	1,710	6,491	11,360	7,474	4,047	15,360	26,881
CT	4,447	332	8,439	13,219	1,992	149	3,780	5,921	3,179	238	6,032	9,448	9,618	719	18,251	28,588
DE	3,291	208	1,382	4,881	904	57	380	1,341	810	51	340	1,201	5,005	316	2,102	7,423
DC	0	0	0	0	290	19	462	771	1,147	76	1,824	3,047	1,437	95	2,286	3,818
FL	22,628	9,186	31,169	62,983	21,047	8,544	28,992	58,583	37,809	15,348	52,079	105,236	81,484	33,078	112,240	226,802
GA	5,000	4,400	12,741	22,141	5,793	5,098	14,761	25,651	4,906	4,317	12,501	21,723	15,698	13,815	40,002	69,515
HI	2,228	414	2,124	4,766	653	121	623	1,397	1,770	329	1,688	3,787	4,651	864	4,434	9,949
ID	1,972	991	7,328	10,291	1,246	626	4,629	6,501	1,194	600	4,436	6,230	4,411	2,218	16,393	23,022
IL	14,738	517	3,024	18,280	13,109	459	2,690	16,258	36,317	1,273	7,453	45,042	64,164	2,249	13,167	79,580
IN	5,106	3,547	8,596	17,249	5,108	3,549	8,599	17,255	6,967	4,840	11,728	23,535	17,181	11,936	28,923	58,040
IA	2,982	2,380	6,898	12,260	2,881	2,299	6,664	11,844	3,251	2,594	7,520	13,365	9,113	7,273	21,082	37,468
KS	2,154	748	4,834	7,736	1,867	648	4,190	6,705	2,462	854	5,523	8,839	6,483	2,250	14,547	23,280
KY	6,810	2,703	14,454	23,968	7,074	2,808	15,014	24,897	5,821	2,311	12,355	20,486	19,706	7,822	41,823	69,351
LA	6,467	1,328	3,975	11,770	5,544	1,139	3,408	10,090	7,139	1,466	4,388	12,994	19,150	3,933	11,771	34,854
ME	2,368	1,466	4,444	8,278	1,203	744	2,257	4,204	809	501	1,518	2,828	4,380	2,711	8,219	15,310
MD	4,678	2,131	6,971	13,780	2,917	1,329	4,347	8,594	2,761	1,258	4,114	8,133	10,356	4,717	15,433	30,506
MA	4,339	136	9,084	13,559	2,451	77	5,132	7,660	4,568	143	9,565	14,276	11,358	355	23,781	35,494
MI	11,548	3,967	17,499	33,013	10,678	3,668	16,181	30,528	18,781	6,452	28,460	53,693	41,007	14,087	62,140	117,234
MN	2,566	2,353	5,323	10,243	2,262	2,074	4,691	9,027	3,801	3,486	7,885	15,171	8,629	7,913	17,899	34,441
MS	2,395	1,964	4,041	8,400	2,226	1,825	3,756	7,806	1,864	1,529	3,146	6,539	6,485	5,317	10,943	22,745
MO	1,312	2,242	3,493	7,048	1,276	2,180	3,396	6,853	1,739	2,971	4,628	9,337	4,327	7,393	11,517	23,237
MT	1,885	468	4,026	6,380	1,234	307	2,636	4,176	947	235	2,023	3,205	4,066	1,010	8,685	13,761

Table 24. Projections of the number of public-owned vehicles based on 1987-1991 data (continued)

1992

	State Government				County Governments				Municipal Governments				All Governments			
STATE	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Total
NE	2,971	1,364	4,267	8,602	2,287	1,050	3,285	6,622	2,505	1,150	3,598	7,254	7,764	3,563	11,151	22,478
NV	4,167	58	3,763	7,989	1,589	22	1,435	3,046	2,597	36	2,345	4,978	8,353	117	7,543	16,013
NH	1,634	161	4,896	6,691	697	69	2,088	2,853	654	64	1,961	2,680	2,985	294	8,945	12,224
NJ	18,474	1,076	25,050	44,600	12,920	752	17,519	31,192	24,537	1,429	33,271	59,237	55,931	3,257	75,841	135,029
NM	4,202	238	5,044	9,484	2,474	140	2,969	5,583	3,379	192	4,057	7,628	10,055	570	12,070	22,695
NY	16,978	2,812	12,740	32,530	16,084	2,664	12,069	30,817	38,454	6,369	28,856	73,678	71,515	11,845	53,665	137,025
NC	7,633	8,063	15,348	31,045	8,246	8,711	16,581	33,538	8,253	8,718	16,596	33,567	24,132	25,492	48,525	98,149
ND	1,304	736	2,910	4,949	828	467	1,849	3,144	645	364	1,441	2,450	2,777	1,567	6,200	10,544
OH	6,607	5,322	12,123	24,052	6,879	5,541	12,622	25,043	12,952	10,433	23,765	47,151	26,439	21,297	48,510	96,246
OK	2,425	3,401	9,991	15,817	2,045	2,868	8,427	13,341	3,047	4,273	12,552	19,871	7,517	10,542	30,970	49,029
OR	6,985	2,572	6,008	15,566	4,552	1,676	3,916	10,145	6,563	2,417	5,646	14,626	18,100	6,666	15,570	40,336
PA	10,165	1,952	12,857	24,974	9,881	1,898	12,498	24,277	15,446	2,967	19,537	37,950	35,491	6,817	44,893	87,201
RI	1,432	3	2,380	3,815	470	1	780	1,251	798	1	1,326	2,126	2,700	5	4,487	7,192
SC	2,980	3,914	7,018	13,912	2,349	3,085	5,532	10,966	1,991	2,615	4,689	9,295	7,320	9,614	17,239	34,173
SD	966	600	4,209	5,774	675	419	2,939	4,033	472	293	2,055	2,819	2,112	1,311	9,203	12,626
TN	4,656	3,472	11,505	19,634	4,482	3,342	11,075	18,899	5,630	4,198	13,910	23,737	14,768	11,012	36,490	62,270
TX	29,195	9,378	36,860	75,433	37,578	12,071	47,446	97,095	81,876	26,300	103,374	211,550	148,649	47,748	187,680	384,077
UT	3,006	287	3,405	6,699	1,517	145	1,718	3,380	3,038	291	3,441	6,770	7,561	723	8,565	16,849
VT	1,140	514	2,429	4,082	508	229	1,083	1,821	256	116	546	918	1,904	859	4,058	6,821
VA	9,883	4,610	8,173	22,666	11,029	5,144	9,121	25,294	9,809	4,575	8,112	22,497	30,721	14,329	25,406	70,456
WA	5,463	1,666	9,362	16,491	3,679	1,122	6,305	11,106	5,574	1,700	9,553	16,828	14,716	4,489	25,220	44,425
WV	7,781	1,190	15,114	24,084	6,103	933	11,854	18,890	3,724	569	7,234	11,527	17,608	2,692	34,202	54,502
WI	3,472	1,342	10,462	15,277	3,107	1,202	9,365	13,674	4,875	1,885	14,691	21,451	11,454	4,429	34,518	50,401
WY	2,068	709	2,698	5,475	1,038	356	1,354	2,747	1,042	357	1,359	2,758	4,147	1,421	5,412	10,980
TOTAL	307,002	105,801	441,943	854,745	268,325	98,841	385,422	752,588	502,370	148,908	654,230	1,305,507	1,077,696	353,550	1,481,594	2,912,840

Table 25. Projections of the number of public-owned vehicles based on 1987-1991 data

1995

	State Government				County Governments				Municipal Governments				All Governments			
STATE	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Total
AL	4,421	2,302	7,346	14,069	3,872	2,016	6,434	12,322	4,968	2,586	8,254	15,808	13,261	6,904	22,034	42,199
AK	1,019	119	2,603	3,741	464	54	1,186	1,705	540	63	1,380	1,983	2,023	237	5,169	7,429
AZ	4,727	950	2,931	8,609	2,176	437	1,349	3,962	6,619	1,330	4,104	12,053	13,522	2,718	8,384	24,624
AR	2,947	1,679	3,204	7,830	2,586	1,473	2,811	6,871	2,541	1,447	2,762	6,751	8,075	4,599	8,777	21,451
CA	28,268	2,819	33,952	65,039	25,910	2,584	31,119	59,613	102,001	10,171	122,508	234,679	156,179	15,573	187,579	359,331
CO	2,570	1,391	5,282	9,244	1,798	974	3,696	6,468	3,197	1,731	6,571	11,499	7,566	4,096	15,549	27,211
CT	4,482	335	8,504	13,320	2,007	150	3,809	5,966	3,203	239	6,078	9,520	9,692	724	18,390	28,806
DE	3,346	212	1,406	4,963	920	58	386	1,364	823	52	346	1,221	5,089	322	2,138	7,549
DC	0	0	0	0	295	20	470	784	1,167	77	1,856	3,101	1,462	97	2,326	3,885
FL	23,540	9,556	32,425	65,521	21,895	8,888	30,160	60,944	39,332	15,967	54,178	109,477	84,767	34,411	116,763	235,941
GA	5,192	4,570	13,231	22,993	6,015	5,294	15,329	26,638	5,094	4,483	12,982	22,560	16,302	14,347	41,542	72,191
HI	2,295	426	2,188	4,910	673	125	641	1,439	1,824	339	1,739	3,901	4,792	890	4,568	10,250
ID	1,976	994	7,345	10,315	1,248	628	4,640	6,516	1,196	602	4,446	6,244	4,421	2,223	16,431	23,075
IL	14,860	521	3,049	18,431	13,217	463	2,712	16,393	36,617	1,284	7,514	45,415	64,695	2,268	13,276	80,239
IN	5,179	3,598	8,718	17,495	5,181	3,599	8,721	17,501	7,066	4,909	11,895	23,871	17,426	12,106	29,335	58,867
IA	2,983	2,381	6,901	12,265	2,882	2,300	6,667	11,849	3,252	2,596	7,524	13,371	9,117	7,277	21,092	37,486
KS	2,177	756	4,886	7,819	1,887	655	4,235	6,777	2,488	863	5,583	8,934	6,552	2,274	14,704	23,530
KY	6,994	2,776	14,843	24,613	7,265	2,883	15,419	25,567	5,978	2,373	12,687	21,038	20,237	8,032	42,949	71,218
LA	6,680	1,372	4,106	12,158	5,726	1,176	3,520	10,422	7,374	1,514	4,533	13,421	19,780	4,062	12,159	36,001
ME	2,388	1,478	4,481	8,348	1,213	751	2,276	4,240	816	505	1,531	2,852	4,417	2,734	8,288	15,439
MD	4,901	2,233	7,304	14,438	3,057	1,392	4,555	9,004	2,893	1,318	4,311	8,522	10,851	4,943	16,170	31,964
MA	4,396	137	9,204	13,737	2,483	77	5,200	7,761	4,629	144	9,691	14,464	11,508	359	24,095	35,962
MI	11,672	4,010	17,687	33,369	10,793	3,708	16,356	30,857	18,984	6,521	28,767	54,272	41,449	14,239	62,810	118,498
MN	2,623	2,406	5,442	10,471	2,312	2,120	4,796	9,228	3,886	3,563	8,060	15,509	8,821	8,089	18,297	35,207
MS	2,484	2,036	4,191	8,711	2,308	1,892	3,895	8,096	1,934	1,585	3,263	6,782	6,726	5,514	11,349	23,589
MO	1,338	2,286	3,560	7,184	1,301	2,222	3,462	6,985	1,772	3,028	4,717	9,517	4,410	7,536	11,739	23,685
MT	1,888	469	4,034	6,391	1,236	307	2,641	4,184	949	236	2,026	3,211	4,073	1,012	8,701	13,786
NE	2,982	1,369	4,282	8,633	2,295	1,053	3,297	6,645	2,514	1,154	3,611	7,279	7,791	3,576	11,190	22,557
NV	4,210	59	3,802	8,070	1,605	22	1,449	3,077	2,623	37	2,369	5,029	8,438	118	7,620	16,176
NH	1,667	164	4,995	6,827	711	70	2,130	2,911	668	66	2,000	2,734	3,046	300	9,125	12,471
NJ	19,523	1,137	26,473	47,133	13,654	795	18,514	32,963	25,930	1,510	35,161	62,601	59,107	3,442	80,148	142,697

Table 25. Projections of the number of public-owned vehicles based on 1987-1991 data (continued)

1995

	State Government				County Governments				Municipal Governments				All Governments			
STATE	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Total
NM	4,225	240	5,072	9,537	2,487	141	2,986	5,614	3,398	193	4,079	7,670	10,110	574	12,137	22,821
NY	17,702	2,932	13,284	33,918	16,770	2,778	12,584	32,132	40,095	6,641	30,087	76,823	74,567	12,351	55,955	142,873
NC	7,784	8,223	15,653	31,661	8,410	8,884	16,910	34,203	8,417	8,891	16,925	34,234	24,611	25,998	49,489	100,098
ND	1,312	740	2,928	4,979	833	470	1,860	3,163	649	366	1,450	2,465	2,794	1,576	6,238	10,608
OH	6,651	5,358	12,203	24,212	6,925	5,578	12,706	25,210	13,039	10,503	23,923	47,465	26,616	21,439	48,833	96,888
OK	2,573	3,609	10,602	16,784	2,171	3,044	8,942	14,156	3,233	4,534	13,319	21,086	7,977	11,186	32,863	52,026
OR	7,106	2,617	6,113	15,835	4,631	1,705	3,984	10,320	6,677	2,459	5,744	14,879	18,414	6,781	15,840	41,035
PA	10,615	2,039	13,427	26,080	10,318	1,982	13,052	25,352	16,130	3,098	20,403	39,631	37,063	7,119	46,881	91,063
RI	1,445	3	2,401	3,848	474	1	787	1,261	805	1	1,338	2,144	2,723	5	4,526	7,254
SC	3,083	4,049	7,261	14,394	2,430	3,192	5,724	11,346	2,060	2,706	4,851	9,617	7,574	9,947	17,836	35,357
SD	968	601	4,220	5,789	676	420	2,947	4,044	473	294	2,061	2,827	2,117	1,315	9,228	12,660
TN	4,991	3,722	12,332	21,045	4,804	3,583	11,870	20,257	6,034	4,500	14,909	25,443	15,829	11,804	39,112	66,745
TX	31,292	10,052	39,508	80,852	40,278	12,938	50,854	104,070	87,758	28,189	110,801	226,748	159,328	51,179	201,163	411,670
UT	3,038	291	3,441	6,770	1,533	147	1,736	3,415	3,070	294	3,478	6,841	7,640	731	8,655	17,026
VT	1,152	519	2,455	4,127	514	232	1,095	1,840	259	117	552	928	1,925	868	4,102	6,895
VA	10,216	4,765	8,448	23,429	11,400	5,318	9,428	26,146	10,140	4,729	8,385	23,255	31,756	14,812	26,262	72,830
WA	5,660	1,726	9,699	17,086	3,812	1,163	6,533	11,507	5,776	1,762	9,898	17,436	15,248	4,651	26,130	46,029
WV	7,776	1,189	15,104	24,069	6,099	933	11,847	18,879	3,722	569	7,229	11,520	17,597	2,691	34,180	54,468
WI	3,623	1,401	10,919	15,943	3,243	1,254	9,774	14,271	5,088	1,967	15,332	22,387	11,954	4,622	36,025	52,601
WY	2,074	711	2,707	5,491	1,041	357	1,358	2,755	1,045	358	1,364	2,766	4,159	1,425	5,429	11,013
TOTAL	317,017	109,324	456,155	882,496	277,837	102,307	398,852	778,995	520,743	154,465	678,575	1,353,783	1,115,597	366,096	1,533,581	3,015,274

Table 26. Projections of the number of public-owned vehicles based on 1987-1991 data

2000

	State Government				County Governments				Municipal Governments				All Governments			
STATE	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Total
AL	4,789	2,493	7,957	15,238	4,194	2,184	6,969	13,346	5,380	2,801	8,940	17,121	14,363	7,478	23,865	45,706
AK	1,061	124	2,712	3,897	484	57	1,236	1,776	562	66	1,437	2,066	2,107	247	5,385	7,739
AZ	4,847	974	3,006	8,827	2,231	448	1,383	4,063	6,787	1,364	4,208	12,359	13,865	2,787	8,597	25,249
AR	3,265	1,859	3,549	8,673	2,865	1,632	3,114	7,611	2,815	1,603	3,060	7,478	8,945	5,094	9,722	23,761
CA	29,408	2,932	35,321	67,662	26,955	2,688	32,374	62,017	106,114	10,581	127,449	244,143	162,477	16,201	195,144	373,822
CO	2,614	1,416	5,373	9,402	1,829	990	3,759	6,579	3,252	1,761	6,684	11,697	7,695	4,167	15,816	27,678
CT	4,528	338	8,592	13,459	2,028	152	3,848	6,028	3,237	242	6,141	9,620	9,793	732	18,582	29,107
DE	3,425	216	1,439	5,080	941	59	395	1,396	843	53	354	1,250	5,209	329	2,188	7,726
DC	0	0	0	0	304	20	484	809	1,203	80	1,914	3,196	1,507	100	2,398	4,005
FL	24,760	10,051	34,106	68,917	23,030	9,349	31,723	64,103	41,371	16,794	56,986	115,151	89,161	36,195	122,815	248,171
GA	5,445	4,792	13,874	24,110	6,308	5,551	16,074	27,933	5,342	4,701	13,613	23,656	17,095	15,044	43,561	75,700
HI	2,388	444	2,276	5,108	700	130	667	1,497	1,897	352	1,809	4,058	4,985	926	4,752	10,663
ID	1,983	997	7,369	10,349	1,253	630	4,656	6,538	1,200	604	4,461	6,265	4,436	2,231	16,486	23,153
IL	15,421	540	3,165	19,126	13,715	481	2,815	17,011	37,998	1,332	7,798	47,127	67,134	2,353	13,777	83,264
IN	5,315	3,693	8,948	17,956	5,317	3,694	8,951	17,962	7,252	5,038	12,209	24,499	17,885	12,425	30,108	60,418
IA	2,989	2,386	6,916	12,291	2,888	2,305	6,681	11,874	3,259	2,601	7,539	13,399	9,136	7,292	21,136	37,564
KS	2,209	767	4,957	7,932	1,914	664	4,296	6,875	2,524	876	5,664	9,064	6,647	2,307	14,917	23,871
KY	7,296	2,896	15,485	25,676	7,579	3,008	16,085	26,672	6,236	2,475	13,235	21,947	21,111	8,379	44,805	74,295
LA	7,544	1,549	4,637	13,730	6,467	1,328	3,975	11,770	8,328	1,710	5,119	15,157	22,338	4,587	13,731	40,656
ME	2,414	1,494	4,531	8,439	1,226	759	2,301	4,286	825	511	1,548	2,883	4,465	2,764	8,379	15,608
MD	5,215	2,375	7,772	15,363	3,253	1,481	4,847	9,581	3,078	1,402	4,587	9,067	11,546	5,259	17,206	34,011
MA	4,474	140	9,366	13,980	2,527	79	5,291	7,897	4,710	147	9,862	14,719	11,711	366	24,519	36,596
MI	12,034	4,134	18,235	34,403	11,128	3,823	16,862	31,813	19,572	6,723	29,658	55,953	42,733	14,680	64,756	122,169
MN	2,700	2,476	5,600	10,776	2,379	2,182	4,936	9,497	3,999	3,667	8,295	15,961	9,078	8,325	18,831	36,234
MS	2,670	2,189	4,506	9,366	2,482	2,034	4,188	8,704	2,079	1,704	3,508	7,291	7,231	5,928	12,202	25,361
MO	1,376	2,352	3,664	7,392	1,338	2,287	3,562	7,188	1,823	3,116	4,854	9,793	4,538	7,755	12,080	24,373
MT	1,894	471	4,047	6,412	1,240	308	2,649	4,197	952	236	2,033	3,221	4,086	1,015	8,729	13,830
NE	2,998	1,376	4,305	8,679	2,308	1,059	3,314	6,681	2,528	1,160	3,630	7,318	7,833	3,595	11,250	22,678
NV	4,270	60	3,855	8,185	1,628	23	1,470	3,120	2,661	37	2,403	5,101	8,558	120	7,728	16,406
NH	1,709	169	5,120	6,998	729	72	2,183	2,984	684	68	2,050	2,802	3,122	308	9,354	12,784
NJ	21,157	1,232	28,688	51,077	14,796	862	20,063	35,721	28,100	1,636	38,103	67,839	64,053	3,730	86,854	154,637

Table 26. Projections of the number of public-owned vehicles based on 1987-1991 data (continued)

2000

	State Government				County Governments				Municipal Governments				All Governments			
STATE	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Subtotal	Autos	Buses	Trucks	Total
NM	4,259	242	5,113	9,614	2,507	142	3,010	5,659	3,426	194	4,112	7,732	10,192	578	12,235	23,005
NY	19,387	3,211	14,548	37,146	18,366	3,042	13,782	35,190	43,910	7,273	32,950	84,133	81,663	13,526	61,280	156,469
NC	7,968	8,417	16,022	32,407	8,608	9,093	17,308	35,009	8,615	9,101	17,324	35,040	25,191	26,610	50,654	102,455
ND	1,323	746	2,954	5,024	841	474	1,877	3,192	655	370	1,463	2,487	2,819	1,590	6,294	10,703
OH	6,804	5,480	12,483	24,767	7,084	5,706	12,997	25,787	13,338	10,744	24,471	48,552	27,225	21,930	49,951	99,106
OK	2,794	3,918	11,510	18,222	2,356	3,305	9,708	15,369	3,510	4,922	14,461	22,893	8,660	12,145	35,679	56,484
OR	7,268	2,677	6,252	16,197	4,737	1,744	4,075	10,556	6,830	2,515	5,875	15,219	18,835	6,936	16,202	41,973
PA	11,744	2,256	14,856	28,856	11,416	2,193	14,441	28,050	17,846	3,428	22,574	43,848	41,007	7,877	51,870	100,754
RI	1,462	3	2,430	3,894	479	1	796	1,277	815	1	1,354	2,170	2,756	5	4,580	7,341
SC	3,211	4,217	7,561	14,989	2,531	3,324	5,960	11,815	2,145	2,817	5,052	10,014	7,887	10,358	18,573	36,818
SD	972	604	4,237	5,813	679	422	2,960	4,060	475	295	2,069	2,839	2,126	1,320	9,266	12,712
TN	5,406	4,031	13,356	22,792	5,203	3,880	12,856	21,939	6,535	4,873	16,148	27,556	17,144	12,784	42,360	72,288
TX	34,613	11,118	43,701	89,431	44,552	14,311	56,250	115,113	97,070	31,180	122,557	250,808	176,235	56,609	222,508	455,352
UT	3,081	295	3,489	6,865	1,554	149	1,760	3,463	3,113	298	3,526	6,937	7,748	741	8,776	17,265
VT	1,168	527	2,488	4,182	521	235	1,110	1,865	263	118	560	941	1,951	880	4,157	6,988
VA	10,652	4,968	8,809	24,429	11,887	5,544	9,830	27,261	10,572	4,931	8,743	24,246	33,111	15,443	27,382	75,936
WA	5,928	1,808	10,159	17,895	3,993	1,218	6,842	12,052	6,049	1,845	10,367	18,262	15,970	4,871	27,368	48,209
WV	7,804	1,193	15,158	24,156	6,121	936	11,889	18,946	3,735	571	7,255	11,561	17,660	2,700	34,303	54,663
WI	3,834	1,482	11,554	16,871	3,432	1,327	10,342	15,101	5,383	2,082	16,224	23,689	12,649	4,891	38,120	55,660
WY	2,084	714	2,719	5,517	1,046	358	1,365	2,768	1,050	360	1,370	2,780	4,179	1,432	5,454	11,065
TOTAL	333,957	114,841	478,770	927,568	293,948	107,742	420,312	822,002	551,945	163,362	717,604	1,432,911	1,179,851	385,945	1,616,685	3,182,481

APPENDIX E

ESTIMATION OF SAMPLING ERRORS

In this appendix, the statistical theories used in this report to quantify the uncertainty of estimates due to sampling errors are briefly reviewed. Most of these theories are readily available in statistical textbooks. The intent of this appendix is to summarize some of the theories that may not be directly available from these textbooks. It should be emphasized that this appendix deals with "sampling errors" only, and that the bias and uncertainty of estimates caused by nonsampling errors, such as sampling frame error, measurement error, and nonresponse error, are discussed elsewhere in the report as circumstances arise. Simply speaking, "sampling errors" refer to the "variability" of estimates caused by the variation among different samples drawn from the same universe. In other words, different estimates will inevitably be obtained if we had chosen a different sample (with perhaps different sample size) even though the hypothesized model is correct and the sampling procedure has been carried out flawlessly.

The regression model is used in this report to develop the relationship between government fuel use and such predictors as population, land area, and number of government-owned vehicles. The model parameters and associated statistics are first estimated from sample data. The developed model is then used to estimate the fuel uses of those governments for which fuel use data are not available or not collected. Predicted fuel uses for county and municipal governments within a State, together with the State government estimate, are then summed to produce the State total estimate. Whenever data permit, separate regression models have been developed for different government types (i.e., State government, county government, and municipal government) and for different vehicle types (i.e., cars/vans, buses, and trucks). Although there are some preliminary indications from the available data that these fuel use-predictor relationships could be varying across geographical regions, the model is not currently developed by geographical region because of the limitations of the sample data (as reported in Chapter 3), and particularly because of the small sample size available for analysis.

In this review, the sampling error of the fuel use estimate for an individual government is first presented in a regression context. The sampling error associated with the State total estimate, which is the sum of State, county, and municipal governments estimates, is then derived. In order to break the estimated State total fuel use into highway and nonhighway uses and into different motor fuel types (i.e., gasoline, gasohol, and diesel), the shares of fuel uses by usage type and fuel type are also independently estimated from the sample data. The estimated State total fuel use is then multiplied with these estimated shares to obtain fuel use estimates by usage type and fuel type. Statistically, these new estimates are random variables generated from the multiplication of two independent random variables, each of which has some mean and variance. The sampling error associated with these new estimates is also derived in this appendix.

Regression Models

The final regression models used for estimating government fuel uses in this report involve only one predictor, either population or number of vehicles. The regression models have the following form:

$$\log(y_i) = \alpha + \beta \log(x_i) + \varepsilon_i \qquad i=1,2,\ldots,n \tag{E.1}$$

where y_i is the ith observation of the dependent variable, i.e., fuel use, x_i is the ith observation of the predictor, e.g., population, and is assumed to be measured without errors, α and β are unknown regression parameters to be estimated from sample data, and ε_i, i=1,2,...,n, are model residuals that are assumed to be independent with one another and are normally distributed with zero mean and constant variance, σ^2, and, in addition, they are not dependent on x_i. (Note that "log" represents natural logarithms.) In this study, this simple regression model has been used to develop the relationship between government fuel use and population and between highway fuel use and number of government-owned vehicles. Both the assumption regarding the "log-log" functional relationship and the assumption about the model residuals are judged from sample data to be quite adequate in describing such relationships.

The least squares estimation of the regression parameters α and β and residual variance σ^2, together with their statistical properties, are readily available in all regression textbooks, which we will not repeat here. Draper and Smith [1981] and Weisberg [1985] are good references on the subject. If all of the assumptions about the model and the observations above hold, the least squares estimates (which are also the maximum likelihood estimates) of α and β, denoted by $\hat{\alpha}$ and $\hat{\beta}$, respectively, are:

$$\hat{\beta} = \frac{\sum_{i=1}^{n} (\log(x_i) - \overline{\log(x)})(\log(y_i) - \overline{\log(y)})}{\sum_{i=1}^{n} (\log(x_i) - \overline{\log(x)})^2} \quad \text{and} \quad \hat{\alpha} = \overline{\log(y)} - \hat{\beta}\overline{\log(x)} \tag{E.2}$$

where

$$\overline{\log(x)} = \frac{1}{n}\left(\sum_{i=1}^{n} \log(x_i)\right) \quad \text{and} \quad \overline{\log(y)} = \frac{1}{n}\left(\sum_{i=1}^{n} \log(y_i)\right) \tag{E.3}$$

In addition, an estimate of $\hat{\sigma}^2$ is

$$\hat{\sigma}^2 = \frac{\sum_{i=1}^{n} \left[\log(y_i) - \hat{\alpha} - \hat{\beta}\log(x_i)\right]^2}{n-2} \tag{E.4}$$

It can be shown that these estimates are unbiased, i.e., $E(\hat{\alpha})=\alpha$, $E(\hat{\beta})=\beta$, and $E(\hat{\sigma}^2)=\sigma^2$, where E(z) symbolizes the expected value of random variable z. The variance of $\hat{\alpha}$ and $\hat{\beta}$, $Var(\hat{\alpha})$ and $Var(\hat{\beta})$, and their covariance, $Cov(\hat{\alpha},\hat{\beta})$, are also available in most regression books. In addition, it can be shown that $Cov(\hat{\alpha},\hat{\sigma}^2)=0$, $Cov(\hat{\beta},\hat{\sigma}^2)=0$, and $Var(\hat{\sigma}^2)=2\sigma^4/(n-2)$. These variances and covariances involve unknown parameters and can be estimated by replacing these unknown parameters with sample estimates. The estimated variances and covariances are typically symbolized by $\hat{Var}(.)$ and $\hat{Cov}(.,.)$.

Model (E.1) can be rewritten as

$$y_i = \exp(\alpha + \beta \log(x_i) + \varepsilon_i) \tag{E.5}$$

The model implies that y_i follows a lognormal distribution with the expected value (or mean) and variance of

$$E(y_i) = \mu_i = \exp(\alpha + \beta \log(x_i) + \frac{1}{2}\sigma^2) \quad \text{and} \quad Var(y_i) = \mu_i^2 [\exp(\sigma^2) - 1] \tag{E.6}$$

(see, e.g., Lindgren [1976], page 190-191). A good estimate of the mean of y_i is

$$\hat{E}(y_i) = \hat{\mu}_i = \exp(\hat{\alpha} + \hat{\beta} \log(x_i) + \frac{1}{2}\hat{\sigma}^2) \tag{E.7}$$

This estimate is relatively unbiased if both $\hat{\alpha}$ and $\hat{\beta}$ are well determined i.e., with high t-statistics of, e.g., 2 and over (see Miller, 1984). Note that all selected models in this study do have high t-statistics for both $\hat{\alpha}$ and $\hat{\beta}$.

To assess the uncertainty of the estimate in Eq. (E.7), we need to know $Var(\hat{\mu}_i)$. The following derivations use the first order analysis, in which $\hat{\mu}_i$ is first expanded around the expected value of $\hat{\alpha}$, $\hat{\beta}$, and $\hat{\sigma}^2$ (i.e., α, β, and σ^2) using the conventional Taylor series expansion:

$$\hat{\mu}_i = \exp(\hat{\alpha} + \hat{\beta}\log(x_i) + (1/2)\hat{\sigma}^2) \approx \mu_i + \mu_i(\hat{\alpha} - \alpha) + \mu_i \log(x_i)(\hat{\beta} - \beta) + \frac{1}{2}\mu_i(\hat{\sigma}^2 - \sigma^2) \tag{E.8}$$

The variance of the estimate, $Var(\hat{\mu}_i)$, can then be approximated by

$$Var(\hat{\mu}_i) \approx \mu_i^2 Var(\hat{\alpha}) + (\mu_i \log(x_i))^2 Var(\hat{\beta}) + 2\mu_i^2 \log(x_i) Cov(\hat{\alpha},\hat{\beta}) + \frac{1}{4}\mu_i^2 Var(\hat{\sigma}^2) \tag{E.9}$$

since the other two covariances vanish. Thus, the standard deviation of the estimate expressed as a percentage of its mean is:

$$CV\%_i = \frac{[Var(\hat{\mu}_i)]^{1/2}}{\mu_i} \times 100 \approx \left[Var(\hat{\alpha}) + (\log(x_i))^2 Var(\hat{\beta}) + 2\log(x_i)\, Cov(\hat{\alpha},\hat{\beta}) + \frac{1}{4} Var(\hat{\sigma}^2)\right]^{1/2} \times 100 \quad \text{(E.10)}$$

$CV\%_i$ is also called the relative standard error (RSE). A good estimate of $CV\%_i$ is

$$\hat{CV}\%_i \approx \left\{\hat{Var}(\hat{\alpha}) + (\log(x_i))^2 \hat{Var}(\hat{\beta}) + 2\log(x_i)\, \hat{Cov}(\hat{\alpha},\hat{\beta}) + \hat{\sigma}^4/[2(n-2)]\right\}^{1/2} \times 100 \quad \text{(E.11)}$$

This estimate is a measure of sampling variability of the estimate around its mean. Given that the model is appropriate, we can expect to reduce CV% by increasing the sample size, n.

Prediction Errors

For those governments for which fuel use records are not available, Eq. (E.7) is used to predict their fuel uses based on their populations or the number of vehicles they own. Now, suppose the predictor of a government is x_* and its actual fuel use is y_* (which is not known). Using Eq. (E.7), the predicted value of y_* is

$$\hat{y}_* = \hat{\mu}_* = \exp(\hat{\alpha} + \hat{\beta}\log(x_*) + \frac{1}{2}\hat{\sigma}^2) \quad \text{(E.12)}$$

The prediction error is, therefore,

$$e_* = y_* - \hat{y}_* = y_* - \hat{\mu}_* = \exp(\alpha + \beta\log(x_*) + \varepsilon_*) - \exp(\hat{\alpha} + \hat{\beta}\log(x_*) + \frac{1}{2}\hat{\sigma}^2) \quad \text{(E.13)}$$

The variance of the prediction error is

$$Var(e_*) = \mu_*^2[\exp(\sigma^2) - 1] + Var\left[\exp(\hat{\alpha} + \hat{\beta}\log(x_*) + \frac{1}{2}\hat{\sigma}^2)\right] \quad \text{(E.14)}$$

where $\mu_* = \exp(\alpha + \beta\log(x_*) + 0.5\,\sigma^2)$. Note that in Eq. (E.14) $Cov(y_*, \hat{\mu}_*)$ vanishes [see Weisberg, 1985, page 281]. Again, using the first order analysis, the standard deviation of the prediction expressed as a percentage of the mean μ_* can be shown to be approximately as follows.

$$\widehat{PredCV}\%_* \approx \left\{[\exp(\hat{\sigma}^2) - 1] + \hat{Var}(\hat{\alpha}) + (\log(x_*))^2 \hat{Var}(\hat{\beta}) + 2\log(x_*)\, \hat{Cov}(\hat{\alpha},\hat{\beta}) + \hat{\sigma}^4/[2(n-2)]\right\}^{1/2} \times 100 \quad \text{(E.15)}$$

It can be seen that $\widehat{Pred}CV\%$ is greater than $\hat{CV}\%$ because of the additional term, $\exp(\hat{\sigma}^2)$-1, which is always nonnegative. If the model is indeed a valid representation of such relationships, the residual variance, $\hat{\sigma}^2$, and therefore this additional term, can not be reduced by purely increasing the sample size n. It is possible, however, that by increasing the sample size we may be able to develop separate regression models for different States or Census Divisions such that

the intrinsic geographical differences (if any) in government fuel use due, perhaps, to the differences in government energy policy and weather conditions, could be captured by the model. Under these models, the residual variance, $\hat{\sigma}^2$, (and therefore $\exp(\hat{\sigma}^2)$-1) can be reduced. This, however, will probably require a substantial increase in sample size. It is not clear from the available data whether the geographical differences in fuel uses are "significant" enough to warrant such an increase in sample size, and perhaps it would be more imperative in the near future to deal with the nonsampling errors discussed in Chapter 3.

Sum of Estimates from a Regression Model

In this study, in order to obtain State estimate of motor fuel use, we need to estimate the fuel uses for individual counties and cities within a State using their populations or number of government-owned vehicles as a predictor. These estimates are then added to obtain the State estimate. The sampling error associated with such an estimate is illustrated as follows.

Suppose Eq. (E.1) is used for estimating the fuel use for g different governmental units, and the sum of these estimates are

$$\hat{\mu} = \sum_{i=1}^{g} \hat{\mu}_i = \sum_{i=1}^{g} \exp(\hat{\alpha} + \hat{\beta}\log(x_i) + \frac{1}{2}\hat{\sigma}^2) \tag{E.16}$$

Again, using the first order analysis the relative standard error can be derived as

$$\hat{CV}\% \approx \left[\hat{Var}(\hat{\alpha}) + \left(\frac{\sum_i \hat{\mu}_i \log(x_i)}{\sum_i \hat{\mu}_i} \right)^2 \hat{Var}(\hat{\beta}) + 2\left(\frac{\sum_i \hat{\mu}_i \log(x_i)}{\sum_i \hat{\mu}_i} \right) \hat{Cov}(\hat{\alpha},\hat{\beta}) + \frac{\hat{\sigma}^4}{2(n-2)} \right]^{1/2} \times 100 \tag{E.17}$$

Multiplication of Two Independent Random Variables

Consider the multiplication of two estimates as follows:

$$\hat{\mu} = \hat{\mu}_1 \hat{\mu}_2 \tag{E.18}$$

where $\hat{\mu}_1$ and $\hat{\mu}_2$ are two independent estimates with RSE of $CV\%_1$ and $CV\%_2$, respectively. For example, $\hat{\mu}_1$ is an estimate of highway fuel use, $\hat{\mu}_2$ is an independent estimate of gasoline share, and $\hat{\mu}$ is an estimate of highway gasoline use. The uncertainty analysis of interest is to estimate the RSE of $\hat{\mu}$. First, the expected value of $\hat{\mu}$ is

$$E(\hat{\mu}) = E(\hat{\mu}_1 \hat{\mu}_2) = E(\hat{\mu}_1) E(\hat{\mu}_2) \tag{E.19}$$

since $\hat{\mu}_1$ and $\hat{\mu}_2$ are independent estimates. Second, it can be shown that the variance of $\hat{\mu}$ is

$$Var(\hat{\mu}) = \left[Var(\hat{\mu}_1) + (E(\hat{\mu}_1))^2\right]\left[Var(\hat{\mu}_2) + (E(\hat{\mu}_2))^2\right] - \left[E(\hat{\mu}_1)E(\hat{\mu}_2)\right]^2 \tag{E.20}$$

Thus, the RSE of $\hat{\mu}$ is

$$CV\% = \frac{Var(\hat{\mu})^{1/2}}{E(\hat{\mu}_1)E(\hat{\mu}_2)} \times 100 = \left\{\left[(CV\%_1/100)^2 + 1\right]\left[(CV\%_2/100)^2 + 1\right] - 1\right\}^{1/2} \times 100 \tag{E.21}$$

An estimate of the RSE above is to replace the RSEs on the right hand side with the estimated RSE.

APPENDIX F

ESTIMATING FEDERAL GOVERNMENT FUEL USE

In this appendix, a vehicle-based method is developed to estimate the amount of fuels used by Federal government (civilian departments only). The estimates are provided for each State. The method can be outlined as follows:

Step 1 Estimate total motor fuel uses on highways.

Step 1.1 Estimate gallons per vehicle per year (gpv) on highways.

The estimates can be derived from the *Federal Motor Vehicle Fleet Report* [U.S. General Services Administration, 1993]. The latest report was for fiscal year 1991. These estimates were 600, 1636, and 629 gpv, respectively, for cars/vans, buses, and trucks (Table 2), which included fuel used for both on-road and off-road travels. Assuming that on average 3 percent, 0 percent, and 5 percent of the fuel used by cars/vans, buses, and trucks, respectively, were for off-road travels, we obtained 582, 1636, and 598 gpv used on highways.

Step 1.2 Estimate total motor fuel use by cars/vans, buses, and trucks for each State.

Currently, *Highway Statistics* [Annual] publishes number of vehicles owned by Federal civilian agencies by three vehicle types in each State: cars/vans, buses, and trucks. On-road fuel use is calculated by multiplying the number of vehicles with the gpv for each vehicle type and then summing over cars/vans, buses, and trucks to get a total.

Step 1.3 Estimate motor fuel use by "other on-road vehicles" for each State.

Fuels used by other on-road vehicles such as motorcycles are assumed to be 1.61 percent of the fuels used by cars/vans, buses, and trucks. This percentage was obtained for SCM governments in Chapter 5 from sample data.

Step 1.4 Estimate total highway fuel use.

Total highway use is estimated as the sum of fuel use by cars/vans, buses, trucks, and other on-road vehicles. That is, the highway use estimate is obtained by adding the estimates obtained in Steps 1.2 and 1.3.

Step 2 Estimate the ratio of nonhighway use over highway use.

Again, using the estimate from SCM governments, the ratio is estimated to be 0.1624. That is, nonhighway use is estimated as 16.24 percent of the highway use obtained in Step 1.4.

Step 3 Estimate the percentages of highway fuel use by fuel type.

Assuming that 3.6 percent of the light trucks [see Table 2.7 in Davis and Strang, 1993], all buses, and all medium/heavy (over 8,500 lb) trucks use diesel fuel, from the *Federal Motor Vehicle Fleet Report* [U.S. General Services Administration, 1993] we estimated that about 20.15 percent of the fuel used on highway was diesel. In addition, using the relative breakdown between gasoline and gasohol from the SCM governments (Chapter 5), we estimated that 3.15 percent and 76.7 percent of the highway fuel use were gasohol and gasoline, respectively.

Step 4 Estimate the percentages of nonhighway fuel use by fuel type.

Using the estimates for SCM governments in Chapter 5, the estimates are 26.61 percent, 0.52 percent, and 72.87 percent for gasoline, gasohol, and diesel, respectively.

Following the procedure above, the final estimates by State for 1992 are shown in Table 27.

Table 27. Estimates of Federal civilian agencies motor fuel use for year 1992

(in gallons)

STATE	Highway Use				Nonhighway Use				Grand Total
	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	
AL	2,627,947	107,927	690,393	3,426,267	148,065	2,893	405,467	556,426	3,982,693
AK	1,513,660	62,165	397,657	1,973,482	85,283	1,667	233,544	320,493	2,293,975
AZ	4,900,133	201,244	1,287,323	6,388,700	276,085	5,395	756,044	1,037,525	7,426,225
AR	1,477,405	60,676	388,132	1,926,213	83,241	1,627	227,950	312,817	2,239,030
CA	22,945,282	942,342	6,027,998	29,915,622	1,292,793	25,263	3,540,241	4,858,297	34,773,919
CO	4,125,485	169,430	1,083,814	5,378,729	232,440	4,542	636,524	873,506	6,252,235
CT	2,050,836	84,226	538,779	2,673,841	115,549	2,258	316,425	434,232	3,108,072
DE	418,248	17,177	109,879	545,304	23,565	460	64,532	88,557	633,862
DC	2,851,777	117,120	749,196	3,718,093	160,676	3,140	440,002	603,818	4,321,911
FL	7,955,662	326,732	2,090,047	10,372,440	448,241	8,759	1,227,484	1,684,484	12,056,925
GA	3,961,261	162,685	1,040,670	5,164,617	223,187	4,361	611,185	838,734	6,003,351
HI	907,397	37,266	238,384	1,183,047	51,125	999	140,003	192,127	1,375,174
ID	2,320,391	95,296	609,594	3,025,281	130,736	2,555	358,014	491,306	3,516,587
IL	5,647,401	231,934	1,483,639	7,362,974	318,188	6,218	871,341	1,195,747	8,558,720
IN	2,340,136	96,107	614,782	3,051,025	131,849	2,577	361,061	495,486	3,546,512
IA	1,556,222	63,913	408,838	2,028,973	87,681	1,713	240,110	329,505	2,358,478
KS	1,555,539	63,885	408,659	2,028,083	87,643	1,713	240,005	329,361	2,357,443
KY	2,521,430	103,553	662,410	3,287,392	142,063	2,776	389,033	533,873	3,821,265
LA	2,557,405	105,030	671,861	3,334,296	144,090	2,816	394,583	541,490	3,875,785
ME	656,257	26,952	172,406	855,615	36,975	723	101,254	138,952	994,567
MD	3,883,370	159,487	1,020,207	5,063,064	218,798	4,276	599,167	822,242	5,885,305
MA	3,833,259	157,429	1,007,043	4,997,731	215,975	4,220	591,436	811,631	5,809,362
MI	4,520,450	185,651	1,187,576	5,893,677	254,693	4,977	697,463	957,133	6,850,810
MN	2,722,591	111,814	715,257	3,549,662	153,397	2,998	420,070	576,465	4,126,127
MS	1,981,154	81,364	520,473	2,582,991	111,623	2,181	305,673	419,478	3,002,469
MO	3,143,316	129,093	825,786	4,098,195	177,102	3,461	484,984	665,547	4,763,742
MT	2,265,855	93,057	595,267	2,954,179	127,664	2,495	349,600	479,759	3,433,937

Table 27. Estimates of Federal civilian agencies motor fuel use for year 1992 (continued)

(in gallons)

STATE	Highway Use				Nonhighway Use				Grand Total
	Gasoline	Gasohol	Diesel	Subtotal	Gasoline	Gasohol	Diesel	Subtotal	
NE	1,505,473	61,828	395,506	1,962,806	84,822	1,658	232,280	318,760	2,281,566
NV	3,055,667	125,494	802,760	3,983,921	172,164	3,364	471,461	646,989	4,630,910
NH	668,041	27,436	175,502	870,979	37,639	736	103,072	141,447	1,012,425
NJ	4,843,208	198,906	1,272,368	6,314,482	272,878	5,332	747,261	1,025,472	7,339,954
NM	3,472,421	142,609	912,246	4,527,276	195,645	3,823	535,762	735,230	5,262,506
NY	10,638,400	436,910	2,794,834	13,870,143	599,393	11,713	1,641,405	2,252,511	16,122,654
NC	2,845,486	116,862	747,543	3,709,891	160,322	3,133	439,032	602,486	4,312,377
ND	1,046,174	42,965	274,842	1,363,982	58,944	1,152	161,415	221,511	1,585,493
OH	4,781,750	196,382	1,256,222	6,234,355	269,415	5,265	737,779	1,012,459	7,246,814
OK	2,613,392	107,330	686,569	3,407,290	147,245	2,877	403,222	553,344	3,960,634
OR	4,021,706	165,168	1,056,550	5,243,424	226,593	4,428	620,511	851,532	6,094,955
PA	7,034,621	288,906	1,848,078	9,171,605	396,348	7,745	1,085,376	1,489,469	10,661,074
RI	520,407	21,373	136,717	678,497	29,321	573	80,294	110,188	788,685
SC	2,533,472	104,047	665,573	3,303,093	142,742	2,789	390,891	536,422	3,839,516
SD	1,363,207	55,986	358,131	1,777,324	76,806	1,501	210,330	288,637	2,065,961
TN	5,073,831	208,378	1,332,956	6,615,165	285,872	5,586	782,844	1,074,303	7,689,467
TX	11,580,794	475,613	3,042,412	15,098,819	652,490	12,751	1,786,808	2,452,048	17,550,867
UT	2,091,303	85,888	549,410	2,726,601	117,829	2,303	322,668	442,800	3,169,401
VT	325,556	13,370	85,527	424,453	18,343	358	50,230	68,931	493,385
VA	4,649,011	190,931	1,221,350	6,061,293	261,937	5,119	717,299	984,354	7,045,646
WA	6,084,958	249,904	1,598,591	7,933,453	342,841	6,700	938,852	1,288,393	9,221,845
WV	1,168,848	48,004	307,070	1,523,922	65,856	1,287	180,342	247,485	1,771,407
WI	2,265,590	93,046	595,197	2,953,833	127,649	2,494	349,559	479,703	3,433,536
WY	1,257,668	51,651	330,404	1,639,723	70,860	1,385	194,046	266,291	1,906,014
TOTAL	182,680,855	7,502,538	47,992,428	238,175,821	10,292,682	201,135	28,185,936	38,679,753	276,855,575

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