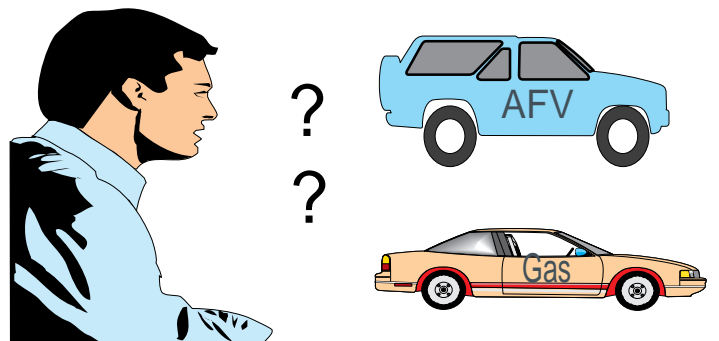
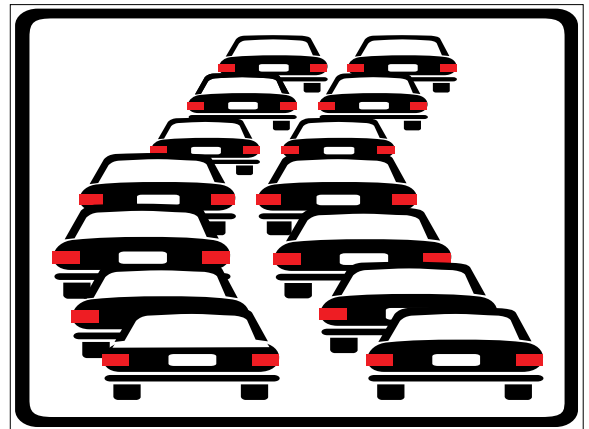
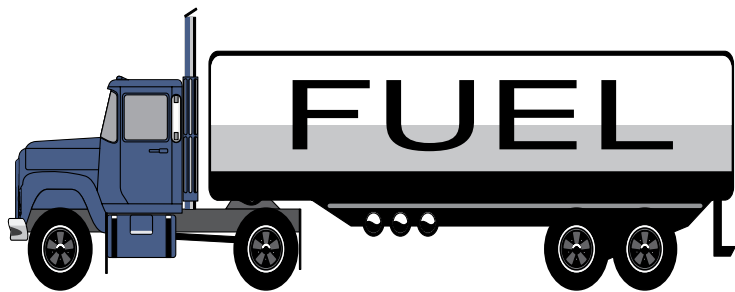


# Describing Current and Potential Markets for Alternative-Fuel Vehicles



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**March 1996**

**Energy Information Administration  
Office of Energy Markets and End Use  
U.S. Department of Energy  
Washington, D.C. 20585**

This report was prepared by the Energy Information Administration, the independent analytical agency within the Department of Energy. The information contained herein should not be construed as advocating or reflecting any policy position of the Department of Energy or any other organization.

# Contacts

General information about Energy Information Administration (EIA) data on energy consumption can be obtained from **Lynda T. Carlson**, Director of the Energy End Use and Integrated Statistics Division (EEUISD) (202-586-1112). General information regarding the contents of this publication can be obtained from **Dwight K. French**, Chief of the Transportation and Industrial Branch (202-586-1126, Internet DFRENCH@EIA.DOE.GOV). **Jennifer Reichert** (202-586-5736, Internet JREICHER@EIA.DOE.GOV) is the contact for the “Fleets of Alternative Fuel Providers” section of this report. **Christy Hall** (202-586-1068, Internet CHALL@EIA.DOE.GOV) is the contact for the “Composition of the U.S. Vehicle Stock” and “Consumer Vehicle Preferences” sections of this report. The FAX number for all EEUISD personnel is 202-586-0018.

The questionnaires administered in the alternative fuel provider fleet surveys and the consumer preference study have not been included in this report. For information regarding the alternative fuel provider fleet questionnaire, contact **Jennifer Reichert**. Contact **Christy Hall** for information concerning the consumer preference questionnaire.

EIA maintains a file transfer protocol (ftp) site on the Internet (<ftp://ftp.eia.doe.gov>) to allow the general public to access electronically the tables found in this report and in many of EIA's statistical reports. In addition to the tables presented in this report, there are additional tables from the alternative fuel provider fleet surveys available. For the Electric Utility Fleet Survey and the Natural Gas Supplier Fleet Survey, State-level data tables are available on the ftp site. All data tables can be found in the **pub/consumption** directory within the ftp site. EIA also maintains a Home Page (<http://www.eia.doe.gov>) on the Internet.

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If you have any data or report-related requirements or suggestions for any of the other EIA consumption surveys, please contact the appropriate survey manager directly or use the address below.

Commercial Buildings Energy Consumption Survey (CBECS): Martha Johnson, Survey Manager, at 202-586-1135 (Internet: MJOHNSON@EIA.DOE.GOV).

Manufacturing Energy Consumption Survey (MECS): Mark A. Schipper, Survey Manager, at 202-586-1136 (Internet: MSCHIPPE@EIA.DOE.GOV).

Residential Energy Consumption Survey (RECS): Wendel Thompson, Survey Manager, at 202-586-1119 (Internet: WTHOMPSO@EIA.DOE.GOV).

Residential Transportation Energy Consumption Survey (RTECS): Ron Lambrecht, Survey Manager, at 202-586-4962 (Internet: RLAMBREC@EIA.DOE.GOV).

You are encouraged to provide your comments to the survey managers. Your feedback is important to us.

EI-63, Mail Stop 2G-090  
1000 Independence Avenue, SW  
Washington, DC 20585  
FAX: 202-586-0018

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## **Section 1.**

### **Introduction**

## Introduction

Motor vehicles are an integral part of the American way of life. Private motor vehicles give us personal freedom and nearly unfettered mobility; and trucks, both large and small, bring goods to even the smallest towns throughout the country. Today, record numbers of vehicles are on the road and are being driven record numbers of miles.

Our reliance on motor vehicles has major implications for both international trade policy and environmental policy. Dependence on foreign oil reached its highest level in 17 years in 1994, with net imports amounting to 45 percent of consumption. Motor gasoline represented the greatest consumption of all oil products, 43 percent of all petroleum products supplied in 1994.<sup>1</sup> Both foreign imports of petroleum and consumption of motor gasoline are on the rise; and consequently, the United States remains as vulnerable as ever to oil embargoes abroad.

Concern that highway-vehicle combustion of gasoline produces by-products that could lead to global warming has heightened awareness of the so-called “greenhouse gases.” Motor vehicles are a major source of greenhouse gases, and the trends of rising numbers of motor vehicles and miles driven could lead to more harmful emissions that may ultimately affect the world’s climate. One approach to curtailing such emissions is to use, instead of gasoline, alternative fuels: liquefied petroleum gas (usually propane), compressed natural gas, electricity, or alcohol fuels.

In addition to the concerns over greenhouse-gas emissions, there is also increasing concern over pollutants which are harmful to human health. The major examples of these pollutants are atmospheric ozone and carbon monoxide. Ozone is not only directly harmful to humans, acting as a powerful irritant to the human respiratory system, but also indirectly because it absorbs ultraviolet light, which can cause skin cancer. Carbon monoxide is also harmful to human health by reducing the flow of oxygen to the body’s organs and tissues. The Clean Air Act Amendments of 1990 authorized the U.S. Environmental Protection Agency to set National Ambient Air Quality Standards (NAAQS). These standards were set in order to address air pollution and designate standards to mediate carbon monoxide and ozone levels.

## Energy Policy Act of 1992

The Energy Policy Act of 1992 (EPACT), which was adopted after the Persian Gulf conflict of 1990-1991, was the first new law to emphasize strengthened energy security and decreased reliance on foreign oil since the oil shortages of the 1970’s. The EPACT emphasized increasing the number of alternative-fuel vehicles (AFV’s) by mandating that Federal, State, and alternative fuel provider fleets incrementally increase the proportion of AFV’s in their vehicle fleets over the next few years. It was concluded that targeting fleets was the most practical approach to increasing the number of AFV’s on the road. One major drawback of alternative fuel use is the lack of a refueling infrastructure. Generally, commercial fleets are centrally refueled, so establishing a widespread refueling infrastructure would not be necessary.

## Energy Security

The United States obtains 53 percent of its net imports of petroleum products from the Organization of Petroleum Exporting Countries (OPEC), mostly from Saudi Arabia and Venezuela. Canada is another major source of net imports, but is not a member of OPEC. The transportation sector consumes 65 percent of the total petroleum products supplied, and, by far, the largest share of product supplied to the transportation sector is motor gasoline.<sup>2</sup>

Growth in gasoline consumption has occurred in spite of significant advances in fuel economy. In 1973, the year of the Arab oil embargo, average miles per gallon for passenger vehicles was 13.3; in 1992, the average miles per gallon was 21.6.<sup>3</sup> Automobile manufacturers instituted several engineering refinements to improve fuel economy, such as the use of lighter materials to decrease weight, aerodynamic body design to reduce drag, and the near universal use of radial tires

<sup>1</sup> Energy Information Administration (EIA), *Annual Energy Review 1994*, July 1995, Tables 5.1 and 5.11.

<sup>2</sup> EIA, *Annual Energy Review 1994*, July 1995, Table 5.12b.

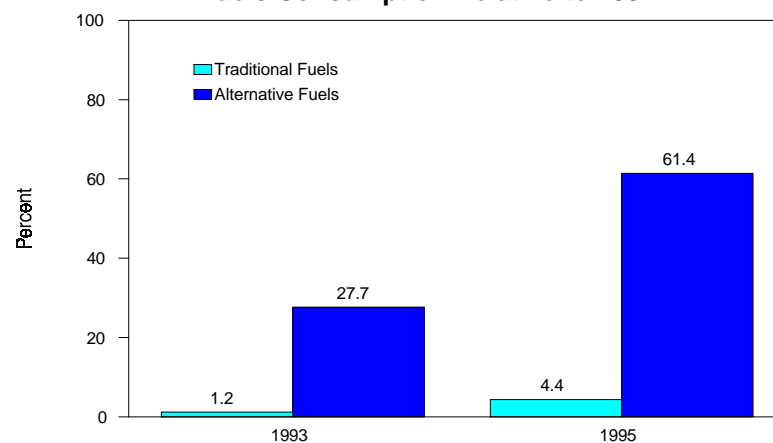
<sup>3</sup> EIA, *Annual Energy Review 1994*, July 1995, Table 2.15.

instead of bias-ply tires. These refinements were encouraged by the Federal Corporate Average Fuel Economy (CAFE) standards, which set fuel efficiency standards for different types of vehicles. However, the number of motor vehicles on the road and the number of miles driven have continued to grow, and motor gasoline consumption has continued to increase. The energy security provisions of EPACT represent a new approach to decreasing U.S. vulnerability to oil price shocks abroad and call for practical approaches to promoting domestic energy sources.

The EPACT set a national goal to replace 30 percent of the petroleum content of fuels for light-duty vehicles with nonpetroleum-derived fuels by the year 2010. To help meet this goal, the legislation also provided the possibility for future requirements for private fleets to acquire AFV's. Tax incentives for the purchase of AFV's and the development of retail service stations are also a requirement in the EPACT, as is encouragement to States to develop their own programs.

The goals set by the EPACT are far from being met. Alternative fuels' share of total vehicle fuel consumption remains trivial (approximately 0.3 percent). There was, however, about 28 percent growth in alternative fuel consumption between 1992 and 1993 and 61 percent growth between 1992 and 1995. Growth in consumption of traditional fuels was not as substantial--1.2 percent between 1992 and 1993 and 4.4 percent between 1992 and 1995 (Figure 1).<sup>4</sup> The Energy Information Administration (EIA) is monitoring the consumption of alternative fuels, the numbers of fleet vehicles, and the overall motor vehicle market. It is also taking a particularly detailed look at fleets in the Department of Energy (DOE)-designated "Clean Cities."<sup>5</sup> These cities have DOE-

**Figure 1.1. Percent Growth in Alternative and Traditional Fuels Consumption Relative to 1992**



Source: Energy Information Administration, *Alternatives to Traditional Transportation Fuels*, 1993, DOE/EIA-0585(93), January 1995.

accepted approaches for promoting the penetration of AFV's and development of the associated infrastructure needed for AFV acceptance. They are located in climatically and geographically diverse parts of the country.

## Reducing Greenhouse-Gas Emissions

Reducing greenhouse-gas emissions is another priority of the EPACT. Transportation, through the burning of petroleum products, accounts for about 30 percent of all anthropogenic greenhouse gases in the United States. Greenhouse gases are gases that absorb heat or prevent its release into the stratosphere, thus warming the Earth (the "greenhouse effect"); or that reflect sunlight, preventing its entry into the troposphere and striking the Earth's surface, thus cooling the Earth. The major gases--carbon dioxide, methane, and nitrous oxide--are found in combustion of hydrocarbons like motor gasoline and diesel fuel. Other gases, including carbon monoxide, nitrogen oxides, and nonmethane volatile organic compounds, are not greenhouse gases, however, they contribute indirectly to the greenhouse effect and are found in vehicle emissions.

<sup>4</sup> EIA, *Alternatives to Traditional Transportation Fuels 1993*, January 1995, p. 18.

<sup>5</sup> The EIA has conducted fleet surveys in Atlanta, GA and Denver, CO, which are two of the designated Clean Cities. Currently, there are a total of 41 Clean Cities--39 additional Clean Cities are as follows: Philadelphia, PA; Wilmington, DE; Las Vegas, NV; Washington, DC; Boston, MA; Austin, TX; Florida Gold Coast; Chicago, IL; Albuquerque, NM; Wisconsin - SE Area; Colorado Springs, CO; Long Beach, CA; Lancaster, CA; Salt Lake City, UT; White Plains, NY; Baltimore, MD; State of West Virginia; Louisville, KY; Rogue Valley, OR; San Francisco, CA; Sacramento, CA; South Bay (San Jose), CA; Oakland, CA; San Joaquin Valley, CA; Western New York; Portland, OR; St. Louis, MO; Waterbury, CT; Norwalk, CT; Norwich, CT; New London, CT; Peoria, IL; Kansas - Southwest Area; Central New York; Dallas/Ft. Worth, TX; Honolulu, HI; Missoula, MT; New Haven, CT; and Central Arkansas.

In the United States, the transportation sector contributes:

- about one-third of carbon dioxide emissions
- about one-third of nitrous oxide emissions
- less than 1 percent of anthropogenic methane emissions
- 77 percent of carbon monoxide emissions
- 45 percent of nitrogen oxide emissions
- more than one-third of nonmethane volatile organic compounds<sup>6</sup>

Alternative-fuel vehicles have the potential to reduce the emissions of many greenhouse gases, but they present a number of drawbacks for the consumer—including shorter driving ranges, less cargo space (because of extra fuel tanks or batteries), and fewer refueling outlets. Only electricity has a suitable fueling infrastructure in place; however, in many respects, electricity is the alternative fuel most in need of technological improvements in order to be a practical transportation fuel.

Fuel distributors are reluctant to build the necessary infrastructures for AFV's until these vehicles are more prevalent on the road; and, at the same time, automobile manufacturers fear the market for AFV's will be very limited until the refueling infrastructure is in place. The EPACT purchase mandates are designed to increase the market for AFV's, but the purchase mandates apply to entities—government and commercial fleets—that are least likely to use retail fuel outlets. Fleet vehicles are much more likely to refuel in a centralized location, often owned by the fleet operator.

In addition to the aforementioned requirements set forth by the EPACT, the Act directed the EIA to establish several new data collection programs. In particular, Section 407 of EPACT required information useful to those entering the markets related to AFV's and the associated infrastructure. As with any emerging market, the core information includes the makeup of the market in which new products would have to compete and the nature of the products that new technology might replace. The text box below gives overviews of the EIA programs required by EPACT Sections 407 and 503. The box first summarizes EIA's data acquisition programs required by Section 407, and then addresses those programs designed to comply with EPACT Section 503, which relates to AFV's in particular rather than to the vehicle market in general. Section 503 required EIA to identify AFV's already in use, AFV's likely to be in use in the following year, and AFV's being made available to the market each year.

This report describes current and potential markets for AFV's. It begins by assessing the total vehicle stock. Then it focuses on the current use of AFV's in alternative fuel provider fleets and the potential for use of AFV's in U.S. households. These topics are covered in the following three sections:

### ***Section 2. Composition of the U.S. Vehicle Stock***

Section 407 required information about the total U.S. vehicle market, and the EIA determined that the composition of the U.S. vehicle stock should be assessed. Using existing data sources and the new data collection systems designed to comply with EPACT, a speculative attempt was made to detect where and in what capacity vehicles are being operated within the United States. Results of this effort are presented in this section.

### ***Section 3. Fleets of Alternative Fuel Providers***

In addition to the various data collection systems, EPACT implemented programs designed to encourage governments and private companies to purchase AFV's for their fleets. These programs require that a certain percentage of new vehicle acquisitions be AFV's. These purchase mandates, which go into effect at different times for the various fleet subpopulations, increase incrementally over several years. The fleets operated by the Federal government were the first to be affected, with purchase requirements going into effect in 1993. Beginning with model year 1997 (approximately September 1996), alternative fuel providers--sellers and distributors of propane, electricity, and natural gas--may fall under AFV purchase mandates.

<sup>6</sup> EIA, *Emissions of Greenhouse Gases in the United States 1987-1994*, October 1995, pp. 12, 25, 45, 63-65.

The EIA established three fleet-level surveys to collect data concerning fleets and fleet vehicles operated by alternative fuel providers. The results of the three surveys: the Propane Provider Fleet Survey, the Electric Utility Fleet Survey, and the Natural Gas Supplier Fleet Survey are presented in this section. The EIA surveyed only providers of propane, natural gas, and electricity because there were existing EIA databases that made the population of those providers easily accessible. At the time the surveys were conducted, there was no database in existence for easy access to the methanol and ethanol providers, and it was still uncertain (due to pending Rules) whether the oil providers/refiners would be covered under the EPACT as alternative fuel providers.

#### ***Section 4. Consumer Vehicle Preferences***

Section 407 of the EPACT also called for data on consumer preferences relating to vehicle operation to assess consumer acceptance of AFV's. To comply, EIA obtained data from a national consumer vehicle preference survey that was designed and conducted by a practicum class in the Joint Program in Survey Methodology sponsored by the University of Maryland, the University of Michigan, and Westat, Inc. This survey collected data concerning consumer vehicle preferences and attitudes toward AFV's and the possible limitations commonly associated with them. Analysis of these data is presented in this section.

## Energy Policy Act

### Section 407 Data Acquisition Program

- Section 407 (a) and (a)(1) direct the Energy Information Administration (EIA) to collect data that would be useful to marketers of alternative-fuel vehicles, and to identify “the number and types of motor-vehicle trips made daily and miles driven per trip.” EIA has responded to these requirements with surveys that collected data on the “**Stock of Motor Vehicles in Fleets.**” These included national surveys of electric, natural gas, and propane fuel provider fleets; and surveys of private-company and municipal fleets in Atlanta (*Profile of Motor-Vehicle Fleets in Atlanta 1994*, November 1995 (DOE/EIA-0601)), and Denver. For data from the survey in Denver, refer to EIA’s home page on the Internet at <http://www.eia.doe.gov> or contact Leigh Carleton (202-586-1132); Contact Jennifer Reichert (202-586-5736) for details on the fuel provider fleet surveys.
- Section 407 (a)(2) calls for “**Projections of Alternative-Fuel Vehicles.**” These forecasts are being conducted as part of EIA’s basic National Energy Modeling System. The forecasts are driven by a consumer vehicle choice model and by estimates of the sales impact of EPACT and the California LEV program. Please refer to *The Supplement to the Annual Energy Outlook* (February 1995, DOE/EIA-0554(95)) or contact David Chien (202-586-3994).
- Section 407 (a)(3) covers “**Cost, Environmental, Energy, and Safety Data**” on alternative fuels and alternative-fuel vehicles. No specific projects are currently underway. Some related data may be developed as part of the EPACT Section 503 Program. Contact Fred Mayes (202-426-1166) for details.
- Section 407 (a)(4) calls for data on “**Consumer Preferences.**” An EIA analysis and summary of the results of a national telephone survey of consumer vehicle preferences and attitudes toward alternative-fuel vehicles was conducted in response to this requirement. These data are not available by fuel type. The survey was conducted by students in a joint survey methodology program of the University of Maryland, the University of Michigan, and Westat, Inc. Contact Christy Hall (202-586-1068) for details.

### Section 503-Replacement Fuel Demand Estimates and Supply Information

- Section 503 directs the Energy Information Administration to estimate annually for the following calendar year: (1) the number of each type of alternative-fuel vehicle (AFV) likely to be in use in the United States, (2) the probable geographic distribution of the vehicles, (3) the amount and distribution of each type of replacement fuel, and (4) the greenhouse-gas emissions likely to result from replacement fuel use. *Alternatives to Traditional Transportation Fuels 1994* (DOE/EIA-0585(94)) is the second in a series of annual reports designed to provide such information. In June 1994, EIA provided background information on alternative and replacement fuels and the use of AFV’s and alternative transportation fuels in the publication *Alternatives to Traditional Transportation Fuels: An Overview* (DOE/EIA-0585/O).
- Section 503 also requires that suppliers of AFV’s report annually, to the Department of Energy, the number and type of AFV’s “made available” in the previous calendar year and those that the supplier plans to make available in the following calendar year. In 1995, the EIA conducted the first survey of AFV suppliers using Form EIA-886, “Alternative Fuel Vehicle Suppliers’ Annual Report.” Survey respondents include vehicle manufacturers and companies that perform conversions. Preliminary survey results are presented in *Alternatives to Traditional Transportation Fuels 1994*. Contact Fred Mayes (202-426-1166) or Mary Joyce (202-426-1168) for details of these data programs.

## **Section 2**

### **Composition of the U.S. Vehicle Stock**



## 2.1. Introduction

The Energy Policy Act of 1992 (EPACT) directed the EIA to establish a data collection program of use to those seeking to enter the market for alternative-fuel vehicles and their fueling facilities. Two critical areas of understanding concerning these emerging markets are the total U. S. vehicle market in which alternative-fuel vehicles would have to compete and the nature of the vehicles that they might replace. Therefore, EIA determined to assess the composition of the total U.S. vehicle stock.

Many vehicle data sources exist, each of which has collected data for distinct groups with specific needs. Together, these data sources provide information that is somewhat limited and often not comparable. Measuring and dissecting the entire U.S. vehicle stock based upon analysis of the existing collections of vehicle data are complicated by the following:

- The data sources that produce definitive estimates on the vehicle stock (those data sources that use State vehicle registration data as a base for estimation) include residential vehicles in their total count, and they do not distinguish the residential vehicles from the nonresidential.
- Different data sources are generally prepared for very different purposes. Consequently, each source has its own scope, target population, relative data of interest, and methodology.
- The data sources are of varied degrees of completeness and/or have different reference periods.
- Many data sources use additional, contributing information from other sources; unclear relationships and circular logic often arise.

Perhaps the most intriguing aspect of the U.S. vehicle stock is that there are nearly fourteen to sixteen million nonresidential vehicles for which no data source can account. The estimate of the expected number of nonresidential vehicles is much larger than the number that can be identified in the major nonresidential vehicle markets.<sup>1</sup> In other words, there exists a gap between how many nonresidential vehicles there should be and how many nonresidential vehicles have been accounted for. This study provides some plausible, but not documented, conjectures regarding the discrepancy. Additionally, some data from local areas have been extrapolated to derive estimates that represent the entire United States. Because of the uncertainty involved with some data sources and the theoretically unsupported nature of inferring by projecting or extending estimated values without sound statistical basis, this study should be viewed as a speculative attempt to quantify the U.S. vehicle stock.

<sup>1</sup>The expected number of nonresidential vehicles is the difference between the 1991 total reported number of registered vehicles and the estimate of residential vehicles as reported by EIA's 1991 Residential Transportation Energy Consumption Survey.

## 2.2. Total Vehicle Stock

To dissect the U.S. vehicle stock, the total number of registered vehicles must be ascertained. Two important sources for the number of vehicles in the total vehicle stock are the Federal Highway Administration (FHWA) and the R.L. Polk Company. Data year 1991 is used for stock counts and subsequent discussion in this analysis. It is the latest year for which detailed composition data are available for residential vehicles, which account for a large majority of the vehicle stock.

### Federal Highway Administration

The FHWA collects U.S. vehicle registration data on a State-by-State basis. By collecting State-by-State data, the FHWA faces three general problems. First, obtaining identical forms of data for all the States is not possible because the registration practices for vehicles, and the way in which the vehicle registrations are reported to the FHWA, differ greatly among the States. For example, in some States, cars and light trucks have separate registrations; in others, light trucks are allowed to be registered as cars. Therefore, the FHWA truck category includes light trucks only to the extent that they can be identified and separated from automobiles. One would expect that this registration and reporting practice would contribute to an overcount of the number of automobiles and an undercount of light duty trucks. Second, the annual vehicle registration dates vary among States. For example: two States use the calendar year for registering all vehicle types; nine States use the calendar year for registering trucks only; fifteen States register only their automobiles on a staggered basis; and twenty-one States register all of their vehicles on a staggered basis. (The staggered system permits a distribution of the registration renewal workload throughout all the months of the year.) To complicate matters further, the FHWA data include all vehicles registered any time throughout the calendar year. Therefore, the data include vehicles retired during the year and may double-count vehicles preregistered or registered twice in different or the same States. Conceivably, a vehicle could have been retired for two years before it would be eliminated from FHWA counts. Third, although the detail of motor-vehicle data collected by States has improved in recent years, sometimes the FHWA must supplement the data supplied by the States with information obtained from other sources. For example, many States report only new registrations; in which case, R. L. Polk's attrition rate of 10 percent is used to adjust for vehicle retirement.

The *Highway Statistics 1991* publication gives the following estimates:

**Table 2.2.1. FHWA Vehicle Registration Estimates, 1991**  
(Thousand Vehicles)

Vehicle Ownership	Motor Vehicles				Trailers and Semi-Trailers	Motorcycles
	Automobiles	Buses	Trucks and Truck Tractors	Total		
<b>Total</b> .....	142,956	631	44,785	188,372	16,467	4,177
<b>Publicly Owned</b>						
Total .....	1,179	357	1,771	188,372	192	37
Federal (civilian only) .....	96	5	269	370	4	(*)
State, County, and Municipal ...	1,082	352	1,502	2,937	188	37
<b>Private and Commercial</b> .....	141,777	275	43,014	185,065	16,275	4,140

(\*)Rounds to zero.

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 1991*.

## R.L. Polk and Company

R.L. Polk and Company, like the FHWA, reports estimates of the automobile and truck population. Although both FHWA and R.L. Polk data use the individual States' registration data, the sources' estimates are different (Table 2.2.2). Some of the more important differences are:

- Unlike the FHWA, whose data are reported by the States by major vehicle classes (i.e., automobiles, buses, trucks, and motorcycles), R.L. Polk obtains more detailed State registration data.<sup>2</sup> Included in these data are vehicle identification numbers (VIN). Decoded, the VIN allows R.L. Polk to more precisely identify the vehicle type.
- R.L. Polk data include only those vehicles registered as of July 1 of the given year; thereby excluding vehicles retired, registered, or re-registered during the last half of the year. In this way, much, but not all, erroneous counting and double counting can be avoided.
- Since 1980, the R.L. Polk data have included passenger vans in the truck category. Passenger vans could be classified as either automobiles or trucks depending on the individual State's practice in the FHWA data.

**Table 2.2.2. R.L. Polk and FHWA Vehicle Registration Estimates, 1991**  
(Thousand Vehicles)

Vehicle Type	FHWA	R.L. Polk	Difference (FHWA - R.L. Polk)
<b>Total</b> .....	187,741	181,438	6,303
Automobiles .....	142,956	123,268	19,688
Trucks .....	44,785	58,179	-13,394

Source: U.S. Department of Energy, *Transportation Energy Data Book: Edition 14*.

R.L. Polk estimates that in 1991, there were approximately 181.4 million registered vehicles, roughly 123.3 million automobiles and 58.2 million trucks. Because R.L. Polk's point-in-time registration count does a better job than FHWA of avoiding duplicate registrations, the remainder of the discussion will use the 1991 Polk estimates as the starting point for assessing the makeup of the U.S. vehicle stock. The next issue is how to describe the composition of the stock.

<sup>2</sup>Some States are "Privacy States" and do not release these data. Information provided by any data source for these States are based on other data sources and are estimated.

## 2.3. Residential Vehicle Stock

The large majority of vehicles in the stock are associated with households and are used in conjunction with everyday household activities. The EIA collects data on these vehicles using the Residential Transportation Energy Consumption Survey (RTECS). The RTECS provides information on the vehicle stock and its energy use from data gathered directly from the end user, the household. The RTECS is a national multistage probability sample survey conducted triennially. In order for a vehicle to be included in the RTECS, one of two criteria must be met. Vehicles must be either (1) owned or used by household members on a regular basis for personal transportation or (2) company vehicles, not owned by the household but kept at home and regularly available to household members.

The RTECS was conducted in 1983, 1985, 1988, and 1991. It is a consistent, reliable information base about the residential vehicle stock. Table 2.3.1 provides RTECS estimates for total number of residential vehicles by vehicle type and survey year.<sup>3</sup>

**Table 2.3.1. Number of Residential Vehicles by Vehicle Type and Survey Year**  
(Million Vehicles)

Vehicle Type	1983 RTECS	1985 RTECS	1988 RTECS	1991 RTECS
<b>Total Vehicles</b> .....	129.3	137.3	147.5	151.2
Passenger Car .....	101.7	106.6	109.3	108.3
Minivan .....	N/A	N/A	2.2	5.1
Sport-Utility Vehicle .....	N/A	3.7	4.8	7.3
Large Van .....	N/A	4.7	4.7	3.9
Pickup Truck .....	19.8	21.2	25.9	25.9
Other .....	7.8	1.1	.7	Q

N/A = Not applicable.

Q = Data withheld because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to independent rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, 1983, 1985, 1988, 1991 Residential Transportation Energy Consumption Surveys.

There is a difference of 30.2 million vehicles between the 1991 R.L. Polk estimate of vehicle registrations and the 1991 RTECS residential stock estimate. To account for these vehicles, it is necessary to examine a much more diverse and difficult-to-assess population, the stock of nonresidential vehicles.

<sup>3</sup>For more information regarding the RTECS sample design, estimation methodologies, and data quality, see Energy Information Administration, *Household Vehicles Energy Consumption 1991*, Appendices A, B, and C.

## 2.4. Nonresidential Vehicle Stock

Unfortunately, no comprehensive nationwide data source for the nonresidential vehicle stock is currently available. Subtracting the 1991 RTECS residential estimates from R.L. Polk registration data gives a target for the number of vehicles yet to be accounted for (Table 2.4.1). The sections to follow discuss several data sources that provide estimates for two subsets of the nonresidential vehicle stock, fleets of 10 or more vehicles and fleets of less than 10 vehicles.

**Table 2.4.1. Derivation of Estimates of Entire Nonresidential Vehicle Stock, 1991**  
(Million Vehicles)

Data Source	Motor Vehicles		
	Autos	Trucks	Total
<b>Vehicle Registration Estimate Source</b>			
R.L. Polk .....	123.3	58.2	181.4
RTECS .....	108.3	42.9	151.2
<b>Nonresidential Vehicles .....</b>	<b>15.0</b>	<b>15.3</b>	<b>30.2</b>

Note: To be comparable to the R.L. Polk data, the RTECS truck category includes all vehicle types except passenger cars, including vehicles classified as "other."

### Vehicles in Fleets of 10 or More

Many studies have explored this sector of the nonresidential fleet, each having a different focus and scope. Data have been collected for distinct groups with specific needs and interests. Because of this, estimates of the number of vehicles in fleets of 10 or more vary by as much as four million. Three data sources available are the Bobit Publishing Company, Dwights Energydata, and the Natural Gas Vehicle Fleet Market Study. The major difficulty in comparing these sources' estimates is determining whether and to what extent government vehicles are included.

### Government Vehicles

According to the General Services Administration's *FY 92 Federal Motor Vehicle Fleet Report*, the Federal Government owned about 553 thousand vehicles and leased about 15 thousand additional vehicles as of September 30, 1991. Overall, nearly 568 thousand vehicles of the 30.2 million (about 1.9 percent) are used by the Federal Government.

The Federal Highway Administration's *Highway Statistics, 1991* indicates that there were approximately 2.9 million vehicles owned by State, county, and municipal governments. These vehicles account for approximately 9.6 percent of the 30.2 million nonresidential vehicles.

The Bobit Publishing Company publishes the *Automotive Fleet* which is a car and truck fleet and leasing management magazine. Bobit estimates that as of January 1, 1993 there were approximately 8.2 million non-government vehicles in fleets of 10 or more vehicles.<sup>4</sup> The data include only those vehicles whose gross vehicle weight (GVW) is 19,500 lbs or less.<sup>5</sup> This estimate combined with the estimate of government vehicles results in approximately 11.7 million vehicles in fleets of 10 or more.

Dwights Energydata provides commercial information products, proprietary market research and analysis, and management consulting services. One product offered is the National Fleet Vehicle Database. This database provides commercial fleet data by county. According to Dwights Energydata (as cited in Bobit's *Automotive Fleet 1993 Fact Book*), there were approximately 124 thousand fleets of 10 or more vehicles operating in the U.S. in 1993. These fleets accounted for about 10.5 million vehicles.<sup>6</sup> It is unclear from this source to what extent government vehicles and large trucks are included. Because of this uncertainty, Dwights estimates will serve as the lower bound for vehicles found in fleets of 10 or more vehicles.

In December of 1991, Easton Consultants, Inc., conducted a study, *Natural Gas Vehicle Fleet Market Study*, on behalf of the American Gas Association and the Natural Gas Vehicle Coalition (NGVC).<sup>7</sup> This study involved secondary research, consultant field research, and a structured telephone survey of 500 fleet managers. Government vehicles were included in this study, as were all large trucks (vehicle classes I - VIII). Among the findings was that approximately 12.3 million vehicles were in fleets of 10 or more.<sup>8</sup> This estimate will be used as the upper bound for the number of vehicles in fleets of 10 or more.

Overall, it is reasonable to postulate that there are approximately 10.5 to 12.3 million vehicles in fleets of 10 or more, roughly 34.8 to 40.7 percent of the total nonresidential vehicle stock. The next two sections discuss two subgroups of vehicles which operate in fleets of 10 or more vehicles.

## Utility Fleet Vehicles

Bobit estimates that as of January 1, 1993 approximately 1.1 million vehicles were operating in utility fleets of 10 or more.<sup>9</sup> This would account for approximately 8.9 to 10.5 percent of the vehicles in fleets of 10 or more and for about 3.6 percent of the entire nonresidential vehicle stock.

The Energy Policy Act of 1992 (EPACT) Sections 407(a) and 407(a1) directed EIA to collect data useful to marketers of alternative-fuel vehicles. EIA established three surveys in 1993 designed to collect information regarding the fleets and fleet vehicles operated by alternative fuel providers. The surveys targeted providers of propane, electricity, and natural gas, all of which are alternative fuels according to EPACT definitions. These surveys are discussed in more detail in later chapters of this report. At the end of 1993, propane providers in the U.S. operated approximately 82,000 fleet vehicles, electric utilities operated nearly 202,000 fleet vehicles, and natural gas suppliers operated just over 138,000 fleet vehicles.<sup>10</sup> Overall, these three utility fleets account for about 422 thousand vehicles (about 3.4 to 4.0 percent) in fleets of 10 or more, or around 1.4 percent of the 30.2 million nonresidential vehicles.

<sup>4</sup>Bobit Publishing Company, *Automotive Fleet, 1993 Fact Book*.

<sup>5</sup>Vehicles in Class IV - VIII are not included. It is unclear how many vehicles in fleets of 10 or more these classes account for.

<sup>6</sup>Bobit Publishing Company, *Automotive Fleet, 1993 Fact Book*.

<sup>7</sup>The Natural Gas Vehicle Coalition, *Natural Gas Vehicle Fleet Market Study*.

<sup>8</sup>The degree to which government vehicles were covered is unclear; thus, the estimate of 12.3 million vehicles in fleets of 10 or more may be low.

<sup>9</sup>Bobit Publishing Company, *Automotive Fleet, 1993 Fact Book*.

<sup>10</sup>The Electric Utility Fleet Survey and the Natural Gas Supplier Survey was conducted only if there were 10 or more vehicles in the fleet.

## Taxis and Rental Vehicles

Bobit also estimates that as of January 1, 1993 there were 140 thousand taxis in operation and 1.75 million rental vehicles.<sup>11</sup> Together, these types of vehicles account for around 1.89 million vehicles (15.4 to 18 percent) of the vehicles in fleets of 10 or more vehicles, or approximately 6.3 percent of the total nonresidential vehicle stock.

## The Atlanta Survey and Vehicles in Fleets of Less than 10

Also as part of the EPACT Section 407 data program, EIA conducted a motor-vehicle fleet survey in Atlanta. The findings from the 1994 Survey of Motor-Vehicle Fleets in Atlanta can serve as another potential data source.<sup>12</sup> The study found that approximately 83 thousand vehicles in private (non-government) business fleets of six or more were operating in the Atlanta nonattainment area.<sup>13</sup> In 1990, about 1 percent of the U.S. population resided in the Atlanta nonattainment area. If we assume that the Atlanta nonattainment area population and the number of private business fleet vehicles operating in Atlanta are related to the U.S. population and the U.S. number of vehicles in private business fleets similarly (1 percent of the total), then the resulting national estimate is about 8.3 million vehicles. Because the Atlanta study included fleets with six to nine vehicles, it is somewhat surprising that this estimate is not much larger than Bobit's non-government estimate of 8.2 million vehicles in fleets of 10 or more. However, extrapolation from a single area to the Nation is a risky, theoretically unjustified exercise, so a discrepancy of this size is not surprising.

The Atlanta results suggest that there are few fleets with six to nine vehicles. The results of Atlanta benchmark data collection reinforce this assumption. Before the actual survey was conducted, benchmark data were collected as a screening mechanism for the main fleet survey. Respondents were asked if the business had a fleet, and, if so, how many vehicles were in the fleet. Nearly 33 thousand vehicles were in fleets of one to five, while only 9 thousand were found in fleets of six to nine. If the estimate of 42 thousand vehicles in Atlanta fleets of one to nine is about 1 percent of the total U.S. number of private business vehicles in fleets with less than 10 vehicles, small fleets account for approximately 4.2 million more nonresidential vehicles (about 14 percent of the nonresidential vehicle stock).

## All Types of Nonresidential Vehicles

Adding all the vehicles from each group (fleets of 10 or more vehicles and fleets of less than 10 vehicles) results in a total of 14.7 to 16.5 million vehicles, or around 48.7 to 54.6 percent of the nonresidential vehicle stock. This leaves about 45.4 to 51.3 percent of the nonresidential vehicle stock, or 13.7 to 15.5 million vehicles, unaccounted for. This gap represents about 7.6 to 8.5 percent of the U.S. vehicle stock.

<sup>11</sup>Bobit Publishing Company, *Automotive Fleet, 1993 Fact Book*.

<sup>12</sup>For more information regarding this survey, see Energy Information Administration, *Profile of Motor-Vehicle Fleets in Atlanta 1994: Assessing the Market for Alternative-Fuel Vehicles*, DOE/EIA-0601(94).

<sup>13</sup>The 13 counties defined by the Clean Air Act Amendments of 1990 to be the nonattainment area. The 13 counties immediately surround Atlanta and roughly correspond to the Atlanta Metropolitan Statistical Area (MSA) with the exclusion of five counties on the outer edge of the MSA.

## 2.5. Unaccounted-for Vehicles

One possible reason for the large number of unaccounted-for vehicles is that the estimate of the total vehicle stock is too high. R.L. Polk collects registration data at a particular day of the year; thus, vehicles registered one place at one time of the year and another place at another time of the year are counted only once. However, it is possible for a vehicle to be registered at two different places simultaneously. If this were the case, then the vehicle would be double counted. For example, after a car is sold, it must be registered; but it may still exist in State registration files under the previous owner. In some States, it is at the time of registration renewal that the State is notified of a change in vehicle ownership. The same could be true if the vehicle was retired from circulation. Nearly 11 million vehicles are retired from use every year,<sup>14</sup> and many more are either traded in or sold privately. If any significant proportion of them shows up as duplicate registrations or registrations of nonexistent vehicles at the time R.L. Polk collects registration data, then the Polk estimate for the total vehicle stock could be too high by several million vehicles. It is possible that the opposite situation could arise: recent registrations of new vehicles that are in use but, due to lag time in data entry, are not included in the R.L. Polk counts. However, the organized registration process should get vehicles into the Polk counts much faster than the less organized de-registration process gets them out.

It is to be expected that some of the 13.7 to 15.5 million vehicles that are not accounted for by any data source are, in fact, available, properly registered vehicles. In other words, these vehicles might be the vehicles that are beyond the scope in the existing surveys and studies. Other potential sources of missing vehicles are discussed below.

### Exclusion of Vehicles from the RTECS

Some vehicles are out of scope for the RTECS and would not be picked up in any of the nonresidential data sources. For example, vehicles associated with students living in group quarters at colleges would not be in the RTECS scope. The total higher education enrollment in 1990 was 13.7 million, of which 7.8 million were full-time.<sup>15</sup> The National Center for Education Statistics estimates that in 1991, approximately 15 percent of full-time undergraduates lived on campus, 56 percent lived off campus and not with parents, and 28 percent lived with parents. Corresponding percents for graduate students were 8, 84, and 8. The students living on campus and some part of the students living off campus but not with parents would not be covered in the RTECS. Many of these students would have vehicles, but the number of vehicles probably would not exceed one million.

### Inconsistent Definition of Fleets

Within the fleet industry, the definition of a fleet is not consistent. Much of the inconsistency of the definition of a fleet lies in the distinction between what number of vehicles constitutes a fleet, whether the vehicles are purchased in bulk, and whether they are operated under one central control. The most typical number used to distinguish a fleet is ten or more vehicles, thus missing all the smaller fleets, which very well may amount to several million. Statistics published by Bobit Publishing Company on fleet vehicles are, for example, based on vehicles operated in groups of ten or more. However, this cutoff for the number of vehicles says nothing about whether the vehicles were purchased in bulk of 10 or more. In contrast, R.L. Polk and Company classifies a vehicle as a member of a fleet only if it is sold to a customer who buys ten or more vehicles within a 2-year period.<sup>16</sup> Conceivably, many fleet vehicles could be missed because of the data source's definition of what vehicles constitute a fleet.

<sup>14</sup>U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, *Statistical Abstract of the United States 1993*.

<sup>15</sup>U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, *Statistical Abstract of the United States 1992*.

<sup>16</sup>Shonka, D.B., *Characteristics of Automotive Fleets in the United States: 1966-1977*, ORNL/TM-6449, Oak Ridge National Laboratory, Oak Ridge, Tennessee, 1978.



## Inconsistent Coverage of Government Vehicles

Generally, data sources are prepared for very different purposes. Consequently, each source has its own target population, scope, and relative data of interest. Because Dwights Energydata, the Bobit Publishing Company, and the Natural Gas Vehicle Coalition are all most interested in the private, commercial business sector of the U.S., it is conceivable that some portion of government vehicles would not be fully covered in their estimates of the number of vehicles in fleets of 10 or more. It is also reasonable to assume that many government vehicles belong to fleets of less than 10 vehicles. These vehicles are not included in the estimate of vehicles in fleets because government vehicles were out of scope in the 1994 Survey of Motor-Vehicle Fleets in Atlanta. Together, Federal, State, and local government vehicles account for about 3.5 million vehicles, or 11.6 percent, of the total nonresidential vehicle stock. Any significant noncoverage of these vehicles would result in a substantially lower estimate of the total number of nonresidential fleet vehicles than are actually in operation and a higher estimate of those vehicles yet to be accounted for. For example, if 2.5 million government vehicles were not covered by the data sources used to estimate the upper and lower limit for the number of nonresidential vehicles in fleets, then only 11.2 to 13.0 million vehicles, or 37.1 to 43.0 percent, would remain unaccounted for. Because of the high level of uncertainty associated with these data sources' coverage of government vehicles, no estimates of the number of government vehicles potentially excluded from these sources are provided.

## Used Car Lots and Auctions

Another possible data gap that might encompass a substantial number of vehicles is the used car industry. Vehicles traded in or sold among used car dealers would likely have an ongoing registration for some time under the previous owner and thus be counted in the total vehicle stock. No data source would identify these vehicles, however, because no survey is currently conducted to obtain this information. This could account for a great many vehicles. For example, in the Washington, DC, metropolitan area telephone book, there are 194 used car establishments listed. If the average number of cars per lot is about 65, then in the DC area alone there are 12,610 vehicles included in the total vehicle stock, yet they are not counted in the residential or nonresidential stock.<sup>17</sup> The Washington metropolitan area contains about 1.7 percent of the total U.S. population. If we assume that population is related similarly to distribution of used car lots, then we could account for about 742,000 vehicles.

Used vehicles are also marketed through the auction industry. Although some auctions are open to the public, for the most part, auctions are a means of selling and acquiring used vehicles among vehicle dealers. It is estimated that around seven million vehicles moved through auctions in 1991.<sup>18</sup> Including the time it would take a dealer to transport a vehicle to an auction, the time it would take for the vehicle to be sold, and the time it would take the buyer to transport the vehicle to its destination, a vehicle could be out of use, and even away from a used car lot, for as much as three weeks. Apportioning the seven million vehicles using a turnaround time of 21 days, approximately 403,000 more vehicles could be accounted for as being at auto auctions at any given time throughout the year.

<sup>17</sup>The average number of 65 vehicles per used car lot was obtained by randomly calling nine Washington used car establishments and asking how many used vehicles were currently on their lot.

<sup>18</sup>Source: *Automotive Fleet, 1993 Fact Book*.

## 2.6. Conclusion

The existing residential and nonresidential vehicle data sources, which are of some reliability, can account for 165.9 to 167.7 million vehicles, or 91.5 to 92.4 percent of the total U.S. vehicle stock, leaving 13.7 to 15.5 million vehicles, or 7.6 to 8.5 percent, unaccounted for. The speculative explanations discussed in section 2.5 include perhaps as many as one million student vehicles and perhaps slightly over one million vehicles out of active use in auctions or used car lots. These values leave 11.7 to 13.5 million vehicles still unaccounted for, with no obvious explanation other than uncertainty in fleet estimates and uncertainty about duplicate registrations in the R.L. Polk files.

In a sense, the extrapolated number of vehicles in used car lots and auctions seems surprisingly small. The vacancy rate for residential households is about 8 percent,<sup>19</sup> and the vacancy rate for commercial floorspace is roughly comparable.<sup>20</sup> Yet, the suggested level of vehicles in used car lots and auto auctions, potential surrogate “vacancy” measure for vehicles, is much less than 1 percent of the total U.S. vehicle stock. Perhaps this is due to the shorter lifetimes of most vehicles and quicker turnaround to new ownership, compared with the lifetimes and ownership changes of residential and commercial buildings.

The persistent gap of several million vehicles is most likely due to some combination of double counting of registrations and overlooking places where vehicles could be found. Perhaps one day there will be a means to assess this section of the vehicle stock directly; but without more complete and consistent data sources all that can be done, for now, is educated speculation.

<sup>19</sup>U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, *Statistical Abstract of the United States 1993*.

<sup>20</sup>Energy Information Administration, Commercial Buildings Energy Consumption Survey, *Commercial Buildings Characteristics 1992*.

## **Section 3.**

### **Fleets of Alternative Fuel Providers**

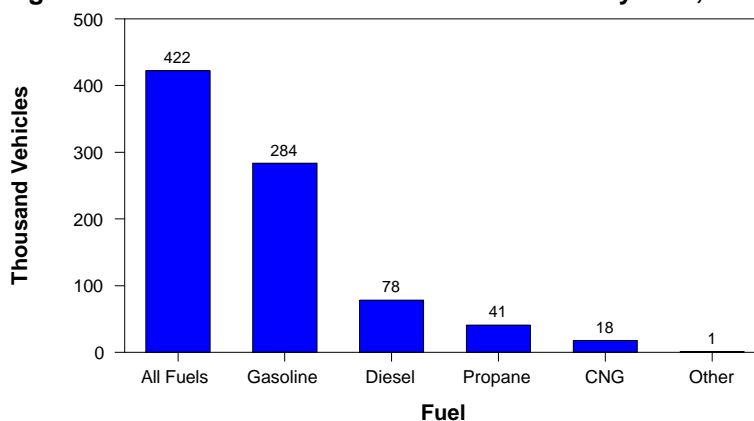
## 3.1. Introduction

The EPACT established vehicle purchase mandates for particular subsets of the U.S. vehicle fleet population. These mandates, which go into effect at different times for various fleet subpopulations, required that an incremental percentage of new vehicle purchases must be alternative-fuel vehicles (AFV's). The Federal government fleets were the first to be affected, with their purchase requirements going into effect with model year 1993. Beginning with model year 1996, providers of alternative fuels also will fall under AFV purchase mandates.

EIA established three surveys to collect information about the fleets operated by providers of propane, natural gas, and electricity. The reason for focusing on alternative-fuel providers is that they would likely be important early users of AFV's because they would derive publicity and public relations benefits from using their energy source as a vehicle fuel. The EIA surveyed only providers of propane, natural gas, and electricity because there were existing EIA databases that made the population of those providers easily accessible. At the time the surveys were conducted, there was no database in existence for easy access to the methanol and ethanol providers, and it was still uncertain (due to pending Rules) whether the oil providers/refiners would be covered under the EPACT as alternative fuel providers.

Survey data reveal that alternative-fuel providers are making use of alternative-fuel vehicles. The three classes of providers covered in this report operate a total of 422,127 vehicles in their fleets. Of those, approximately 60,000 vehicles (14 percent) are fueled by alternative fuels, with propane being the most common (Figure 3.1.1). Detailed tables display the complete survey results, and summary descriptions of survey methodologies and results are presented for each type of provider. Throughout this section of the report the term "multifuel" is used to refer to all AFV's that are capable of operating on more than one fuel type (i.e., bi-fuel, flex-fuel, dual-fuel, and hybrid).

**Figure 3.1.1. Alternative Fuel Provider Fleets by Fuel, 1993**



Sources: Energy Information Administration, Form EIA-885, Propane Provider Fleet Survey; Form EIA-861, Schedule VII, Electric Utility Fleet Survey; and Form EIA-176, Schedule B, Natural Gas Supplier Fleet Survey.

## Highlights

### *Propane Provider Fleet Survey*

- The top 35 propane providers (as measured by sales volume) are responsible for nearly two-thirds of the propane deliveries in the United States, but they operate only about one-third of all propane provider fleet vehicles. The smaller companies operate approximately 70 percent of the total vehicle stock. However, the top 35 companies are much more likely to operate AFV's. Overall, about 80 percent of the top 35 companies' fleet vehicles use propane, while slightly less than one-third of those of the smaller companies use propane.

- On average, costs to acquire conventional-fuel vehicles were 42 percent higher than the costs of acquiring AFV's; however, acquisition costs varied widely over vehicles types. Respondents also reported lower maintenance costs for propane vehicles than for conventional-fuel vehicles, regardless of vehicle type.

### ***Electric Utility Fleet Survey***

- Although one may expect that electric utilities would use electric vehicles in order to promote their energy source as a transportation fuel, only 237 electric vehicles (4.2 percent of all AFV's) were reported in the Electric Utility Fleet Survey. One could speculate that this is probably because many electric utilities are opting to operate the more economical compressed natural gas (CNG) vehicles until electric vehicle technology develops further. Also, some of the utilities reporting data on the fleet survey are combined utilities, which provide natural gas as well as electricity. These utilities may be choosing to operate CNG vehicles and still are able to promote their energy source.
- After CNG, methanol/ethanol was the most common alternative fuel in electric utility fleets, followed by propane, and then electricity.

### ***Natural Gas Supplier Fleet Survey***

- Natural gas suppliers appear to be farther along than electric utilities in integrating AFV's into their fleets. Survey data indicate that nearly 12 percent of the fleet vehicles operated by natural gas suppliers are AFV's. This proportion is substantially higher than the 3 percent found in the electric utility fleets, but much lower than the 46 percent penetration realized by the propane providers.
- Vehicles fueled by CNG were predominantly multifuel vehicles--vehicles capable of using more than one type of fuel. Most AFV's were converted from the use of conventional fuels to the use of alternative fuels.

## 3.2. Survey Operations

### Propane Provider Fleet Survey

The Propane Provider Fleet Survey collected information from a sample of the approximately 7,800 propane providers in the United States. The top 35 propane providers in the United States (as determined by 1992 sales volumes<sup>1</sup>) were asked to provide detailed information on fleet characteristics and operating practices. These providers, who in 1992 accounted for two-thirds of total residential and commercial propane sales, were mailed a questionnaire that collected the following information:

- Distribution of fleet vehicles among size classes, fuel types, and AFV engine technologies (i.e., multifuel vs. dedicated)
- Fleet vehicle retirements, acquisitions, and conversions planned for 1994
- Source of AFV's (original equipment manufacturer vs. conversion)
- Fleet vehicle fueling practices for conventional-fuel and alternative-fuel vehicles
- Fuel consumption
- Vehicle miles traveled
- Employee usage of fleet vehicles
- Average length of service of fleet vehicles before retirement (in months and miles)
- Fuel storage capacity in fleet vehicles
- Vehicle acquisition costs
- Vehicle conversion costs (for converted AFV's)
- Comparison of maintenance costs between AFV's and conventional-fuel vehicles.

A stratified random sample of 100 of the remaining smaller providers was selected to provide basic information about their vehicle stock and 1994 acquisition plans by means of a brief telephone interview that collected only the first three items in the above list. These smaller providers were separated into four strata corresponding to the four Census regions. The sample was then drawn using proportional allocation.

### Electric Utility Fleet Survey

Approximately 1,000 electric utilities provided information on their fleets and fleet vehicles in response to the Electric Utility Fleet Survey. This survey was conducted as a supplement to the EIA survey "Annual Electric Utility Report" (Form EIA-861), a census survey of about 3,200 electric utilities in the United States. Only utilities operating a fleet of 10 vehicles or more were required to provide information on the fleet portion of the survey. The respondents to the Electric Utility Fleet Survey were asked (via a mail questionnaire) to report the following:

- Distribution of fleet vehicles among size classes, fuel types, and AFV engine technologies (i.e., multifuel vs. dedicated) and
- Fleet vehicle retirements, acquisitions, and conversions planned for 1994.

### Natural Gas Supplier Fleet Survey

As with the Electric Utility Fleet Survey, the Natural Gas Supplier Fleet Survey was conducted as a supplement to an existing EIA survey, "Annual Report of Natural and Supplemental Gas Supply and Disposition" (Form EIA-176). This form is a census survey of all companies in the United States that take custody of natural gas, excluding consumers and producers. For the 1993 survey, there were approximately 2,064 respondents that completed Form EIA-176. Of those companies, only 553 which operated a fleet of 10 vehicles or more were required to complete the fleet survey.

<sup>1</sup> "Top 35 U.S. LPG Retailers," *LP-Gas Magazine*, June 1993, pg. 22.

The respondents to the Natural Gas Supplier Fleet Survey were asked to provide the following information:

- Distribution of fleet vehicles among size classes, fuel type, and AFV engine technologies (i.e., multifuel vs. dedicated)
- Fleet vehicle retirements, acquisitions, and conversions planned for 1994
- Fleet vehicles fueling practices for conventional-fuel and alternative-fuel vehicles
- Fuel consumption
- Daily vehicle miles traveled range
- Employee usage of fleet vehicles
- Average length of service of fleet vehicles before retirement (in months and miles)
- Source of AFV's (original equipment manufacturer vs. conversion).

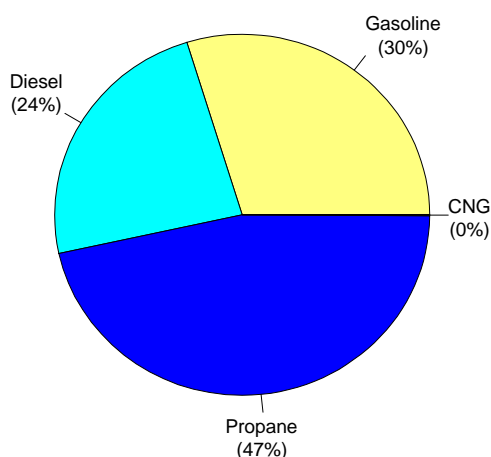
## 3.3. Fleet Size and Composition

### Propane Provider Fleet Survey

At the end of 1993, propane providers in the United States operated approximately 82,000 fleet vehicles. More than two-thirds of these vehicles were medium-duty and heavy-duty trucks, i.e., trucks with a Gross Vehicle Weight (GVW) greater than 8,500 pounds. These large vehicles tended to be trucks for making deliveries of propane to households and businesses. Large pickup trucks made up the next largest share of fleet vehicles.

Nearly half (47 percent) of the propane provider fleet vehicles were fueled by alternative fuels, more than were fueled by either gasoline or diesel alone (Figure 3.3.1). As expected, the primary alternative fuel used by propane providers in their fleet vehicles was propane. Only a small number (less than one percent) of their AFV's were fueled by compressed natural gas (CNG).

**Figure 3.3.1. Propane Provider Fleet Vehicles by Fuel, 1993**



Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, Propane Provider Fleet Survey.

Nearly all of the propane vehicles reported by the propane providers (89 percent) were dedicated vehicles, that is, vehicles that operate solely on one fuel--in this case, propane. Multifuel vehicles, meaning AFV's capable of operating on more than one fuel, i.e., bi-fuel, flex-fuel, dual-fuel, and electric hybrid vehicles, made up the rest of the AFV's.

Considerable disparity in the proportion of AFV's in fleets existed between the fleets operated by the top 35 providers and the smaller providers. The top 35 providers operated about three times as many light-duty vehicles fueled by propane as light-duty vehicles fueled by gasoline or diesel alone. The top 35 providers operated nearly five times as many propane vehicles as gasoline or diesel vehicles within the medium- and heavy-duty classes. In contrast, the fleets operated by the smaller providers contain twice as many conventional-fuel vehicles as propane vehicles in these classes (Table 3.3.1).



**Table 3.3.1. Propane Provider Fleet Vehicles by Provider Category, 1993**  
(Number of Vehicles)

Provider Category and Vehicle Type	Total	Light-Duty Vehicles	Medium-/Heavy-Duty Vehicles
<b>Total</b> .....	81,967	25,648	56,319
<b>Top 35 Providers</b>			
Total Vehicles .....	24,236	6,730	17,506
Conventional-Fuel Vehicles .....	4,694	1,685	3,010
Propane Vehicles .....	19,448	4,956	14,492
<b>Remaining Providers</b>			
Total Vehicles .....	57,731	21,057	36,674
Conventional-Fuel Vehicles .....	39,005	14,375	24,631
Propane Vehicles .....	18,726	6,682	12,044

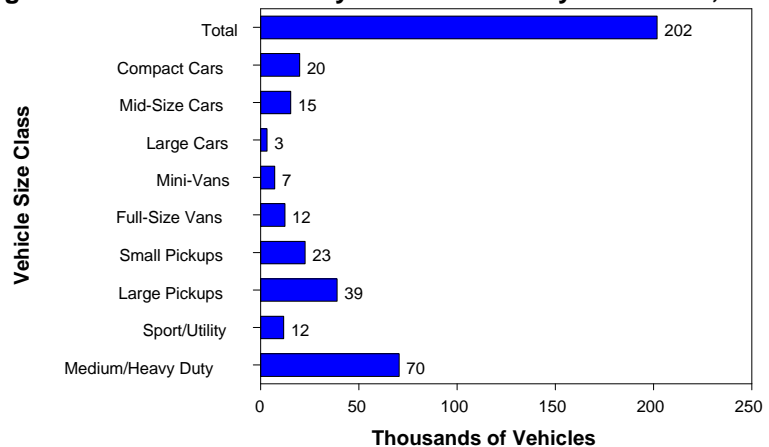
Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, Propane Provider Fleet Survey.

Fleets can acquire alternative-fuel vehicles in two ways: by purchasing them from an original equipment manufacturer (OEM) or by converting a conventional-fuel vehicle to operate on an alternative fuel. The propane providers used both methods to place AFV's in their fleets, but for the most part the propane providers tended to operate converted AFV's. Among dedicated AFV's, only 27 percent were OEM vehicles and only 17 percent of multifuel vehicles were obtained from OEM's. Overall, three-fourths of the AFV's operated by propane providers were converted from conventional-fuel vehicles.

## Electric Utility Fleet Survey

As of December 31, 1993, electric utilities with fleets of 10 vehicles or more operated a total of 201,836 vehicles. These vehicles were widely distributed among the different vehicle size classes, although nearly one-third of the vehicles (70,448 vehicles) were medium-duty and heavy-duty trucks. Pickup trucks were the next largest category of vehicles, followed by compact and mid-size passenger cars. Nearly 20 percent of all fleet vehicles in electric utility fleets were passenger cars, in contrast to the propane provider fleets, which had only three percent passenger cars (Figure 3.3.2).

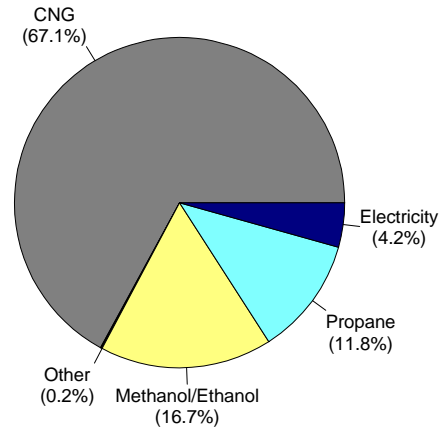
**Figure 3.3.2. Electric Utility Fleet Vehicles by Size Class, 1993**



Source: Energy Information Administration, Office of Coal, Nuclear, Electric, and Alternative Fuels, Form EIA-861 Schedule VII, Electric Utility Fleet Survey.

Nearly all fleet vehicles (97 percent) operated by electric utilities were conventional-fuel vehicles, with the vast majority of those being dedicated gasoline vehicles. Approximately 21 percent of the conventional-fuel vehicles in electric utility fleets were diesel vehicles. Only 3 percent of the fleet vehicles were alternative-fuel vehicles, and two-thirds of these AFV's were fueled with CNG. These CNG vehicles were mostly multifuel vehicles (78 percent), with only 821 of the 3,756 CNG vehicles being dedicated vehicles. The next most common alternative fuel used in electric utility fleets was methanol/ethanol (used in 935 vehicles), followed by propane (658 vehicles), and then electricity (237 vehicles). An insignificant number of alternative-fuel vehicles are fueled by other alternative fuels, mostly liquid natural gas (Figure 3.3.3).

**Figure 3.3.3. Electric Utility Fleet Alternative-Fuel Vehicles by Fuel, 1993**



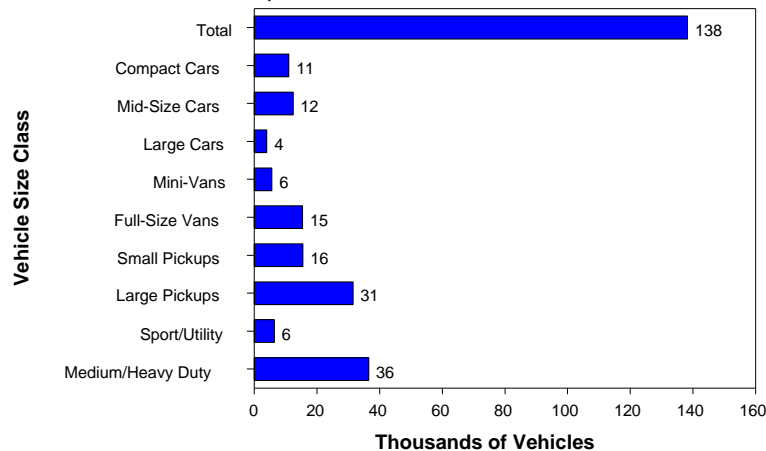
Note: Alternative-Fuel vehicles represent only three percent of the total fleet vehicles operated by electric utilities.  
 Source: Energy Information Administration, Office of Coal, Nuclear, Electric, and Alternative Fuels, Form EIA-861 Schedule VII, Electric Utility Fleet Survey.

## Natural Gas Supplier Fleet Survey

At the end of 1993, natural gas suppliers with fleets of 10 or more vehicles operated a total of 138,324 fleet vehicles. As with the fleets operated by electric utilities, the fleet vehicles operated by natural gas suppliers were well distributed among the various vehicle size classes. However, pickup trucks and full-sized vans made up nearly half (45 percent) of the fleet vehicles used by natural gas suppliers. Medium-duty and heavy-duty vehicles represented a substantial 26 percent of the fleet vehicles in use. Passenger cars made up another 20 percent (Figure 3.3.4).

Gasoline vehicles dominated the conventional-fuel vehicles with 85 percent of the total. These vehicles were mostly

**Figure 3.3.4. Natural Gas Supplier Fleet Vehicles by Size Class, 1993**



Source: Energy Information Administration, Office of Oil and Gas, Form EIA-176 Schedule B, Natural Gas Supplier Fleet Survey.

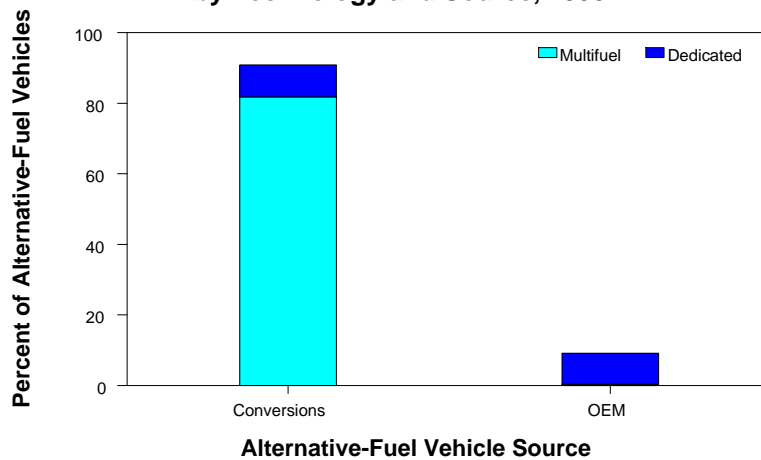
light-duty vehicles, with medium-duty and heavy-duty vehicles representing only 17 percent of the gasoline vehicles. The remaining 15 percent of the conventional-fuel vehicles were mostly medium-duty and heavy-duty diesel vehicles.

Predictably, most AFV's (87 percent) were fueled by CNG, but the natural gas providers did make significant use of propane as a vehicle fuel. Of the 14,032 CNG vehicles in natural gas supplier fleets, 84 percent (11,809 vehicles) were

multifuel vehicles. Conversely, dedicated propane vehicles outnumbered multifuel propane vehicles. Fewer than 1 percent were fueled by electricity and other alternative fuels.

The alternative-fuel vehicles in natural gas supplier fleets were almost all converted vehicles. The few OEM vehicles in use in natural gas supplier fleets tended to be dedicated vehicles--only 55 were reported to be OEM multifuel vehicles. The dedicated vehicles in operation were fairly evenly split between OEM and conversion vehicles: 1,582 OEM vehicles and 1,401 converted vehicles (Figure 3.3.5).

**Figure 3.3.5. Natural Gas Supplier Alternative-Fuel Vehicles by Technology and Source, 1993**



Source: Energy Information Administration, Office of Oil and Gas, Form EIA-176 Schedule B, Natural Gas Supplier Fleet Survey.

## 3.4. Fleet Vehicle Retirement/Acquisition Plans

### Propane Provider Fleet Survey

The propane providers were asked to report their plans for vehicle retirements and acquisitions during 1994. Only 6 percent (5,592 vehicles) of the fleet vehicles operated by propane providers were planned for retirement, nearly half (47 percent) of which were AFV's. The planned acquisitions, 6,970 vehicles, would more than make up for the vehicles being retired.

In addition to the acquisitions, 1,475 vehicle conversions were planned for 1994. There is some double counting in the acquisitions and conversions data. Analysis of the reported data revealed that if a respondent had plans to acquire a new vehicle in 1994 and then immediately convert that vehicle to an alternative fuel, in some cases that vehicle was reported as both an acquisition and a conversion. Analyzing the data to correct the double counting shows that of the 1,475 conversions planned for 1994, 921 were conversions of newly acquired conventional-fuel vehicles and 554 were conversions of vehicles previously operated within the fleet as conventional-fuel vehicles. Overall, more new AFV's were planned for service in 1994 than conventional-fuel vehicles, including both new vehicles and old vehicles being converted to use alternative fuels.

### Electric Utility Fleet Survey

Only about 9 percent of the fleet vehicles operated by electric utilities (18,956 vehicles) were planned for retirement during 1994. Most retirements were planned for gasoline vehicles; of the total of 16,438 gasoline vehicles planned for retirement, 2,736 were medium/heavy-duty vehicles, 5,675 were pickup trucks, and 3,052 were compact passenger cars. Only 455 AFV's were planned for retirement, and most of these were large pickup trucks. The acquisitions planned for 1994 (18,182 vehicles) would not completely replace all vehicles being retired. Only 724 conversions of conventional-fuel vehicles to alternative-fuel vehicles were planned.

As with the propane survey data, there is double counting within the data regarding fleet vehicle acquisitions and conversions. A similar analysis to the one conducted with the propane provider fleet data revealed that of the 724 conversions planned for 1994, only 159 were conversions of existing fleet vehicles. The other 565 planned conversions were of vehicles newly purchased as conventional-fuel vehicles. Further, only 1,003 of the planned new vehicle acquisitions (6 percent) were AFV's. The remainder were conventional-fuel vehicles, some of which were planned for subsequent conversion.

### Natural Gas Supplier Fleet Survey

The natural gas suppliers planned to retire a larger percentage of their fleet vehicles than either the propane providers or the electric utilities. About 12 percent (17,088 vehicles) of the fleet vehicles operated by natural gas suppliers were planned for retirement during 1994. In addition, only 14,374 vehicle acquisitions were planned, indicating that the fleets operated by natural gas suppliers tended to downsize in 1994. Only 7 percent of the planned vehicle retirements included alternative-fuel vehicles.

A total of 4,623 newly acquired AFV's and conversions of existing vehicles to AFV's were planned for service in 1994. Almost 80 percent of those planned vehicles were multifuel CNG vehicles. Most CNG vehicles were light-duty vehicles, with the largest proportion (40 percent) being large pickup trucks. The Natural Gas Supplier Fleet Survey did not experience the double counting problems encountered in the Propane Provider Fleet Survey and the Electric Utility Fleet Survey, so all of the 1,623 planned conversions represent conversions planned for existing fleet vehicles.

## 3.5 Fleet Operating Characteristics

In addition to the fleet size and composition characteristics covered above, the Propane Provider Fleet Survey (top 35 providers only) and the Natural Gas Supplier Fleet Survey also collected information regarding operating characteristics. Information collected included data concerning fleet vehicle fueling facilities, vehicle usage by employees, vehicle replacement cycles, vehicle fuel storage and consumption, and vehicle miles traveled. In addition, the top 35 propane providers responded to questions about vehicle costs.

### Fleet Vehicle Fueling Facilities

A company has several ways to fuel its fleet vehicles. Large commercial fleets tend to use their own fuel tanks located on a company site to fuel their vehicles. Fleets can also fuel at public fueling stations in the same manner as personal vehicles are fueled, or at private facilities that are designed for use by fleets and are not open to the general public. Fleets sometimes enter into fuel-purchase agreements with their fueling facilities, stipulating that the fleet agrees to purchase its fuel from a specific facility. If the fleet has a credit card for use at a facility but has no commitment to purchase fuel there, then such an arrangement is not considered a fuel purchase agreement.

The EPACT purchase mandates use central fueling as a criterion for determining which fuel provider fleets would be covered by vehicle purchase requirements, so questions about fueling arrangements were asked in order to determine whether alternative-fuel providers were centrally fueled or were capable of being centrally fueled.

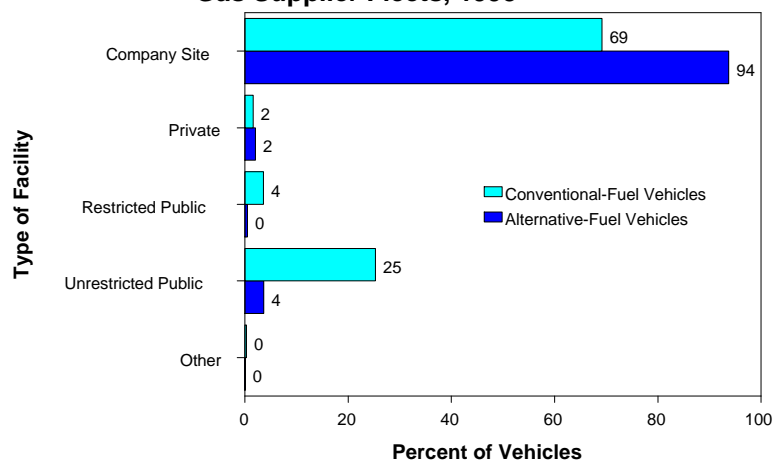
### Propane Provider Survey

Conventional-fuel vehicles, for the most part, were fueled either at a company-owned location or at a public fueling location without any type of fuel-purchase agreement. A small number of conventional-fuel vehicles also obtained their fuel at private facilities not open to the public. The data indicate that the propane provider fleets tended not to enter into fuel-purchase agreements with the facilities that provide their fuel.

Only a very small number of the AFV's operated by propane providers fuel at facilities other than company-owned sites. This is probably because almost all of the AFV's operated by propane providers run on propane and therefore use the company's fuel. Vehicles that do obtain their fuel off-site generally purchase the fuel through a fuel-purchase agreement with private facilities.

### Natural Gas Supplier Survey **Figure 3.5.1. Types of Fueling Facilities Used by Natural Gas Supplier Fleets, 1993**

Natural gas suppliers tended to fuel their fleet vehicles at a variety of types of facilities. For both the conventional-fuel vehicles and the alternative-fuel vehicles, the majority of vehicles were fueled on company-owned sites, but significant numbers of vehicles fueled at other types of facilities. More than one-quarter (35,370 vehicles) of the conventional-fuel vehicles operated in fleets belonging to natural gas suppliers were fueled at public fueling facilities. Nearly all of those (88 percent) were fueled without any commitments to a fuel purchase agreement.



Source: Energy Information Administration, Office of Oil and Gas, Form EIA-176 Schedule B, Natural Gas Supplier Fleet Survey.

Only 6 percent of AFV's, or 1,004 vehicles, were fueled off-site, a much lower percentage than for conventional-fuel vehicles (Figure 3.5.1).

## Fleet Vehicle Usage by Employees

Company vehicles parked overnight at an employee's residence and not centrally fueled from the provider's facility are excluded from a provider's fleet for purposes of determining whether a fleet is subject to EPACT's purchase mandates. For that reason, the Propane Provider Fleet Survey (top 35 providers) and the Natural Gas Providers Survey collected information regarding the availability of fleet vehicles to company employees.

### Propane Provider Survey

Nearly all vehicles (87 percent) operated by propane providers were available to their employees for business use only, and those vehicles were garaged overnight at a company site. The remaining vehicles were available to employees for commuting and business use or for unrestricted business and personal use, and would most likely be garaged overnight at the employees' residences. The respondents also indicated that 99 percent of employees who had the unrestricted use of company vehicles were required to keep a log to record personal and business use.

### Natural Gas Supplier Survey

Fleet vehicles operated by natural gas suppliers tended not to be available to company employees for uses other than business. Three-fourths of the fleet vehicles were designated as for business use only. Employees were allowed to use another 16 percent (22,662 vehicles) for commuting to and from work in addition to using them for business. A relatively small number of vehicles were available to employees for unrestricted or other uses. These data indicate that the fleets belonging to natural gas suppliers were, for the most part, garaged at a company site.

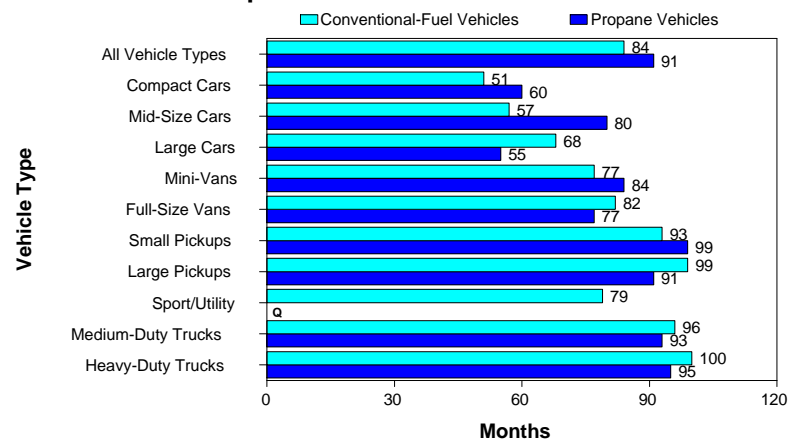
## Fleet Vehicle Replacement Cycles

Replacement cycles refer to the amount of time (or other measure) a company keeps its vehicles before retiring and/or replacing them. A company may retire or replace a vehicle after a certain number of months or after the vehicle has been driven a certain number of miles. In these surveys, respondents could provide replacement cycle data in months, miles, or both.

### Propane Provider Survey

The average months-based cycle for conventional-fuel vehicles in propane provider fleets was 84 months, although propane vehicles were in service for an average of 91 months (Figure 3.5.2). The average miles-based cycle for conventional-fuel vehicles (216,482 miles) was higher than for propane vehicles (179,866 miles) (Figure 3.5.3). Analysis of the miles-based cycles for the individual vehicle types reveals that this was completely due to the miles-based cycle for the heavy-duty trucks. The miles-based replacement cycle for conventional-fuel heavy-duty vehicles

**Figure 3.5.2. Months-Based Replacement Cycles for Propane Provider Fleet Vehicles**

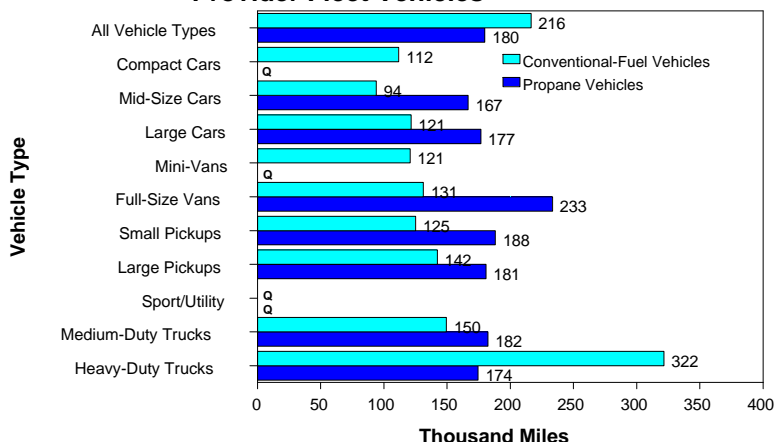


Q = Data withheld because fewer than three companies are represented.  
Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, Propane Provider Fleet Survey.

was nearly twice that of the propane heavy-duty vehicles. This is most likely because the conventional-fuel heavy-duty vehicles travel longer distances than the heavy-duty vehicles fueled by alternative fuels, but the miles traveled data (discussed below) for light-duty vehicles are much more similar.

Analysis of the replacement cycle data reported by the respondents to the Propane Provider Fleet Survey reveals that there is a discrepancy within the reported data. The propane providers reported that approximately 6 percent of their fleet vehicles were planned for retirement in 1994. If 1994 was a typical year for vehicle retirements, then about 100 percent of the fleet vehicles would have been retired and replaced every 17 years. However, data indicate that the typical reported replacement cycle for vehicles is approximately every 7 years. The data collected in the survey cannot positively explain this discrepancy, but possible explanations can be offered. One explanation is that nearly half of all retirements and/or replacements are unplanned; that is, although only 6 percent of the vehicles are planned for retirement at the beginning of a given year, another 6 percent may be retired or replaced due to vehicle condition or other unforeseen circumstances. Four respondents reported that they did not retire their vehicles on a cycle, but rather they retired or replaced them when the condition of the vehicle dictated that it was necessary. Another possible explanation is that 1994 was an abnormal year for retirements, and in a normal year, twice that many vehicles tend to be retired or replaced.

**Figure 3.5.3. Miles-Based Replacement Cycles for Propane Provider Fleet Vehicles**



Q = Data withheld because fewer than three companies are represented.  
 Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, Propane Provider Fleet Survey.

## Natural Gas Supplier Survey

The replacement cycles for fleet vehicles reported by the natural gas suppliers indicated that fleet vehicles tended to be replaced more often in natural gas supplier fleets than in propane provider fleets. On average, vehicles are replaced after about 6 years of use or after 94,530 miles have been traveled, slightly less than the average replacement cycles for the vehicles in propane provider fleets. A possible explanation may be that propane provider fleets contain more medium-duty and heavy-duty vehicles, which tend to be replaced less often than the light-duty vehicles that are more prominent in natural gas supplier fleets.

There also appears to be a small discrepancy between the planned vehicle retirements and the reported replacement cycles among natural gas suppliers. The natural gas suppliers reported that they planned to retire approximately 12 percent of their fleet vehicles in 1994. Using the same logic as with the propane provider fleet data, one could conclude that the entire fleet is replaced approximately every 8 years. However, the natural gas suppliers reported that the average replacement cycle for their fleet vehicles is about 6 years. In addition to the possible explanations provided with the propane provider fleet data, another reason for the discrepancy could be that the suppliers report the replacement cycles that the company would like to adhere to, but, due to budgetary or other constraints, those cycles cannot be met and fleet vehicles are actually kept in service longer than the replacement cycles indicate. However, none of the possible explanations provided in this report can be confirmed using the data collected on the fuel provider surveys.

## Fleet Vehicle Fuel Storage Capacity

One of the most prominent drawbacks of alternative-fuel vehicles is that the vehicles cannot be driven as far between refuelings as conventional-fuel vehicles. Additional fuel tanks are often placed in the vehicles in order to provide additional fuel. Information on fuel storage capacity was collected only from the propane providers.

The survey data reveal that the propane vehicles indeed had more fuel storage capacity than the conventional-fuel vehicles. The average fuel storage capacity for dedicated vehicles in the light-duty category was approximately 91 percent higher for propane vehicles than for conventional-fuel vehicles. The difference between multifuel vehicles and conventional-fuel vehicles was much smaller. For the multifuel light-duty vehicles, the average fuel storage capacity for propane was only approximately 22 percent higher than the storage capacity for conventional fuels in conventional-fuel vehicles. This may be due to the fact that in multifuel vehicles, capacity is needed for both propane and gasoline or diesel. Meaningful comparisons between the reported propane and conventional fuel storage capacities for the medium- and heavy-duty vehicles cannot be made, because these vehicles are often fueled from the large delivery tanks they carry, which can hold thousands of gallons of propane.

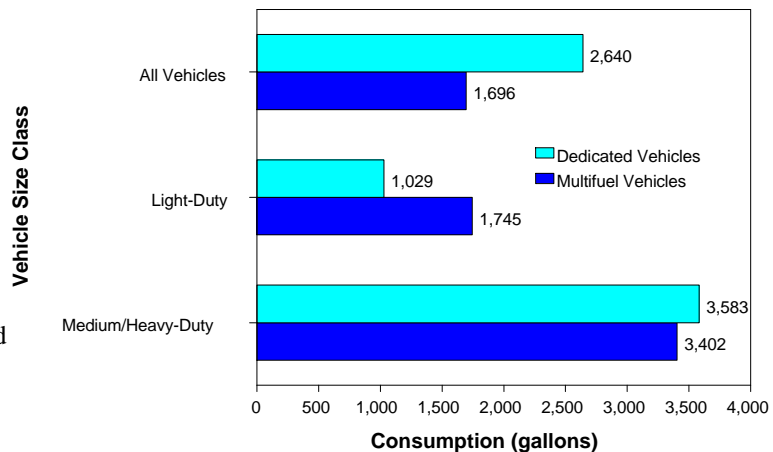
## Fleet Vehicle Fuel Consumption

### Propane Provider Survey

Of the three fuels that are significantly represented in propane provider fleets (gasoline, diesel, and propane), the most heavily consumed per vehicle is diesel (6,512 gallons per vehicle per year). Diesel fuel is used, for the most part, in the heavy-duty trucks that tend not only to travel long distances, but also to achieve low fuel economies--even though diesel is more efficient than gasoline for similar vehicle types. Gasoline tends to be the least consumed fuel, with dedicated

gasoline vehicles only consuming an average of about 1,100 gallons per vehicle per year. Multifuel AFV's consume an average of another 200 gallons of gasoline per vehicle per year. Annual consumption of propane per vehicle was about 2,640 gallons in dedicated propane vehicles and 1,696 gallons in multifuel vehicles. As expected, the largest consumers of propane were the medium-duty and heavy-duty trucks. The dedicated medium-duty and heavy-duty propane vehicles consumed an average of 3,583 gallons of propane per vehicle per year, while the multifuel vehicles consumed 3,402 gallons per vehicle per year. Although over all vehicle types the dedicated vehicles tended to be heavier consumers per vehicle of propane than the multifuel vehicles, among just light-duty vehicles, the multifuel propane vehicles consumed about 70 percent more per vehicle per year than the dedicated propane vehicles (Figure 3.5.4).

**Figure 3.5.4. Annual Propane Consumption per Vehicle by Vehicle Size Class for Propane Provider Fleet Vehicles**



Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, Propane Provider Fleet Survey.

### Natural Gas Supplier Survey

**This Section deleted due to concern over unreliability of data.**

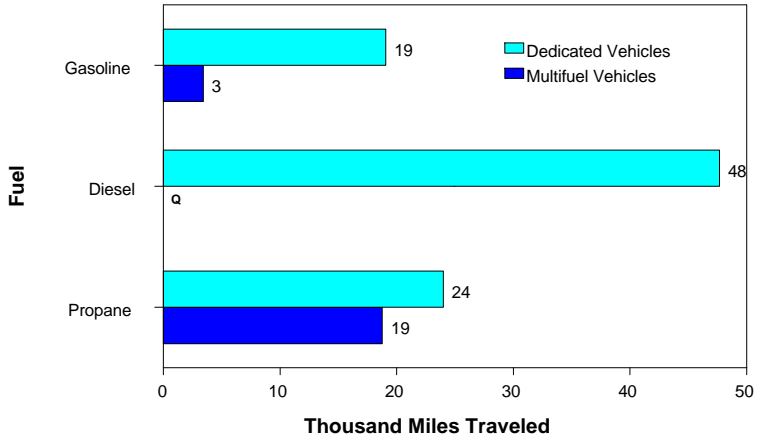


# Fleet Vehicle Miles Traveled

## Propane Provider Survey

In the analysis of annual vehicle miles traveled, the diesel vehicles tended to stand out. On average, over all vehicle types, the diesel vehicles traveled twice as far per year than the next closest category, dedicated propane vehicles, averaging slightly less than 48,000 miles per year per vehicle. Dedicated gasoline vehicles traveled about 20,000 miles per year, and approximately 3,500 additional miles were traveled on gasoline in multifuel AFV's (Figure 3.5.6). Because little gasoline was consumed in multifuel vehicles and multifuel vehicles traveled relatively few miles on gasoline, one can conclude that the multifuel propane vehicles operated by propane providers were more likely to run on propane than gasoline. Overall, the propane vehicles traveled an average of about 21,000 miles per year per vehicle. The dedicated propane vehicles (23,997 miles per year) do tend to travel slightly more in a year than the multifuel propane vehicles (18,768 miles per year).

**Figure 3.5.6. Annual Vehicle Miles Traveled per Vehicle on Gasoline, Diesel, and Propane by Vehicle Technology for Propane Provider Fleet Vehicles**

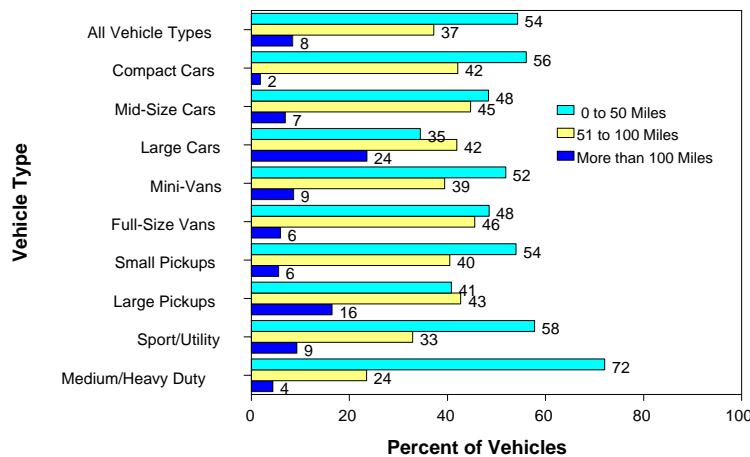


Q = Data Withheld because fewer than three companies are represented.  
 Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, Propane Provider Fleet Survey.

## Natural Gas Supplier Survey

Natural gas supplier fleet vehicles tended not to travel long distances on a daily basis. Miles traveled data were collected from the respondents to the Natural Gas Supplier Fleet Survey in the form of ranges of daily miles traveled. Nearly all fleet vehicles (92 percent) traveled between 0 and 100 miles per day on average. The vehicles that traveled more miles in a day tended to be large passenger cars and large pickup trucks (Figure 3.5.7).

**Figure 3.5.7. Daily Miles Traveled by Natural Gas Supplier Fleet Vehicles**



Source: Energy Information Administration, Office of Oil and Gas, Form EIA-176 Schedule B, Natural Gas Supplier Fleet Survey.

## Fleet Vehicle Operating Costs

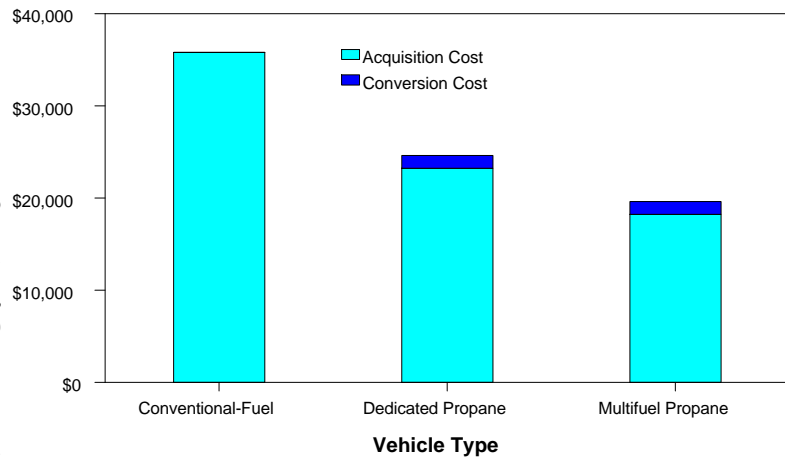
Proponents of alternative-fuel vehicles often cite lower operating costs as a benefit of these vehicles, so the Propane Provider Survey asked respondents about their vehicle operating costs. The Natural Gas Supplier Fleet Survey did not include these questions.

Operating costs were separated into three types of costs: vehicle acquisition costs, costs to convert vehicles to an alternative fuel, and maintenance costs. Data on acquisition costs and conversion costs were collected in dollars, and data on maintenance costs were collected as a comparison between conventional-fuel vehicles and alternative-fuel vehicles; that is, the respondents were asked to report if the maintenance costs for a particular alternative-fuel vehicle were more or less than a comparable conventional-fuel vehicle and by what percentage.

No clear trend appears between conventional-fuel vehicle acquisition costs and the cost to acquire propane vehicles. For example, the costs were about equal for large pickup trucks; for medium-duty trucks (8,501 to 26,000 lbs. GVW), the conventional-fuel vehicles were acquired for less than the dedicated propane vehicles; and for heavy-duty trucks (more than 26,000 lbs. GVW), the costs to acquire conventional-fuel vehicles were significantly higher than the costs to acquire propane vehicles. On average, for all vehicle types, the acquisition costs for conventional-fuel vehicles (\$35,802) tended to be 73 percent higher than the cost to acquire propane vehicles (\$20,736) (Figure 3.5.8). The majority of this difference can be attributed to the difference between acquisition costs for propane vehicles and for conventional-fuel heavy-duty vehicles. The differences for the other vehicle types are not nearly that great. The large difference in the heavy-duty vehicle category cannot be explained without further information, but one possible explanation is that the heavy-duty propane vehicles tend to be just slightly more than 26,000 lbs. GVW, whereas the conventional-fuel heavy-duty vehicles are very large vehicles weighing substantially more than 26,000 lbs. This explanation would be consistent with the finding that the acquisition costs for heavy-duty propane vehicles tend to be very close to the acquisition costs for medium-duty propane vehicles.

The cost to convert vehicles from a conventional fuel to an alternative fuel was fairly stable over the various vehicle types, ranging from around \$1,200 to just under \$1,800. The most costly conversion appeared to be the conversion of a large passenger car (\$1,783) to a dedicated AFV, and the least expensive conversion tended to be that of medium-duty trucks to multifuel vehicles (\$1,150). Conversion to a dedicated AFV tended to cost slightly more than conversion to a multifuel vehicle, with the difference averaging \$100 to \$150 (Figure 3.5.8).

**Figure 3.5.8. Propane Provider Fleet Vehicle Acquisition and Conversion Costs**



Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, Propane Provider Fleet Survey.

One of the many benefits of AFV's promoted by the industry is that they are more economical to maintain because the engines tend to have fewer moving parts and the fuels burn cleaner. The data from the Propane Provider Fleet Survey seem to confirm this. The respondents report that the maintenance costs for their propane vehicles are less than for their conventional-fuel vehicles across all vehicle types. The difference between the two types of vehicles is slightly greater for dedicated vehicles (5.7 percent) than for multifuel vehicles (4.4 percent).

## 3.6 Detailed Tables

The tables on the following pages present all data collected on the alternative-fuel provider surveys. All numbers quoted in the preceding text and figures can be obtained using the data in the detailed tables. For those tables that include data from the sampled companies, the corresponding table of Relative Standard Errors is also provided.<sup>3</sup> Tables 3.6.1 through 3.6.16 contain data from the Propane Provider Fleet Survey; Tables 3.6.17 through 3.6.19 contain data from the Electric Utility Fleet Survey; and Tables 3.6.20 through 3.6.28 present data from the Natural Gas Supplier Fleet Survey.

State-level data for the Electric Utility Fleet Survey and the Natural Gas Supplier Fleet Survey are available. These data can be accessed using EIA's file transfer protocol (ftp) site on the Internet at **ftp://ftp.eia.doe.gov** in the **pub/consumption** directory.

<sup>3</sup>For more information, see section "3.7 Data Quality."

**Table 3.6.1. Fleet Vehicles Operated by Propane Providers as of December 31, 1993**  
(Number of Vehicles)

Fuel Type	Total	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Conventional-Fuel Vehicles</b> .....	43,699	279	1,801	Q	Q	1,571	585	8,040	575	10,128	17,512
Gasoline .....	24,288	279	1,801	Q	Q	1,545	584	6,360	571	7,686	2,255
Diesel .....	19,412	NC	NC	Q	NC	Q	Q	Q	Q	2,443	15,257
<b>Alternative-Fuel Vehicles</b> .....	38,267	131	41	65	14	Q	1,282	9,786	Q	15,078	11,462
Compressed Natural Gas											
Dedicated .....	Q	NC	NC	NC	NC	Q	Q	Q	NC	NC	NC
Multifuel .....	Q	Q	NC	Q	NC	Q	Q	Q	NC	Q	NC
Propane											
Dedicated .....	33,800	124	6	Q	Q	Q	1,082	7,080	Q	14,383	10,719
Multifuel .....	4,374	6	35	39	6	Q	182	2,659	NC	691	743
<b>Total</b> .....	81,967	409	1,842	Q	Q	1,934	1,867	17,826	732	25,300	28,974

NC = No cases in sample.

Q = Data withheld because Relative Standard Errors are greater than 50 percent or fewer than three companies are represented.

Notes: • Data in this table are based on total survey sample (top 35 providers as well as 100 sampled providers). • Totals may not equal sum of components due to independent rounding. • "Multifuel" refers to all AFV's capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.2. Relative Standard Errors for Table 3.6.1**  
(Percent)

Fuel Type	Total	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Conventional-Fuel Vehicles</b> .....	24	27	41	78	52	34	49	25	44	30	27
Gasoline .....	28	27	41	78	52	35	49	26	44	36	32
Diesel .....	25	NA	NA	0	NA	0	0	68	0	27	30
<b>Alternative-Fuel Vehicles</b> .....	17	0	0	0	0	64	6	33	0	11	25
Compressed Natural Gas											
Dedicated .....	0	NA	NA	NA	NA	0	0	0	NA	NA	NA
Multifuel .....	0	0	NA	0	NA	0	0	0	NA	0	NA
Propane											
Dedicated .....	19	0	0	0	0	71	7	44	0	11	27
Multifuel .....	24	0	0	0	0	0	0	34	NA	41	43
<b>Total</b> .....	16	19	40	76	51	30	16	21	35	14	20

NA = Not applicable.

Note: "Multifuel" refers to all AFV's capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.3. Alternative-Fuel Fleet Vehicles in Propane Provider Fleets by Source, 1993**  
(Number of Vehicles)

Vehicle Source	Total	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤ 8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Total Vehicles</b> .....	38,267	131	41	65	14	Q	1,282	9,786	Q	15,078	11,462
<b>Dedicated</b>											
Original Equipment .....	9,131	Q	Q	NC	NC	Q	NC	Q	Q	3,742	Q
Conversion .....	24,709	Q	Q	Q	Q	Q	1,088	6,918	Q	10,756	5,415
<b>Multifuel</b>											
Original Equipment .....	605	NC	NC	NC	NC	NC	Q	Q	NC	Q	Q
Conversion .....	3,823	7	35	40	6	Q	186	2,396	NC	Q	621

NC = No cases in sample.

Q = Data withheld because Relative Standard Errors are greater than 50 percent or fewer than three companies are represented.

Notes: • Data in this table are based on total survey sample (top 35 providers as well as 100 sampled providers). • Totals may not equal sum of components due to independent rounding. • "Multifuel" refers to all AFV's capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.4. Relative Standard Errors for Table 3.6.3**  
(Percent)

Vehicle Source	Total	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤ 8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Total Vehicles</b> .....	17	0	0	0	0	64	6	33	0	11	25
<b>Dedicated</b>											
Original Equipment .....	31	0	0	NA	NA	0	NA	83	0	16	54
Conversion .....	16	0	0	0	0	71	7	45	0	14	13
<b>Multifuel</b>											
Original Equipment .....	36	NA	NA	NA	NA	NA	0	0	NA	97	73
Conversion .....	26	0	0	0	0	0	0	38	NA	55	25

NA = Not applicable.

Note: "Multifuel" refers to all AFV's capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.5. Propane Provider Fleet Vehicle Retirement/Acquisition Plans - 1994**  
(Number of Vehicles)

Fleet Vehicle Plans	Total	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Retirements</b> .....	5,592	101	234	Q	Q	Q	165	502	Q	1,658	2,395
Gasoline .....	1,475	74	229	Q	Q	Q	26	Q	Q	Q	Q
Diesel .....	Q	NC	NC	NC	NC	Q	Q	Q	Q	46	Q
Alternative Fuel .....	2,627	Q	Q	10	NC	13	138	408	NC	1,221	803
<b>Acquisitions</b> .....	6,970	60	491	11	Q	Q	116	Q	Q	2,056	2,730
<b>Conversions to AFV</b> .....	1,475	NC	Q	Q	NC	Q	127	344	Q	666	317
<b>Conversions to Gasoline</b> <sup>1</sup> .....	115	NC	Q	Q	Q	NC	Q	Q	Q	44	25
<b>Conversions to Diesel</b> <sup>1</sup> .....	Q	NC	NC	NC	NC	NC	NC	NC	NC	Q	NC

<sup>1</sup> "Conversions to Gasoline" and "Conversions to Diesel" refer to vehicles being converted from an alternative fuel to gasoline or diesel.

NC = No cases in sample.

Q = Data withheld because Relative Standard Errors are greater than 50 percent or fewer than three companies are represented.

Notes: • Data in this table are based on total survey sample (top 35 providers as well as 100 sampled providers). • Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.6. Relative Standard Errors for Table 3.6.5**  
(Percent)

Fleet Vehicle Plans	Total	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Retirements</b> .....	31	0	47	82	0	85	0	22	95	23	44
Gasoline .....	49	0	48	92	0	89	0	86	96	81	70
Diesel .....	68	NA	NA	NA	NA	0	0	0	0	0	70
Alternative Fuel .....	15	0	0	0	NA	0	0	19	NA	17	39
<b>Acquisitions</b> .....	24	0	46	0	96	54	0	51	91	22	28
<b>Conversions to AFV</b> .....	13	NA	0	0	NA	0	0	31	0	23	0
<b>Conversions to Gasoline</b> <sup>1</sup> .....	0	NA	0	0	0	NA	0	0	0	0	0
<b>Conversions to Diesel</b> <sup>1</sup> .....	100	NA	NA	NA	NA	NA	NA	NA	NA	100	NA

<sup>1</sup> "Conversions to Gasoline" and "Conversions to Diesel" refer to vehicles being converted from an alternative fuel to gasoline or diesel.

NA = Not applicable.

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."



**Table 3.6.7. "New" Propane Provider Fleet Vehicles Planned for Service in 1994<sup>1</sup>**  
(Number of Vehicles)

Fuel Type	Total	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Conventional-Fuel Vehicles</b> .....	3,151	57	467	4	Q	Q	Q	54	Q	Q	1,451
Gasoline .....	1,400	57	465	3	Q	Q	Q	Q	Q	Q	Q
Diesel .....	1,750	NC	Q	Q	NC	Q	NC	18	Q	356	1,366
<b>Alternative-Fuel Vehicles</b> .....	4,373	Q	Q	10	Q	Q	158	1,180	Q	1,629	1,350
Compressed Natural Gas											
Dedicated .....	Q	NC	NC	NC	NC	NC	Q	Q	NC	NC	NC
Multifuel .....	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Propane											
Dedicated .....	4,226	NC	Q	Q	Q	Q	143	1,111	Q	1,617	1,326
Multifuel .....	122	Q	Q	9	Q	NC	Q	54	Q	Q	Q
<b>Total</b> .....	7,524	60	494	14	Q	Q	168	1,233	Q	2,296	2,801

<sup>1</sup> "New" Vehicles refers to both newly acquired vehicles and existing vehicles converted to operate on a new fuel.

NC = No cases in sample.

Q = Data withheld because Relative Standard Errors are greater than 50 percent or fewer than three companies are represented.

Notes: • Data in this table are based on total survey sample (top 35 providers as well as 100 sampled providers). • Totals may not equal sum of components due to independent rounding. • "Multifuel" refers to all AFV's capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.8. Relative Standard Errors for Table 3.6.7**  
(Percent)

Fuel Type	Total	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Conventional-Fuel Vehicles</b> .....	40	0	48	0	96	55	0	0	91	51	41
Gasoline .....	42	0	49	0	96	56	0	0	92	78	90
Diesel .....	39	NA	0	0	NA	0	NA	0	0	43	43
<b>Alternative-Fuel Vehicles</b> .....	27	0	0	0	0	0	0	47	0	21	37
Compressed Natural Gas											
Dedicated .....	0	NA	NA	NA	NA	NA	0	0	NA	NA	NA
Multifuel .....	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Propane											
Dedicated .....	28	NA	0	0	0	0	0	50	0	21	38
Multifuel .....	0	0	0	0	0	NA	0	0	0	0	0
<b>Total</b> .....	23	0	46	0	95	54	0	45	79	21	27

NA = Not applicable.

Note: "Multifuel" refers to all AFV's capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.9. Propane Provider Fleet Vehicle Fueling Locations, 1993**  
(Number of Vehicles)

Fuel Type and Fueling Location	Total	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Conventional-Fuel Vehicles</b>											
<b>Company-Owned</b> .....	2,167	NC	23	3	Q	506	54	139	Q	437	953
<b>Private</b>											
Restricted .....	7	Q	Q	NC	NC	NC	NC	NC	NC	NC	NC
Unrestricted .....	347	Q	63	22	Q	15	Q	Q	Q	48	142
<b>Public</b>											
Restricted .....	Q	Q	Q	NC	NC	Q	NC	NC	Q	Q	Q
Unrestricted .....	2,089	121	373	28	18	33	50	52	Q	161	1,250
<b>Alternative-Fuel Vehicles</b>											
<b>Company-Owned</b> .....	19,534	131	41	65	14	125	1,202	3,414	Q	8,318	6,179
<b>Private</b>											
Restricted .....	Q	NC	NC	NC	NC	Q	Q	NC	Q	NC	NC
Unrestricted .....	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
<b>Public</b>											
Restricted .....	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Unrestricted .....	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

NC = No cases in sample.

Q = Data withheld because fewer than three companies are represented.

Notes: • Data in this table represent only the top 35 propane providers. • Totals may not equal sum of components due to independent rounding.

• A "restricted" location refers to the situation where the fleet fuels at a particular location under the obligation of a fuel purchase agreement. If there is no fuel purchase agreement, the location is considered to be "unrestricted."

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.10. Propane Provider Fleet Vehicle Usage for Vehicles Assigned to Employees, 1993**  
(Number of Vehicles)

Vehicle Usage	Total	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Total Vehicles</b> . . . .	24,236	332	521	117	63	690	1,323	3,607	76	8,967	8,539
<b>Business Use Only</b> . . . . .	21,084	Q	47	48	19	461	522	2,681	69	8,612	8,474
<b>Business Use &amp; Commuting</b> . . . . .	1,603	20	46	48	37	223	169	638	Q	354	65
<b>Unrestricted Use (Log)</b> . . . . .	1,526	162	414	13	6	Q	632	287	Q	NC	NC
<b>Unrestricted Use (No Log)</b> . . . . .	23	NC	13	7	Q	NC	NC	Q	NC	NC	NC

NC = No cases in sample.

Q = Data withheld because fewer than three companies are represented.

Notes: • Data in this table represent only the top 35 propane providers. • Totals may not equal sum of components due to independent rounding.

• "Unrestricted Use" refers to usage that includes business use, commuting, and personal use. This type of usage can be with accounting of personal versus business use (Log) or without such accounting (No Log).

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.11. Propane Provider Fleet Vehicle Replacement Cycles, 1993**  
(Months and Miles)

Cycle Unit and Fuel Type	Fleet Average	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Months</b>											
Gasoline/Diesel .....	84	51	57	68	77	82	93	99	79	96	100
Compressed Natural Gas .....	Q	Q	NC	Q	NC	Q	Q	Q	NC	Q	NC
Propane .....	91	60	80	55	84	77	99	91	Q	93	95
<b>Miles</b>											
Gasoline/Diesel .....	216,482	111,667	94,000	121,417	120,714	131,250	125,000	142,200	Q	149,500	321,625
Compressed Natural Gas .....	Q	Q	NC	Q	NC	Q	Q	Q	NC	Q	NC
Propane .....	179,866	Q	166,667	176,667	Q	233,333	188,125	180,688	Q	182,250	174,438

NC = No cases in sample.

Q = Data withheld because fewer than three companies are represented.

Note: • Data in this table represent only the top 35 propane providers.

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.12. Propane Provider Fleet Vehicle Costs, 1993**  
(Dollars per Vehicle)

Cost and Fuel Type	Fleet Average	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤ 8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Acquisition Costs</b>											
Gasoline/Diesel . . . . .	35,802	12,167	15,451	21,687	Q	20,000	Q	17,354	Q	21,904	51,985
<b>Compressed Natural Gas</b>											
Dedicated . . . . .	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Multifuel . . . . .	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
<b>Propane</b>											
Dedicated . . . . .	23,238	NC	NC	Q	NC	NC	15,230	17,629	NC	27,144	29,105
Multifuel . . . . .	18,233	Q	Q	Q	Q	Q	16,600	20,112	NC	19,780	NC
<b>Conversion Costs</b>											
<b>Compressed Natural Gas</b>											
Dedicated . . . . .	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Multifuel . . . . .	Q	Q	NC	Q	NC	Q	Q	Q	NC	Q	NC
<b>Propane</b>											
Dedicated . . . . .	1,378	Q	Q	1,783	Q	1,367	1,500	1,197	Q	1,350	1,232
Multifuel . . . . .	1,386	Q	1,367	1,417	Q	Q	1,279	1,283	NC	1,150	Q

NC = No cases in sample.

Q = Data withheld because fewer than three companies are represented.

Notes: • Data in this table represent only the top 35 propane providers. • "Multifuel" refers to all AFV's capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.13. Alternative-Fuel Vehicle Maintenance Costs Relative to Conventional-Fuel Vehicles in Propane Provider Fleets, 1993**  
(Percent)

Fuel Type	Vehicle Type									
	Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
	Subcompact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Compressed Natural Gas</b>										
Dedicated .....	NC	NC	NC	NC	Q	NC	NC	NC	NC	NC
Multifuel .....	Q	NC	Q	NC	Q	Q	Q	Q	NC	NC
<b>Propane</b>										
Dedicated .....	Q	-1	Q	Q	-1	-9	-8	Q	-11	-4
Multifuel .....	Q	-1	-6	Q	Q	-4	-5	Q	-6	Q

NC = No cases in sample.

Q = Data withheld because fewer than three companies are represented.

Notes: •Data in this table represent only the top 35 propane providers. • A negative percentage indicates lower maintenance costs for the AFV than for a comparable conventional-fuel vehicle. • "Multifuel" refers to all AFV's capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.14. Fuel Storage Capacity in Propane Provider Fleet Vehicles, 1993**  
(Physical Units per Vehicle)

Fuel Type	Vehicle Type									
	Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
	Subcompact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Dedicated</b>										
Gasoline (gallons) . . . . .	15	17	24	22	29	20	38	23	44	56
Diesel (gallons) . . . . .	NC	NC	Q	NC	Q	Q	24	Q	43	105
CNG (cubic feet) . . . . .	NC	NC	NC	NC	Q	Q	Q	NC	NC	NC
Propane (gallons) . . . . .	15	39	Q	Q	68	49	55	Q	370	684
<b>Multifuel</b>										
Gasoline (gallons) . . . . .	22	18	22	17	Q	21	35	NC	28	Q
Diesel (gallons) . . . . .	NC	NC	NC	NC	NC	NC	NC	NC	NC	Q
CNG (cubic feet) . . . . .	Q	NC	Q	NC	Q	Q	Q	NC	Q	NC
Propane (gallons) . . . . .	25	26	27	16	Q	37	49	NC	85	57

NC = No cases in sample.

Q = Data withheld because fewer than three companies are represented.

Notes: • Storage capacity for large propane vehicles is inflated because some vehicles are fueled directly from the delivery tanks. • Data in this table represent only the top 35 propane providers. • "Multifuel" refers to all AFV's capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."



**Table 3.6.15. Annual Consumption by Fuel and Vehicle Technology for Propane Provider Fleet Vehicles, 1993**  
(Physical Units per Fleet Vehicle)

Technology and Fuel	Fleet Average	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤ 8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Dedicated Vehicles</b>											
Gasoline (gallons) . . . . .	1,082	675	784	959	689	1,032	871	1,458	1,027	1,786	4,078
Diesel (gallons) . . . . .	6,512	NC	NC	Q	NC	Q	Q	1,007	Q	1,947	7,869
CNG (cubic feet) . . . . .	Q	NC	NC	NC	NC	Q	Q	Q	NC	NC	NC
Propane (gallons) . . . . .	2,640	1,293	608	Q	Q	1,051	844	1,349	Q	3,143	4,023
<b>Multifuel Vehicles</b>											
Gasoline (gallons) . . . . .	202	50	275	118	548	Q	101	289	NC	49	Q
Diesel (gallons) . . . . .	Q	NC	NC	NC	NC	NC	NC	NC	NC	NC	Q
CNG (cubic feet) . . . . .	Q	Q	NC	Q	NC	Q	Q	Q	NC	Q	NC
Propane (gallons) . . . . .	1,696	1,781	1,693	2,531	1,522	Q	1,315	1,630	NC	2,857	3,947

NC = No cases in sample.

Q = Data withheld because fewer than three companies are represented.

Notes: • Data in this table represent only the top 35 propane providers. • "Multifuel" refers to all AFV's capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.16. Annual Miles Traveled by Fuel and Vehicle Technology for Propane Provider Fleet Vehicles, 1993**  
(Miles per Fleet Vehicle)

Fuel and Technology	Fleet Average	Vehicle Type									
		Passenger Cars			Light-Duty Vans/Trucks (≤ 8,500 lbs. GVW)					Medium-/Heavy-Duty Trucks	
		Sub-compact/Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/Utility	8,501 to 26,000 lbs. GVW	>26,000 lbs. GVW
<b>Dedicated Vehicles</b>											
Gasoline .....	19,056	18,355	17,050	20,401	12,126	12,662	16,695	20,596	19,212	17,188	59,266
Diesel .....	47,673	NC	NC	Q	NC	Q	Q	21,041	Q	15,569	55,085
CNG .....	Q	NC	NC	NC	NC	Q	Q	Q	NC	NC	NC
Propane .....	23,997	23,666	9,357	Q	Q	12,236	13,973	16,575	Q	22,386	27,107
<b>Multifuel Vehicles</b>											
Gasoline .....	3,426	1,280	5,633	1,883	8,333	Q	3,427	4,610	NC	3,571	Q
Diesel .....	Q	NC	NC	NC	NC	NC	NC	NC	NC	NC	Q
CNG .....	Q	Q	NC	Q	NC	Q	Q	Q	NC	Q	NC
Propane .....	18,768	33,831	24,213	23,260	16,333	Q	20,031	15,116	NC	19,342	19,712

NC = No cases in sample.

Q = Data withheld because fewer than three companies are represented.

Notes: • Data in this table represent only the top 35 propane providers. • "Multifuel" refers to all AFV's capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-885, "Propane Provider Fleet Survey."

**Table 3.6.17. Fleet Vehicles Operated by Electric Utilities as of December 31, 1993**  
(Number of Vehicles)

Fuel Type	Total	Vehicle Type								
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium/ Heavy-Duty Trucks
		Subcompact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	
<b>Conventional-Fuel Vehicles</b> .....	196,241	19,589	14,965	3,248	7,011	11,567	22,091	37,137	11,134	69,499
Gasoline .....	155,070	19,588	14,949	3,238	6,997	11,003	21,870	34,480	10,358	32,587
Diesel .....	41,171	1	16	10	14	564	221	2,657	776	36,912
<b>Alternative-Fuel Vehicles</b> .....	5,595	244	342	55	193	853	593	1,831	535	949
Compressed Natural Gas										
Dedicated .....	821	0	4	3	5	516	13	212	42	26
Multifuel .....	2,935	92	233	16	128	206	360	1,047	452	401
Propane										
Dedicated .....	489	1	0	0	0	21	52	91	6	318
Multifuel .....	169	1	0	0	3	3	12	120	11	19
Methanol/Ethanol Blends										
Dedicated .....	523	11	47	26	15	20	47	222	13	122
Multifuel .....	412	79	52	9	11	30	62	136	7	26
Electricity										
Dedicated .....	237	60	6	1	31	50	46	3	4	36
Multifuel .....	0	0	0	0	0	0	0	0	0	0
Other Alternative Fuels										
Dedicated .....	9	0	0	0	0	7	1	0	0	1
Multifuel .....	0	0	0	0	0	0	0	0	0	0
<b>Total</b> .....	201,836	19,833	15,307	3,303	7,204	12,420	22,684	38,968	11,669	70,448

Note: "Multifuel" refers to all AFV's capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Coal, Nuclear, Electric, and Alternative Fuels, Form EIA-861, Schedule VII, "Electric Utility Fleet Survey."

**Table 3.6.18. 1994 Electric Utility Fleet Vehicle Retirement/Acquisition Plans**  
(Number of Vehicles)

Fleet Vehicle Plans	Total	Vehicle Type								
		Passenger Cars			Light-Duty Vans/Trucks (≤ 8,500 lbs. GVW)					Medium/ Heavy- Duty Trucks
		Subcompact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	
<b>Retirements</b> .....	18,956	3,059	1,966	381	659	1,075	1,983	4,171	1,076	4,586
Gasoline .....	16,438	3,052	1,911	378	652	1,014	1,895	3,780	1,020	2,736
Diesel .....	2,063	0	2	0	2	21	32	202	41	1,763
Alternative-Fuel .....	455	7	53	3	5	40	56	189	15	87
<b>Acquisitions</b> .....	18,182	2,815	1,539	290	806	1,067	1,929	4,223	946	4,567
<b>Conversions to AFV</b> .....	724	31	27	3	52	30	128	368	35	50

Source: Energy Information Administration, Office of Coal, Nuclear, Electric, and Alternative Fuels, Form EIA-861, Schedule VII, "Electric Utility Fleet Survey."

**Table 3.6.19. "New" Electric Utility Fleet Vehicles Planned for Service in 1994<sup>1</sup>**  
(Number of Vehicles)

Fuel Type	Total	Vehicle Type								
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium/ Heavy-Duty Trucks
		Subcompact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	
<b>Conventional-Fuel Vehicles</b> .....	16,611	2,616	1,413	281	644	865	1,719	3,874	896	4,303
Gasoline .....	13,388	2,616	1,413	281	644	847	1,684	3,574	826	1,503
Diesel .....	3,223	0	0	0	0	18	35	300	70	2,800
<b>Alternative-Fuel Vehicles</b> .....	1,727	133	142	7	178	206	299	465	57	240
Compressed Natural Gas										
Dedicated .....	208	0	3	0	102	47	13	27	4	12
Multifuel .....	841	36	77	3	55	67	122	380	47	54
Propane										
Dedicated .....	44	0	0	0	0	1	7	5	0	31
Multifuel .....	83	13	8	0	5	19	25	9	3	1
Methanol/Ethanol Blends										
Dedicated .....	161	0	4	3	9	58	4	16	0	67
Multifuel .....	120	36	47	1	1	0	9	23	2	1
Electricity										
Dedicated .....	253	43	2	0	5	14	114	5	0	70
Multifuel .....	12	5	0	0	1	0	5	0	1	0
Other Alternative Fuels										
Dedicated .....	0	0	0	0	0	0	0	0	0	0
Multifuel .....	5	0	1	0	0	0	0	0	0	4
<b>Total</b> .....	18,338	2,749	1,555	288	822	1,071	2,018	4,339	953	4,543

<sup>1</sup> "New" Vehicles refers to both newly acquired vehicles and existing vehicles converted to operate on a new fuel.

Note: "Multifuel" refers to all AFV's capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Coal, Nuclear, Electric, and Alternative Fuels, Form EIA-861, Schedule VII, "Electric Utility Fleet Survey."

**Table 3.6.20. Fleet Vehicles Operated By Natural Gas Suppliers as of December 31, 1993**  
(Number of Vehicles)

Fuel Type	Total	Vehicle Type								
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium/ Heavy-Duty Trucks
		Subcompact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	
<b>Conventional-Fuel Vehicles</b> .....	122,276	10,416	11,626	3,652	5,141	11,806	13,688	26,144	5,731	34,072
Gasoline .....	104,434	10,416	11,609	3,649	5,134	11,465	13,629	25,070	5,440	18,022
Diesel .....	17,842	0	17	3	7	341	59	1,074	291	16,050
<b>Alternative-Fuel Vehicles</b> .....	16,048	585	791	335	495	3,610	1,839	5,347	638	2,408
Compressed Natural Gas										
Dedicated .....	2,223	7	19	31	21	965	118	935	31	96
Multifuel .....	11,809	567	756	291	447	2,505	1,612	3,464	602	1,565
Propane										
Dedicated .....	1,005	2	13	8	17	99	87	185	3	591
Multifuel .....	948	0	3	5	2	16	19	763	2	138
Electricity										
Dedicated .....	37	8	0	0	7	18	3	0	0	1
Multifuel .....	0	0	0	0	0	0	0	0	0	0
Other Alternative Fuels										
Dedicated .....	26	1	0	0	1	7	0	0	0	17
Multifuel .....	0	0	0	0	0	0	0	0	0	0
<b>Total</b> .....	<b>138,324</b>	<b>11,001</b>	<b>12,417</b>	<b>3,987</b>	<b>5,636</b>	<b>15,416</b>	<b>15,527</b>	<b>31,491</b>	<b>6,369</b>	<b>36,480</b>

Note: "Multifuel" refers to all alternative-fuel vehicles capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).  
Source: Energy Information Administration, Office of Oil and Gas, Form EIA-176, Schedule B, "Natural Gas Supplier Fleet Survey."

**Table 3.6.21. Alternative-Fuel Fleet Vehicles in Natural Gas Supplier Fleets by Source, 1993**  
(Number of Vehicles)

Vehicle Source	Total	Vehicle Type								
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium/ Heavy-Duty Trucks
		Subcompact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	
<b>Total Alternative-Fuel Vehicles</b> .....	16,048	585	791	335	495	3,610	1,839	5,347	638	2,408
<b>Dedicated</b>										
Original Equipment . . . .	1,582	2	24	16	8	697	23	721	3	88
Conversion .....	1,401	14	18	15	33	404	98	252	29	538
<b>Multifuel</b>										
Original Equipment . . . .	55	0	1	0	0	5	0	13	5	31
Conversion .....	13,010	569	748	304	454	2,504	1,718	4,361	601	1,751

Note: "Multifuel" refers to all alternative-fuel vehicles capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).  
Source: Energy Information Administration, Office of Oil and Gas, Form EIA-176, Schedule B, "Natural Gas Supplier Fleet Survey."

**Table 3.6.22. 1994 Natural Gas Supplier Fleet Vehicle Retirement/Acquisition Plans**  
(Number of Vehicles)

Fleet Vehicle Plans	Total	Vehicle Type								
		Passenger Cars			Light-Duty Vans/Trucks (≤ 8,500 lbs. GVW)					Medium/ Heavy-Duty Trucks
		Subcompact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	
<b>Retirements</b> .....	17,088	1,320	2,105	590	694	1,805	1,836	4,796	735	3,207
Gasoline .....	14,522	1,304	2,004	530	660	1,679	1,701	4,024	686	1,934
Diesel .....	1,334	0	34	2	9	19	1	105	23	1,141
Alternative-Fuel .....	1,232	16	67	58	25	107	134	667	26	132
<b>Acquisitions</b> .....	14,374	799	1,664	421	748	1,564	1,522	4,147	564	2,945
<b>Conversions to AFV</b> .....	1,623	60	85	79	79	181	164	821	40	114

Source: Energy Information Administration, Office of Oil and Gas, Form EIA-176, Schedule B, "Natural Gas Supplier Fleet Survey."



**Table 3.6.23. "New" Natural Gas Supplier Fleet Vehicles Planned for Service in 1994<sup>1</sup>**  
(Number of Vehicles)

Fuel Type	Total	Vehicle Type								
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium/ Heavy-Duty Trucks
		Subcompact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	
<b>Conventional-Fuel Vehicles</b> .....	11,374	680	1,413	363	481	949	1,183	3,212	499	2,594
Gasoline .....	9,911	680	1,413	363	481	936	1,182	3,131	485	1,240
Diesel .....	1,463	0	0	0	0	13	1	81	14	1,354
<b>Alternative-Fuel Vehicles</b> .....	4,623	179	336	137	346	796	503	1,756	105	465
Compressed Natural Gas										
Dedicated .....	420	6	33	23	47	213	10	61	1	26
Multifuel .....	3,674	161	297	112	208	504	466	1,475	104	347
Propane										
Dedicated .....	197	4	0	0	89	54	5	9	0	36
Multifuel .....	257	0	0	2	0	0	9	196	0	50
Methanol/Ethanol Blends										
Dedicated .....	1	0	0	0	1	0	0	0	0	0
Flex-Fuel .....	23	0	0	0	0	23	0	0	0	0
Electricity										
Dedicated .....	25	8	0	0	1	1	13	0	0	2
Multifuel .....	0	0	0	0	0	0	0	0	0	0
Other Alternative Fuels										
Dedicated .....	0	0	0	0	0	0	0	0	0	0
Multifuel .....	26	0	6	0	0	1	0	15	0	4
<b>Total</b> .....	15,997	859	1,749	500	827	1,745	1,686	4,968	604	3,059

<sup>1</sup> "New" Vehicles refers to both newly acquired vehicles and existing vehicles converted to operate on a new fuel.

Note: "Multifuel" refers to all alternative-fuel vehicles capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

Source: Energy Information Administration, Office of Oil and Gas, Form EIA-176, Schedule B, "Natural Gas Supplier Fleet Survey."

**Table 3.6.24. Natural Gas Supplier Fleet Vehicle Fueling Locations, 1993**  
(Number of Vehicles)

Fuel Type and Fueling Location	Total	Vehicle Type								
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium/ Heavy-Duty Trucks
		Subcompact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	
<b>Conventional-Fuel Vehicles</b>										
Company-Owned . . . . .	84,553	8,606	7,359	1,857	3,876	9,353	8,979	13,833	4,155	26,535
Private . . . . .	1,959	49	258	64	38	197	234	825	55	239
<b>Public</b>										
Restricted . . . . .	4,420	337	601	103	186	353	585	1,196	108	951
Unrestricted . . . . .	30,950	1,420	3,315	1,628	1,026	1,789	3,808	10,231	1,411	6,322
Other . . . . .	394	4	93	0	15	114	82	59	2	25
<b>Alternative-Fuel Vehicles</b>										
Company-Owned . . . . .	15,044	558	739	266	476	3,464	1,801	4,827	627	2,286
Private . . . . .	326	1	8	2	5	48	10	193	6	53
<b>Public</b>										
Restricted . . . . .	78	1	0	0	2	38	5	30	0	2
Unrestricted . . . . .	589	24	44	66	11	55	22	295	5	67
Other . . . . .	11	1	0	1	1	5	1	2	0	0

Note: A "restricted" location refers to the situation where the fleet fuels at a particular location under the obligation of a fuel purchase agreement. If there is no fuel purchase agreement, the location is considered to be "unrestricted."

Source: Energy Information Administration, Office of Oil and Gas, Form EIA-176, Schedule B, "Natural Gas Supplier Fleet Survey."

**Table 3.6.25. Natural Gas Supplier Fleet Vehicle Usage for Vehicles Assigned to Employees, 1993**  
(Number of Vehicles)

Vehicle Usage	Total	Vehicle Type								
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium/ Heavy-Duty Trucks
		Subcompact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	
<b>Total Vehicles</b> . . . .	138,324	11,001	12,417	3,987	5,636	15,416	15,527	31,491	6,369	36,480
<b>Business Use</b>										
<b>Only</b> . . . . .	106,177	7,827	5,992	1,321	4,236	13,511	12,603	21,530	4,553	34,604
<b>Business Use &amp; Commuting</b> . . . . .	22,662	1,966	3,392	1,319	977	1,723	2,323	8,225	1,279	1,458
<b>Unrestricted Use (Log)</b> . . . . .	8,511	1,185	2,574	1,246	422	179	591	1,467	477	370
<b>Unrestricted Use (No Log)</b> . . . . .	944	22	457	98	0	0	8	262	54	43
<b>Other Usage</b> . . . . .	30	1	2	3	1	3	2	7	6	5

Note: "Unrestricted Use" refers to usage that includes business use, commuting, and personal use. This type of usage can be with accounting of personal versus business use (Log) or without such accounting (No Log).

Source: Energy Information Administration, Office of Oil and Gas, Form EIA-176, Schedule B, "Natural Gas Supplier Fleet Survey."

**Table 3.6.26. Natural Gas Supplier Fleet Vehicle Daily Miles Traveled Range, 1993**  
(Number of Vehicles)

Miles Traveled Range (Miles per Operating Day)	Total	Vehicle Type								
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium/ Heavy-Duty Trucks
		Subcompact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	
<b>Total Vehicles</b> .....	138,324	11,001	12,417	3,987	5,636	15,416	15,527	31,491	6,369	36,480
<b>0 to 50</b> .....	75,142	6,168	6,006	1,376	2,924	7,473	8,382	12,849	3,678	26,286
<b>51 to 100</b> .....	51,512	4,631	5,550	1,671	2,224	7,023	6,280	13,456	2,098	8,579
<b>101 to 150</b> .....	7,902	166	655	509	345	754	582	3,339	457	1,095
<b>151 to 200</b> .....	2,179	21	104	90	130	130	247	1,057	100	300
<b>201 to 300</b> .....	1,117	10	89	310	8	32	34	530	32	72
<b>More than 300</b> .....	472	5	13	31	5	4	2	260	4	148

Source: Energy Information Administration, Office of Oil and Gas, Form EIA-176, Schedule B, "Natural Gas Supplier Fleet Survey."

**Table 3.6.27. Natural Gas Supplier Fleet Vehicle Replacement Cycles, 1993**  
(Months and Miles)

Cycle Unit	Fleet Average	Vehicle Type								
		Passenger Cars			Light-Duty Vans/Trucks (≤8,500 lbs. GVW)					Medium/ Heavy-Duty Trucks
		Subcompact/ Compact	Mid-Size	Large	Mini-Van	Full-Size Van	Small Pickup	Large Pickup	Sport/ Utility	
<b>Months</b> .....	70	67	61	57	67	72	70	69	67	93
<b>Miles</b> .....	94,530	87,283	89,569	87,796	96,601	96,104	95,853	96,574	95,488	103,888

Source: Energy Information Administration, Office of Oil and Gas, Form EIA-176, Schedule B, "Natural Gas Supplier Fleet Survey."

**Table 3.6.28. Annual Consumption per Vehicle by Fuel and Vehicle Technology for Natural Gas Supplier Fleet Vehicles, 1993**  
(Physical Units)

**This Table deleted due to concern over unreliability of data.**

## 3.7 Data Quality

### Propane Provider Fleet Survey

Unlike the Electric Utility Fleet Survey and the Natural Gas Supplier Fleet Survey, the Propane Provider Fleet Survey was conducted as a sample survey and, therefore, the data collected are subject to sampling and nonsampling error. However, the sampling error will affect only portions of the data collected. The data that were collected from the top 35 providers, but not the 100 sampled companies, are not subject to sampling error because that part of the survey was a census.

#### Nonsampling Error

Nonsampling errors are errors of the survey process and include both random errors and systematic errors or biases. The magnitudes of nonsampling biases cannot be estimated from the sample data. Thus, avoidance of systematic biases is a primary objective of all stages of survey design. Subsequent to conducting a survey, problems of unit nonresponse and item nonresponse need to be addressed. The treatment of these types of errors in the Propane Provider Fleet Survey are discussed below.

#### Unit Nonresponse

Unit nonresponse is the type of nonresponse that occurs when no data are available for a survey respondent. Most unit nonresponse occurs when a respondent is unavailable or refuses to cooperate. There was one instance of unit nonresponse in the top 35 providers portion of the Propane Provider Fleet Survey that was accounted for using a simple weight adjustment. One respondent among the top 35 providers was also a respondent to the Natural Gas Supplier Fleet Survey. In order to prevent duplication of the data collection and to reduce burden on the respondent, that particular provider was released from the Propane Provider Fleet Survey. The remaining 33 responding providers were given a weight of  $34/33 = 1.03$  to account for the nonresponding provider. Within the sample portion of the survey, there was 100 percent response.

#### Imputation for Item Nonresponse

There were three variables on the Propane Provider Fleet Survey that required imputation due to item nonresponse. Those variables were fuel storage capacity, vehicle fuel consumption, and vehicle miles traveled (VMT). For fuel storage capacity, the hot-deck procedure was used to impute for missing responses. In hot-decking, when a certain response is missing for a given respondent, another respondent, called a donor, is randomly chosen to furnish its reported value for that missing item. The donated value is then assigned to the nonrespondent company.

Due to the complex nature of consumption and miles-traveled data, it was determined that the hot-deck procedure would not be adequate. Therefore, missing responses for consumption and miles traveled were derived using nonmissing data items for the nonrespondent companies along with data from outside sources. The outside data used were average fuel economies (in miles per unit of fuel) for each fuel and each vehicle type. For those companies that did not report consumption data, but did report VMT, the missing consumption data were imputed by dividing the reported VMT by the appropriate fuel economy estimate.

If a respondent did not report either consumption or VMT, a more complicated derivation was necessary. First, an average VMT per vehicle was computed from all reported values for each fuel and vehicle type. Consumption was then imputed as gallons per vehicle by dividing the appropriate average VMT per vehicle by the appropriate fuel economy estimate. There were two respondents who were unable to report the consumption data by vehicle type, but were able to provide the total consumption of each fuel. For these two respondents, the consumption was first imputed as described; the ratio was adjusted using the reported total consumption. The ratio was computed by dividing the reported

total consumption by the sum (over all vehicle types) of imputed consumption. Once the consumption was imputed, those newly imputed data were used to impute VMT by multiplying the imputed consumption by the appropriate fuel economy estimate.

## Sampling Error

The random differences between the survey estimate and the true population value that occur because of the particular sample that was selected are known as sampling errors. The average sampling error, averaged over all possible samples, should be zero. Although the sampling error is nonzero and unknown for the particular sample chosen, the sample design permits sampling errors to be estimated. The typical magnitude of the sampling error is measured by the “standard error” of the estimate. Standard errors in this report are given as percents of their estimated values, that is, as relative standard errors (RSE’s).

For a given survey statistic, Y, the relative standard error, RSE(Y) is computed as follows:

$$S_h^2 = \frac{\sum_i (Y_i - \bar{Y}_h)^2}{n_h - 1}$$

$$\sigma = \sqrt{\sum_h \left(\frac{N - n}{n}\right) N_h S_h^2}$$

$$RSE = \left(\frac{\sigma}{Y}\right) * 100$$

where,

n	=	total sample size
n <sub>h</sub>	=	sample size in stratum h
N	=	total population size, and
N <sub>h</sub>	=	population size in stratum h.

For this survey, there were four strata representing the four Census regions. The propane provider frame, omitting the top 35 providers, was separated into these four strata before the sample of 100 companies was selected. The top 35 providers did not contribute to sampling error because they were in the sample with certainty. However, for determining RSE’s, the contribution of the top 35 providers was kept in the denominator. RSE’s for applicable tables are included in the “3.6 Detailed Tables” section.

## Electric Utility Fleet Survey

Because the Electric Utility Fleet Survey was conducted as a census survey, the data collected are not subject to sampling error. However, as with all surveys, non-sampling errors can occur. These types of errors cannot be estimated using sample data. No adjustments for either unit or item nonresponse were performed on the data collected in the Electric Utility Fleet Survey.

## Natural Gas Suppliers Fleet

Because the Natural Gas Supplier Fleet Survey was conducted as a census survey, the data collected are not subject to sampling error. However, as with all surveys, non-sampling errors can occur. These types of errors cannot be estimated using sample data.



## **Section 4**

# **Consumer Vehicle Preferences**

## 4.1. Introduction

The major aims of this study are to analyze and summarize the results of a national telephone survey of consumer vehicle preferences and attitudes toward alternative-fuel vehicles. The study approach, the sample design specifications, the questionnaire, and the processing specifications were developed by students enrolled in a survey practicum course at the University of Maryland. This course is one of the graduate degree requirements of the Joint Program in Survey Methodology sponsored by the University of Maryland, the University of Michigan, and Westat, Inc. The professor for the course, who oversaw all aspects of the survey, was Dr. Stanley Presser.

The eligible population for the study consisted of telephone households in the continental United States that owned or leased one or more motor vehicles driven on a regular basis. The respondent was the adult in the household most knowledgeable about the use of the household's vehicle(s). Interviewing for the survey occurred from February 17 to May 16, 1994, in the Maryland Survey Research Center (SRC) Telephone Facility on the College Park campus. The total number of respondents was 1,712.

### Highlights

The following are selected findings, estimated by analysis of the data obtained from the Consumer Preference Survey, concerning the consumer population.

- Eighty-seven percent use personal vehicles as their main type of transportation
- Fifty-nine percent belong to households with two persons over the age of 18
- Eighty-five percent have heard of alternative-fuel vehicles
- Sixty-two percent feel that electricity is a safer vehicle fuel than gasoline
- Seventy-seven percent are concerned about outdoor air pollution in their area
- Sixty-one percent feel that vehicle emissions are extremely or very dangerous
- Forty-eight percent consider themselves to be environmentalists
- More than one-half are willing to refuel a vehicle twice as often as usual to reduce vehicle emissions
- About one-third are willing to reduce their current trunk or cargo space by one-half in order to reduce vehicle emissions

In order to understand much of the data presented in this report, it is necessary to understand the design of the questionnaire and the way in which data were collected. The next section provides this essential information.

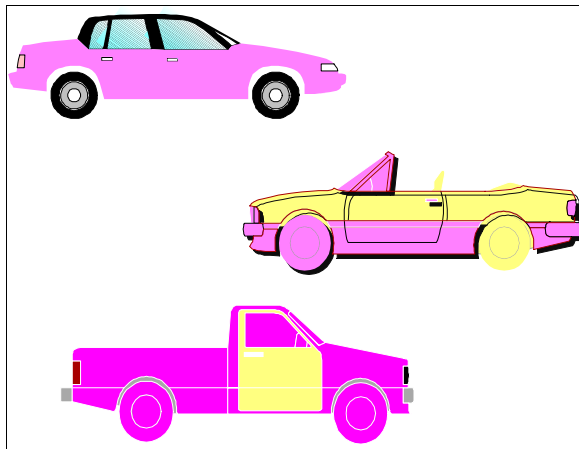
### Design of the Questionnaire

The questionnaire opened with an eligibility question about the number of vehicles in the household. If the household owned or leased one or more vehicles, a question was asked to identify the adult in the household who knew most about the vehicle(s) and how they were used. If this adult was someone other than the initial informant, this person was contacted and the number of vehicles was asked again.

The remainder of the questionnaire fell into three broad categories: 1) vehicle questions, 2) vehicle preference questions, and 3) questions concerning attitudes about pollution and the environment.

## Vehicle Questions

For households with four or fewer vehicles, the main part of the interview began with a series of questions about each vehicle (year, make, model, whether bought new or used, and size and usage of trunk (cargo) space), its regular uses (whether driven to work, school, or as part of a job, and if so, how frequently and how far), and its special uses (overnight trips or whether it was entered into competitions). Questions were also asked about fueling patterns and respondent general satisfaction with the vehicle. These questions were, for the most part, asked in order to select the vehicle that was to serve as the vehicle to be replaced in the vehicle preference section of the questionnaire. Consequently, analysis of these variables is not included in this report. The survey assumed that the least used vehicle was the vehicle with the highest likelihood of being replaced by a modified vehicle.



To reduce respondent burden, the very small number of households with more than four vehicles were asked only about the two vehicles driven the least. This was done because in the vehicle preference section the respondent was asked to choose between a modified vehicle and the vehicle in the household used the least. For households with multiple vehicles, the least used was defined as the one least often fueled. If a tie occurred between two vehicles, it was broken according to which had the least used trunk space, then according to which had the fewest overnight trips, and then by random selection.

Estimates for vehicle preference questions may include bias because of the sample's design. Bias may have been introduced in one of two ways. First, while the least-used household vehicle seems a plausible choice as the most likely vehicle to be a candidate for replacement by a modified vehicle, no data are available to support this conclusion. The household vehicle chosen for the vehicle preference questions might not have been the vehicle that the respondent would have chosen if given the choice. Therefore, with respect to the vehicle population, the study cannot claim to represent preferences over the entire stock, or even over the subset of vehicles most likely to be replaced by modified vehicles. The population that is covered can be described most accurately as the subpopulation of least-used vehicles in U.S. households. Second, the respondent may not have been the most appropriate person to make decisions about the vehicle addressed in the questionnaire. The respondents were chosen on the basis of their knowledge of all the household vehicles, not on the basis of whether or not they were directly responsible for the upkeep and operation of the least-used vehicle. Consequently, the respondent may not have been the household member who was the main driver of the vehicle to be replaced or the member in the position to make purchasing decisions regarding the vehicle. Likewise, the personal characteristics, opinions, and concerns for the environment are those of the respondent and not the main driver of the vehicle to be replaced, except where otherwise stated. This population would most closely represent the subpopulation of most vehicle-knowledgeable persons in U.S. households. With these caveats in mind, some national estimates based on responses about households' least-used vehicles are given below.

### Characteristics of Vehicles to be Replaced

73% were domestic vehicles  
70% were automobiles  
51% were bought used  
38% were 1985-1989 models  
32% were 1990-1994 models  
70% of consumers were very/extremely satisfied with this vehicle  
61% were used by someone in the household to commute to work  
44% were used to make overnight trips

## Vehicle Preference Questions

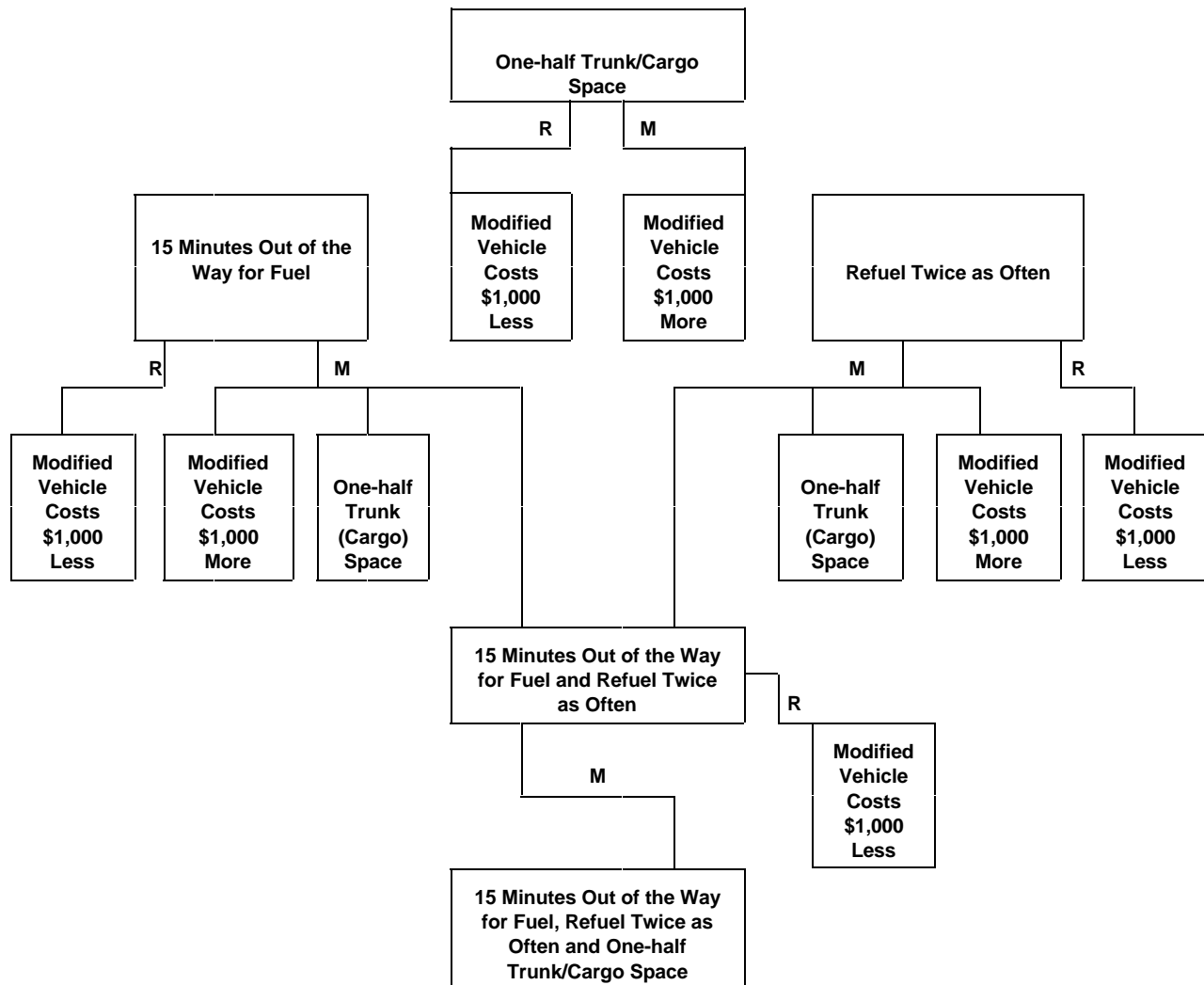
The respondent was asked a series of hypothetical choice questions between a new model of the household's least-used vehicle and a less-polluting modified vehicle that was identical to the regular vehicle except for certain limitations or "penalty" characteristics. The limitations of the modified vehicle are similar to those currently associated with alternative-fuel vehicles (AFV) and imply behavioral changes for the operator. The questionnaire contained three scenarios:

1. The modified vehicle has only one-half the trunk (cargo) space of the regular vehicle.
2. The respondent must drive 15 minutes out of the way to buy fuel for the modified vehicle.
3. The modified vehicle must be refueled twice as often as the regular vehicle.

Respondents were asked to choose which vehicle they would purchase, given each limitation individually and in combination.

Within each individual scenario, respondents who said they would choose the modified vehicle were asked which they would choose if the modified vehicle cost \$1,000 more than the regular vehicle. Respondents who chose the regular vehicle were asked which they would choose if the modified vehicle was \$1,000 less than the regular vehicle. Figure 4.1.1 illustrates the flow of the vehicle preference section of the questionnaire. In the figure, "M" means that the respondent chose the modified vehicle. "R" means that they chose the regular vehicle.

**Figure 4.1.1. Flow Chart of the Questionnaire**



Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

Additionally, for a random half-sample, the modified vehicle was described as producing half as much air pollution as a regular vehicle; for the other half, the modified vehicle was described as producing no air pollution. Although the two categories were general, the modified vehicle that produced no air pollution was intended to represent electric-powered vehicles. The vehicle that produced half as much air pollution as a regular vehicle represented other alternative-fuel vehicles, such as those powered by natural gas, propane, and other non-petroleum fuels.

### **Attitudinal Questions**

The final section of the questionnaire measured respondent awareness of AFV's and attitudes about air pollution and environmentalism. Questions included ascertained: (1) whether and to what extent respondents had heard of alternative-fuel vehicles, (2) respondents' perception of the relative safety of alternative fuels to gasoline, (3) respondents' concerns about air pollution in their area, and (4) whether and to what extent respondents considered themselves environmentalists.

## **Organization of this Report**

Sections 4.2 and 4.3 address three general topics: (1) consumer characteristics and their general attitudes and concerns about air pollution, (2) prospective vehicle purchasers' receptiveness to behavioral changes they might have to make to operate an alternative-fuel vehicle, and (3) price differentials between conventional vehicles and alternative-fuel vehicles that consumers will accept in making purchasing decisions. The detailed tables for the survey are found in section 4.4. Section 4.5 contains the relative standard errors for the estimates found throughout this section of the report. Data quality and methodology issues are briefly discussed in section 4.6.

## 4.2. Consumer Characteristics, Awareness, and Concerns

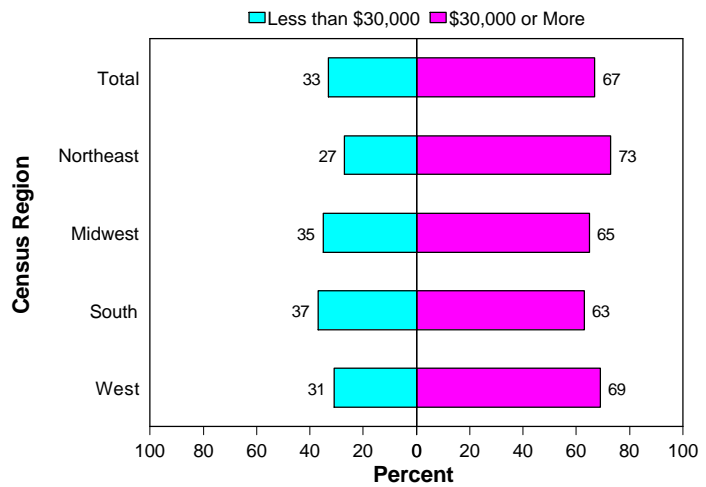
The Consumer Preference Survey contained questions to learn respondent demographic characteristics, consumer knowledge of alternative-fuel vehicles, perception of the relative safety of alternative fuels, and general concerns for the environment.

### Consumer Characteristics

The Consumer Preference Survey found that 39 percent of the telephone household population has one household vehicle, 42 percent has two, 12 percent has three, and 7 percent has four or more. Sixty-seven percent of the population has an average annual household income of \$30,000 or more. For these households, nearly 75 percent owned two or more vehicles. In contrast, 64 percent of households with annual income of less than \$30,000 owned only one vehicle.

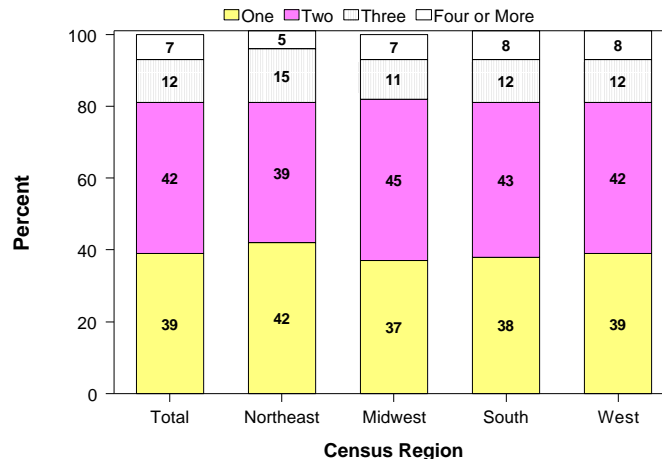
Nineteen percent of the population lives in the Northeast, 25 percent in the Midwest, 35 percent in the South, and 21 percent in the West. Within each Census Region the household annual income is distributed as shown in Figure 4.2.1. The Northeast has the highest percentage of people earning \$30,000 or more annually, and the South has the highest percentage of people who earn less than \$30,000. Most households have one or two vehicles (about 80 percent). The distribution of the number of vehicles is shown in Figure 4.2.2.

**Figure 4.2.1. Household Annual Income by Census Region**



Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

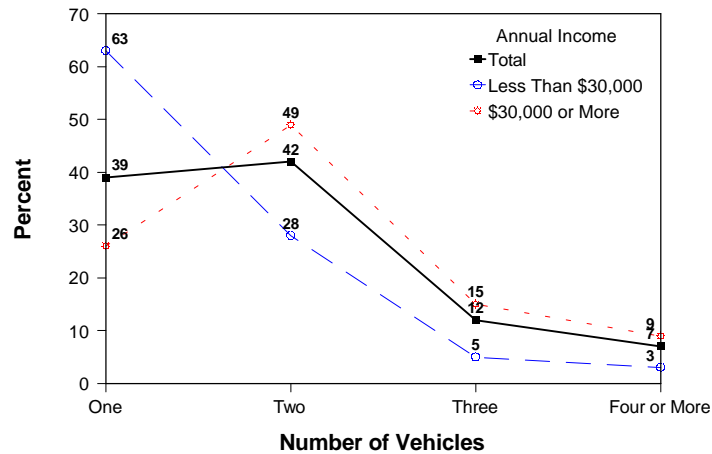
**Figure 4.2.2. Number of Vehicles by Census Region**



Note: Percents may not sum to 100 due to rounding.  
Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

The relationship between the number of vehicles and annual income in households is shown in Figure 4.2.3.

**Figure 4.2.3. Household Annual Income by Number of Vehicles**



Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

Other consumer characteristic estimates are given below.

Consumer Characteristics	
87%	used personal vehicles as their main type of transportation
67%	had household income greater than \$30,000
69%	lived in single-family detached homes
86%	had high school or college education
59%	belonged to household with two persons over 18 years of age
85%	were white

## Consumer Awareness

Most consumers (85 percent) had heard of alternative-fuel vehicles, although only slightly more than one-half of the population knew more than “just a little” about them. By far, the perception of fuel safety of alternative fuels was strongest for electricity, with 62 percent stating it was a safer vehicle fuel than gasoline. The following summarizes consumers’ awareness of alternative-fuel vehicles and opinions of the relative safety of alternative fuels.

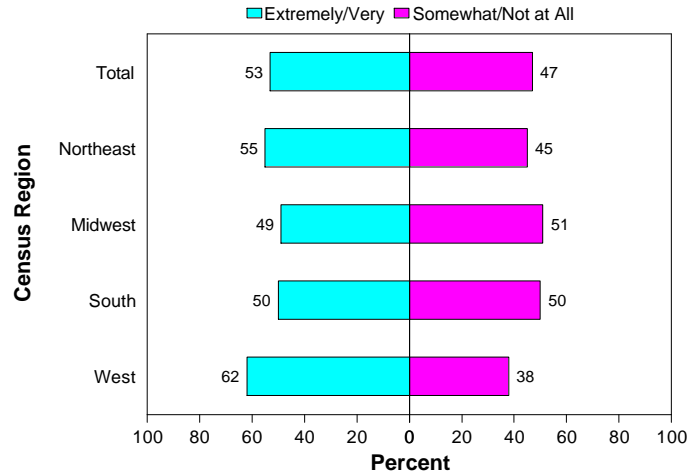
Consumer Awareness and Opinions	
85%	had heard of alternative-fuel vehicles
18%	felt that natural gas was a safer vehicle fuel than gasoline
29%	felt that gasoline was a safer vehicle fuel than natural gas
11%	felt that propane was a safer vehicle fuel than gasoline
41%	felt that gasoline was a safer vehicle fuel than propane
62%	felt that electricity was a safer vehicle fuel than gasoline
12%	felt that gasoline was a safer vehicle fuel than electricity



## Consumer Concern

Concern for the environment was greatest in the Northeast and West Census regions (Figure 4.2.4).

**Figure 4.2.4. Level of Concern for the Environment by Census Region**



Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

Overall, consumers are concerned about the environment and consider themselves environmentalists; however, of the 48 percent who consider themselves environmentalists, only 22 percent are members of any environmental organization.

**Consumer Concern for Environment**

77% were concerned about outdoor air pollution in their area  
 Of these, 53% were extremely/very concerned  
 61% feel that vehicle emissions are extremely/very dangerous  
 48% consider themselves to be environmentalists

## 4.3. Consumer Receptiveness to Behavioral Changes and Price Differentials

Respondents were asked whether they would purchase a new model of the household's least used vehicle, or a less-polluting modified vehicle (AFV) identical to the regular vehicle except for certain limitations that might require respondents to change their normal behavior associated with operating a vehicle. Three simple cases were first addressed: the modified vehicle would have only half the trunk space of the regular vehicle; the modified vehicle would require refueling at a station that was 15 minutes out of the way for the respondent; and, the modified vehicle would need to be refueled twice as often as the regular vehicle. If the respondent answered that they would choose the modified vehicle with the single limitation over the regular vehicle, then they were asked about their vehicle choice if the modified vehicle had any combination of these same three limitations. Additionally, in all the single limitation scenarios, respondents were asked a question regarding the price of the modified vehicle to learn if a \$1,000 difference in price would influence the respondents' original vehicle preference. Respondents who had chosen the regular vehicle were asked their preference if the modified vehicle cost \$1,000 less. Respondents who chose the modified vehicle were asked their preference if the modified vehicle cost \$1,000 more.

### Single Vehicle Limitations

The following table presents consumer vehicle preferences, expressed in percents, when given three possible modified vehicle limitations.

**Table 4.3.1. Overview of Vehicle Preference by Modified Vehicle Limitations, 1994**  
(Percent)

Vehicle Limitation	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>One-half Trunk (Cargo) Space</b> .....	60	33	Q	55	35	Q
<b>15 Minutes Out of the Way to Refuel</b> .....	55	41	Q	44	51	Q
<b>Refuel Twice as Often</b> ...	42	54	Q	37	57	Q

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

Between the two options of giving up one-half of the trunk (cargo) space of a regular vehicle and having to refuel the modified vehicle twice as often, consumers in both pollution level groups were clearly more willing to refuel more often. Twenty-one percent more consumers were willing to refuel twice as often than were willing to give up trunk space when the modified vehicle polluted half as much as a regular vehicle, 22 percent more if the modified vehicle did not pollute at all. Not much can be said, however, concerning consumer willingness to drive 15 minutes out of the way to refuel in comparison to the other two options. The differences were statistically insignificant.

With one exception, within each limitation scenario, differences among the pollution level groups' vehicle choice were statistically insignificant. The exception occurred when the respondent had to drive 15 minutes out of the way to refuel the

modified vehicle. Eleven percent fewer respondents chose the regular vehicle if the modified vehicle did not pollute than if it polluted half as much as a regular vehicle.

The following sections look at the behavioral changes and the effect of price differentials on vehicle choice associated with each of the vehicle limitations.

## Giving Up Trunk Space

Potential vehicle purchasers were most reluctant to give up half the amount of trunk (cargo) space of their current vehicle even if it meant halving or eliminating the pollution produced in operating a vehicle. Vehicle choice was related to the size of the trunk of the consumer's current vehicle (Table 4.3.2).

**Table 4.3.2. Vehicle Preference Regarding Loss of One-Half Trunk Space, by Size of Current Vehicle Trunk, 1994**  
(Percent)

Trunk Size	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
Large .....	58	34	Q	48	40	Q
Medium .....	65	Q	Q	54	Q	Q
Small .....	44	51	Q	Q	60	Q
No Trunk .....	66	29	Q	71	Q	Q

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

As expected, those who currently had large or medium-sized trunks were less willing to replace their vehicle with one with only one-half the trunk space no matter how much pollution was reduced. This result suggests that a large trunk may have been an important factor in the purchasing decision of their current vehicle, and it continued to be a deciding factor in the selection of a new vehicle. Consumers whose current vehicles had small trunks were more likely to choose the modified vehicle, perhaps because trunk space was not as important as other considerations in their vehicle-purchasing decision.

A result that appears surprising is that the majority of respondents who reported that their current vehicle had no trunk at all were unwilling to buy the modified vehicle. The explanation lies in the wording of the trunk size and preference questions. The question concerning current vehicle trunk size was asked about the space contained in the trunk of the vehicle alone, while the vehicle preference question included both trunk space and cargo space. Therefore, a respondent who answered that the current vehicle had no trunk most often had a truck, van, station-wagon, or sport-utility vehicle; all have cargo space but no trunk. In fact, about 70 percent of those who stated that their current vehicle had no trunk were referring to one of these types of vehicles. Since these vehicles are often purchased for their hauling capacity, it makes sense that reducing the cargo space by one-half would not be a compromise many would be willing to make. For those respondents who were not referring to one of these types of vehicles (30 percent), it is feasible that they were referring to an automobile with a hatchback or whose back seat was used for cargo rather than passengers. It could also be that the respondent simply would not purchase another vehicle without a trunk or other cargo space again.

**Price Differential.** In both price cases, trunk (cargo) space seemed more important to consumers than \$1,000. Consumers who were willing to give up trunk (cargo) space were not willing to pay \$1,000 extra to do so. The question of how much pollution was reduced had little impact (Table 4.3.3). Consumers who chose the regular vehicle originally were not swayed

to choose the modified vehicle by \$1,000. The price reduction was little incentive to accept the reduction in trunk space for most people (Table 4.3.3).

**Table 4.3.3. Vehicle Preference Incorporating Price Differential Based on Original Vehicle Choice, 1994 (Percent)**

Differential Cost of Modified Vehicle	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
\$1,000 More . . . . .	68	26	Q	69	27	Q
\$1,000 Less . . . . .	88	Q	Q	79	Q	Q

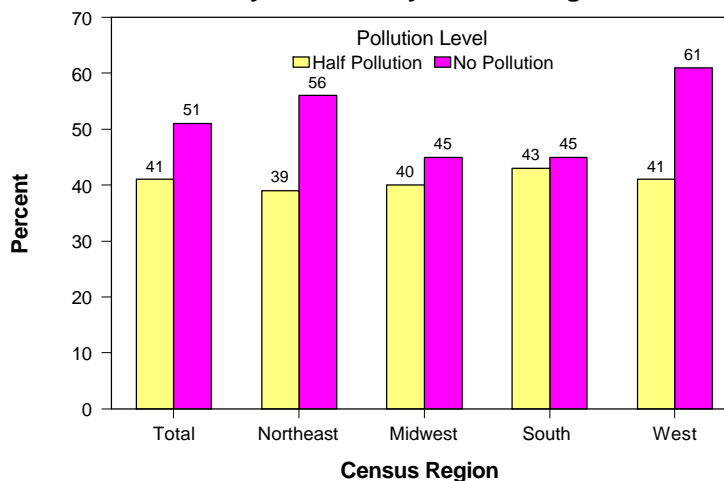
Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

### Driving 15 Minutes Out of the Way to Refuel

Respondents were nearly equally divided about whether they were willing to drive a short distance out of their way for fuel in order to drive a vehicle that pollutes less. Unlike giving up trunk space, willingness to purchase the modified vehicle did differ between the two pollution levels of the modified vehicle. Forty-one percent of the group given the half-polluting modified vehicle scenario and 51 percent of the non-polluting vehicle group were willing to travel 15 minutes out of their way. Consumers offered a vehicle that did not pollute at all chose the modified vehicle at a higher rate than those who were offered a vehicle that polluted only half as much. This trend was especially strong among respondents who live in the West or the Northeast. Figure 4.3.1 illustrates the difference between the two groups by Census region.

**Figure 4.3.1. Consumers Willing to Drive 15 Minutes Out of the Way to Refuel by Census Region**



Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

Respondents' willingness to drive 15 minutes out of the way to refuel did not appear to be affected by their usual frequency of gas purchase (Table 4.3.4).

**Table 4.3.4. Willingness to Drive 15 Minutes Out of the Way to Refuel by Frequency of Usual Gas Purchase, 1994**  
(Percent)

Frequency of Gas Purchase	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
Less than Once a Week .....	58	38	Q	45	51	Q
Once a Week .....	53	43	Q	42	51	Q
More than Once a Week .....	52	46	Q	45	46	Q

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Price Differential.** Nearly one-third of respondents who chose the regular vehicle over the modified vehicle that has to be driven 15 minutes out of the way to refuel said they would choose the modified vehicle if it cost \$1,000 less. There was practically no difference among the pollution-reduction level groups (Table 4.3.5).

On the other hand, when those who originally chose the modified vehicle were asked if they would pay an additional \$1,000 for the vehicle, over one-third said they would not. A larger percentage of potential consumers was “lost” because of a price increase than was “gained” from a price decrease (Table 4.3.5).

**Table 4.3.5. Vehicle Preference Incorporating Price Differential Based on Original Vehicle Choice, 1994**  
(Percent)

Differential Cost of Modified Vehicle	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
\$1,000 More .....	40	54	Q	33	61	Q
\$1,000 Less .....	68	29	Q	68	26	Q

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

## Refueling Twice as Often

Of the limitations specified in this study for the modified vehicle, the one that respondents seemed most willing to accept in order to reduce the amount of pollution emitted was refueling twice as often. More than half chose the modified vehicle, 54 percent among those offered a vehicle polluting half as much, and 57 percent among those offered the choice of a nonpolluting vehicle. Frequency of regular fuel purchases affected willingness to purchase the modified vehicle only minimally (Table 4.3.6). In the non-polluting modified vehicle cases, people who fueled once a week or more were more willing to refuel twice as often than those who refueled less than once a week.

**Table 4.3.6. Willingness Refuel Twice as Often by Frequency of Usual Gas Purchase, 1994**  
(Percent)

Frequency of Gas Purchase	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
Less than Once a Week .....	40	55	Q	39	53	Q
Once a Week .....	41	54	Q	33	61	Q
More than Once a Week .....	47	52	Q	40	56	Q

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Price Differential.** The price differential affected the original purchasing decision in much the same way as it affected the scenario requiring drivers to drive 15 minutes out of the way to refuel. The \$1,000 price increase persuaded more people to change their choice from the modified vehicle to the regular one than the \$1,000 price decrease persuaded people to choose the modified vehicle after choosing the regular one (Table 4.3.7).

**Table 4.3.7. Vehicle Preference Incorporating Price Differential Based on Original Vehicle Choice, 1994**  
(Percent)

Differential Cost of Modified Vehicle	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
\$1,000 More .....	37	56	Q	31	63	Q
\$1,000 Less .....	67	25	Q	72	22	Q

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

## Combinations of Vehicle Limitations

Table 4.3.8 presents vehicle preference estimates given different combinations of vehicle limitations. Only those who responded that they would choose the modified vehicle given the single limitation were asked about combinations of limitations. Therefore, the populations these estimates represent are depleted populations of the total (Figure 4.1.1).

**Table 4.3.8. Overview of Vehicle Preference by Combinations of Modified Vehicle Limitations for Depleted Populations, 1994**  
(Percent)

Vehicle Limitation	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
15 Minutes Out of the Way and One-half Trunk (Cargo) Space	49	48	Q	52	45	Q
Refuel Twice as Often and One-half Trunk (Cargo) Space . . . .	51	47	Q	46	52	Q
15 Minutes Out of the Way and Refuel Twice as Often . . . . .	24	75	Q	20	76	Q
15 Minutes Out of the Way, Refuel Twice as Often and One-half Trunk (Cargo) Space . . . .	38	61	Q	34	62	Q

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

The addition of limited trunk or cargo space in the modified vehicle lost, by far, the largest proportion of consumers willing to purchase a modified vehicle. How much pollution reduction the modified vehicle attained seemed to make little difference in vehicle choice.

Consumers who were willing to drive 15 minutes out of the way and refuel twice as often individually, were usually willing to do so in combination (75 percent and 76 percent). Of these, the addition of the loss of trunk (cargo) space lost a somewhat smaller proportion of people willing to buy the modified vehicle than in the double combinations involving trunk (cargo) space.

## Conclusions

Overall, consumers seem fairly willing to accept vehicles with characteristics of alternative-fuel vehicles. The scenarios of having to drive 15 minutes out of the way to fuel the modified vehicle and having to refuel the modified vehicle twice as often gained wider acceptance than the scenario in which trunk (cargo) space was reduced. Perhaps, this suggests that particular attention should be paid to solving the problem of limited trunk (cargo) space associated with those AFV's that require a great amount of space for fuel storage. There seemed to be a difference in vehicle preference when a price differential was introduced. More respondents were dissuaded from purchasing the modified vehicle if it cost \$1,000 more than were persuaded to purchase the modified vehicle if it cost \$1,000 less. For the most part, consumer preferences were not affected by how much pollution was reduced.

## 4.4. Detailed Tables



**Table 4.4.1. Consumer Characteristics by Level of Concern for the Environment, 1994**  
(Percent)

Consumer Characteristic	All Consumers	Level of Concern for Environment			
		Extremely Concerned	Very Concerned	Somewhat Concerned	Not Too Concerned
<b>Total</b> .....	100	100	100	100	100
<b>Census Region</b>					
Northeast .....	19	25	20	19	Q
Midwest .....	25	23	20	25	27
South .....	35	28	33	38	33
West .....	21	24	28	18	Q
<b>Sex of Respondent</b>					
Male .....	46	42	45	45	52
Female .....	55	58	55	55	48
<b>Age of Main Driver</b>					
16 to 24 .....	8	Q	Q	Q	Q
25 to 34 .....	22	20	22	24	27
35 to 44 .....	24	28	27	26	Q
45 to 54 .....	18	20	17	20	Q
55 or Older .....	28	26	25	22	33
<b>Education of Respondent</b>					
Elementary .....	Q	Q	Q	Q	Q
High School .....	40	39	37	42	55
College .....	45	48	46	46	31
Graduate School .....	13	Q	15	12	Q
<b>Race of Respondent</b>					
White .....	85	78	81	86	81
Black .....	9	Q	11	Q	Q
Asian .....	2	Q	Q	Q	Q
Other .....	5	Q	Q	Q	Q
<b>Household Income</b>					
\$30,000 or Less .....	34	31	31	30	36
More than \$30,000 .....	67	69	69	70	64
<b>Perception of Relative Safety of Fuels</b>					
<b>Natural Gas</b>					
Gasoline Safer .....	29	25	30	28	Q
Natural Gas Safer .....	18	20	19	16	Q
No Difference .....	29	32	28	30	32
Don't Know .....	25	23	23	26	34
<b>Propane</b>					
Gasoline Safer .....	41	39	39	44	37
Propane Safer .....	11	Q	12	10	Q
No Difference .....	28	27	31	26	29
Don't Know .....	20	20	17	20	25
<b>Electricity</b>					
Gasoline Safer .....	12	Q	Q	12	Q
Electricity Safer .....	62	55	69	62	52
No Difference .....	12	17	12	12	Q
Don't Know .....	13	Q	10	14	Q

See footnotes at end of table.

**Table 4.4.1. Consumer Characteristics by Level of Concern for the Environment, 1994 (Continued)**  
(Percent)

Consumer Characteristic	All Consumers	Level of Concern for Environment			
		Extremely Concerned	Very Concerned	Somewhat Concerned	Not Too Concerned
<b>Total</b> .....	100	100	100	100	100
<b>Heard of Alternative-Fuel Vehicles</b>					
No .....	15	16	13	14	Q
Yes .....	85	84	87	86	83
<b>How Much Heard About Alternative-Fuel Vehicles</b>					
Great Deal .....	29	42	33	22	Q
Some .....	33	21	35	36	29
Little .....	37	35	30	42	46
<b>How Dangerous is Pollution Caused by Motor Vehicles</b>					
Extremely .....	26	63	34	15	Q
Very .....	35	26	47	39	Q
Somewhat .....	31	Q	16	41	47
Not Very .....	Q	Q	Q	Q	Q
Not at All .....	Q	NC	Q	Q	Q
Don't Know .....	Q	Q	Q	Q	Q
<b>Are You an Environmentalist</b>					
No .....	50	32	39	59	65
Yes .....	48	66	60	39	35
<b>Member of Environmental Organization</b>					
No .....	78	74	81	76	Q
Yes .....	22	Q	Q	Q	NC

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.4.2. Consumer Characteristics by Census Region, 1994**  
(Percent)

Consumer Characteristic	All Consumers	Census Region			
		Northeast	Midwest	South	West
<b>Total</b> .....	100	100	100	100	100
<b>Sex of Respondent</b>					
Male .....	46	46	48	42	48
Female .....	55	54	52	58	52
<b>Age of Main Driver</b>					
16 to 24 .....	8	Q	Q	Q	Q
25 to 34 .....	22	21	21	23	23
35 to 44 .....	24	20	28	22	27
45 to 54 .....	18	21	17	18	16
55 or Older .....	28	29	27	29	24
<b>Education of Respondent</b>					
Elementary .....	Q	Q	Q	Q	Q
High School .....	40	43	42	42	40
College .....	45	43	45	45	42
Graduate School .....	13	13	10	10	15
<b>Race of Respondent</b>					
White .....	85	87	93	80	80
Black .....	9	Q	Q	16	Q
Asian .....	Q	Q	Q	Q	Q
Other .....	Q	Q	Q	Q	Q
<b>Number of Adults Over 18</b>					
One .....	23	21	23	20	27
Two .....	59	53	62	62	54
Three .....	13	14	Q	13	14
Four .....	Q	Q	Q	Q	Q
Five .....	Q	Q	Q	Q	Q
Six .....	Q	Q	Q	NC	Q
<b>Household Income</b>					
\$30,000 or Less .....	34	27	35	37	31
More than \$30,000 .....	67	73	65	63	69
<b>Type of Housing Unit</b>					
Apartment .....	15	13	15	13	20
Single-Family Detached .....	69	28	73	70	65
Townhouse .....	Q	Q	Q	Q	Q
Other .....	11	Q	10	12	Q
<b>Transportation Type Most Often Used</b>					
Public Transportation .....	Q	Q	Q	Q	Q
Personal Vehicles .....	87	81	91	86	88
<b>Respondent Concern for the Environment</b>					
Extremely Concerned .....	14	17	15	12	15
Very Concerned .....	39	38	34	38	47
Somewhat Concerned .....	42	40	45	46	33
Not too Concerned .....	Q	Q	Q	Q	Q

See footnotes at end of table.

**Table 4.4.2. Consumer Characteristics by Census Region, 1994 (Continued)**  
(Percent)

Consumer Characteristic	All Consumers	Census Region			
		Northeast	Midwest	South	West
<b>Total</b> .....	100	100	100	100	100
<b>Perception of Relative Safety of Fuels</b>					
<b>Natural Gas</b>					
Gasoline Safer .....	29	31	31	29	24
Natural Gas Safer .....	18	19	15	18	19
No Difference .....	29	25	31	29	29
Don't Know .....	25	25	23	24	28
<b>Propane</b>					
Gasoline Safer .....	41	45	43	40	38
Propane Safer .....	11	Q	10	13	Q
No Difference .....	28	25	28	27	30
Don't Know .....	20	19	19	20	20
<b>Electricity</b>					
Gasoline Safer .....	12	13	11	15	Q
Electricity Safer .....	62	62	62	57	68
No Difference .....	12	Q	14	14	Q
Don't Know .....	13	13	13	15	14

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.4.3. Vehicle Choice When Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994**  
(Percent)

Consumer Characteristic	Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	60	33	Q	55	35	Q
<b>Region</b>						
Northeast .....	44	42	Q	46	41	Q
Midwest .....	74	24	Q	54	41	Q
South .....	62	33	Q	55	32	Q
West .....	51	35	Q	62	Q	Q
<b>Number of Vehicles</b>						
One .....	64	27	Q	58	28	Q
Two .....	60	35	Q	46	43	Q
Three .....	48	46	Q	63	37	NC
Four or More .....	65	Q	Q	67	Q	NC
<b>Sex of Respondent</b>						
Male .....	65	29	Q	58	33	Q
Female .....	56	36	Q	52	36	Q
<b>Age of Main Driver</b>						
16 to 24 .....	62	Q	NC	Q	Q	NC
25 to 34 .....	45	49	Q	58	40	Q
35 to 44 .....	53	37	Q	52	42	Q
45 to 54 .....	71	Q	Q	49	41	Q
55 or Older .....	67	23	Q	57	25	Q
<b>Education of Respondent</b>						
Elementary .....	Q	Q	Q	Q	Q	Q
High School .....	63	31	Q	58	35	Q
College .....	52	39	Q	51	37	Q
Graduate School .....	75	Q	NC	59	Q	Q
<b>Race of Respondent</b>						
White .....	60	33	Q	53	36	Q
Black .....	63	37	NC	68	Q	Q
Asian .....	NC	Q	NC	Q	Q	Q
Other .....	Q	Q	Q	Q	Q	NC
<b>Household Income</b>						
\$30,000 or Less .....	64	27	Q	55	34	Q
More than \$30,000 .....	58	36	Q	55	35	Q
<b>Type of Housing Unit</b>						
Apartment .....	54	40	Q	49	44	Q
Single-Family Detached .....	63	30	Q	59	34	Q
Townhouse .....	Q	Q	Q	Q	NC	Q
Other .....	66	Q	Q	Q	Q	Q
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	Q	Q	NC	Q	Q	Q
Personal Vehicles .....	59	34	Q	56	33	Q
Both .....	Q	Q	Q	Q	Q	NC
Neither .....	NC	Q	NC	Q	NC	NC
Don't Know .....	Q	Q	NC	Q	Q	Q

See footnotes at end of table.

**Table 4.4.3. Vehicle Choice When Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	60	33	Q	55	35	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	61	Q	Q	Q	Q	Q
Very Concerned .....	53	41	Q	58	Q	Q
Somewhat Concerned .....	58	34	Q	53	41	Q
Not Too Concerned .....	77	Q	Q	Q	Q	Q
<b>Trunk Size</b>						
Large Trunk .....	58	34	Q	48	40	Q
Medium Trunk .....	65	Q	Q	54	Q	Q
Small Trunk .....	44	51	Q	Q	60	Q
No Trunk .....	66	29	Q	71	Q	Q
<b>More Than Half the Trunk Space Used</b>						
Yes .....	64	31	Q	64	26	Q
All the Time .....	70	Q	NC	67	Q	Q
Most of the Time .....	58	35	Q	82	Q	Q
Some of the Time .....	31	33	Q	68	Q	Q
Rarely .....	73	Q	Q	52	46	Q
No .....	54	36	Q	46	42	Q
<b>Things Stored or Left in Trunk</b>						
Yes .....	64	36	NC	73	Q	Q
No .....	58	32	Q	34	Q	Q
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	67	28	Q	55	33	Q
Once a Week .....	51	39	Q	52	35	Q
More than Once a Week .....	69	28	Q	60	40	NC
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	54	32	Q	46	49	Q
Does Fill Tank .....	61	33	Q	56	33	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.4.4. Vehicle Choice When Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle and the Modified Vehicle Costs \$1,000 More, 1994**  
(Percent)

Consumer Characteristic	Half Trunk/Cargo Space and Costs \$1,000 More					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	68	26	Q	69	27	Q
<b>Region</b>						
Northeast .....	83	Q	Q	64	Q	NC
Midwest .....	63	Q	Q	67	Q	NC
South .....	65	Q	Q	69	Q	Q
West .....	Q	Q	NC	Q	Q	NC
<b>Number of Vehicles</b>						
One .....	73	Q	Q	79	Q	Q
Two .....	65	Q	Q	65	Q	Q
Three .....	73	Q	NC	80	Q	NC
Four or More .....	Q	Q	NC	Q	Q	Q
<b>Sex of Respondent</b>						
Male .....	60	37	Q	55	38	Q
Female .....	74	Q	Q	78	Q	Q
<b>Age of Main Driver</b>						
16 to 24 .....	Q	Q	Q	Q	Q	NC
25 to 34 .....	85	Q	Q	58	Q	NC
35 to 44 .....	57	Q	Q	72	Q	Q
45 to 54 .....	Q	Q	Q	81	Q	NC
55 or Older .....	61	Q	Q	62	Q	Q
<b>Education of Respondent</b>						
Elementary .....	Q	Q	NC	NC	Q	NC
High School .....	67	Q	Q	77	Q	Q
College .....	69	Q	Q	65	Q	Q
Graduate School .....	Q	Q	NC	Q	Q	Q
<b>Race of Respondent</b>						
White .....	71	23	Q	65	30	Q
Black .....	Q	Q	Q	Q	NC	NC
Asian .....	Q	NC	NC	NC	Q	NC
Other .....	Q	Q	NC	Q	NC	NC
<b>Household Income</b>						
\$30,000 or Less .....	69	Q	Q	89	Q	NC
More than \$30,000 .....	67	27	Q	55	37	Q
<b>Type of Housing Unit</b>						
Apartment .....	83	Q	Q	95	NC	Q
Single-Family Detached .....	60	34	Q	58	32	Q
Townhouse .....	Q	NC	NC	NC	NC	NC
Other .....	Q	Q	Q	Q	NC	NC
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	Q	NC	NC	Q	Q	NC
Personal Vehicles .....	68	25	Q	75	Q	Q
Both .....	Q	NC	NC	Q	Q	NC
Neither .....	Q	NC	NC	NC	NC	NC
Don't Know .....	Q	NC	NC	Q	NC	NC

See footnotes at end of table.

**Table 4.4.4. Vehicle Choice When Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle and the Modified Vehicle Costs \$1,000 More, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Half Trunk/Cargo Space and Costs \$1,000 More					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	68	26	Q	69	27	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	Q	Q	NC	Q	NC	NC
Very Concerned .....	55	Q	Q	Q	Q	Q
Somewhat Concerned .....	64	Q	Q	63	Q	Q
Not Too Concerned .....	Q	Q	Q	Q	Q	NC
<b>Trunk Size</b>						
Large Trunk .....	65	33	Q	60	35	Q
Medium Trunk .....	Q	NC	Q	Q	Q	Q
Small Trunk .....	62	Q	Q	63	Q	Q
No Trunk .....	78	Q	Q	87	Q	NC
<b>More Than Half the Trunk Space Used</b>						
Yes .....	65	Q	Q	57	Q	Q
All the Time .....	Q	Q	NC	Q	NC	NC
Most of the Time .....	Q	Q	Q	NC	Q	Q
Some of the Time .....	65	Q	Q	Q	Q	Q
Rarely .....	Q	Q	NC	Q	Q	NC
No .....	73	Q	Q	72	Q	Q
<b>Things Stored or Left in Trunk</b>						
Yes .....	80	Q	NC	Q	Q	NC
No .....	55	Q	Q	Q	Q	Q
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	77	Q	Q	59	37	Q
Once a Week .....	66	Q	Q	82	Q	Q
More than Once a Week .....	Q	Q	Q	Q	Q	Q
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	71	Q	Q	84	Q	Q
Does Fill Tank .....	67	28	Q	65	31	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's .

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.



**Table 4.4.5. Vehicle Choice When Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle and the Modified Vehicle Costs \$1,000 Less, 1994**  
(Percent)

Consumer Characteristic	Half Trunk/Cargo Space and Costs \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	88	Q	Q	79	Q	Q
<b>Region</b>						
Northeast .....	95	Q	NC	73	Q	NC
Midwest .....	86	Q	Q	80	Q	Q
South .....	92	Q	Q	83	Q	Q
West .....	75	Q	Q	75	Q	Q
<b>Number of Vehicles</b>						
One .....	85	Q	Q	71	Q	Q
Two .....	90	Q	Q	92	Q	Q
Three .....	86	Q	NC	77	Q	NC
Four or More .....	90	NC	Q	85	Q	Q
<b>Sex of Respondent</b>						
Male .....	90	Q	Q	87	Q	Q
Female .....	85	Q	Q	73	Q	Q
<b>Age of Main Driver</b>						
16 to 24 .....	Q	Q	Q	Q	Q	Q
25 to 34 .....	92	Q	Q	82	Q	NC
35 to 44 .....	84	Q	NC	97	NC	Q
45 to 54 .....	90	Q	Q	76	Q	NC
55 or Older .....	93	Q	Q	73	Q	Q
<b>Education of Respondent</b>						
Elementary .....	Q	NC	NC	Q	Q	NC
High School .....	84	Q	Q	78	Q	Q
College .....	93	Q	Q	83	Q	Q
Graduate School .....	89	Q	Q	Q	Q	Q
<b>Race of Respondent</b>						
White .....	86	Q	Q	82	Q	Q
Black .....	94	Q	NC	77	Q	Q
Asian .....	NC	NC	NC	Q	Q	Q
Other .....	Q	NC	NC	Q	NC	NC
<b>Household Income</b>						
\$30,000 or Less .....	88	Q	Q	76	Q	Q
More than \$30,000 .....	87	Q	Q	82	Q	Q
<b>Type of Housing Unit</b>						
Apartment .....	67	Q	Q	72	Q	NC
Single-Family Detached .....	89	Q	Q	79	Q	Q
Townhouse .....	Q	NC	NC	Q	NC	Q
Other .....	100	NC	NC	Q	NC	NC
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	Q	NC	NC	Q	NC	NC
Personal Vehicles .....	86	Q	Q	76	Q	Q
Both .....	Q	Q	NC	Q	NC	NC
Neither .....	NC	NC	NC	Q	NC	NC
Don't Know .....	Q	NC	NC	Q	NC	Q

See footnotes at end of table.

**Table 4.4.5. Vehicle Choice When Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle and the Modified Vehicle Costs \$1,000 Less, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Half Trunk/Cargo Space and Costs \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	88	Q	Q	79	Q	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	Q	Q	NC	Q	Q	NC
Very Concerned .....	88	Q	NC	68	Q	Q
Somewhat Concerned .....	81	Q	Q	89	Q	Q
Not Too Concerned .....	100	NC	NC	Q	Q	Q
<b>Trunk Size</b>						
Large Trunk .....	87	Q	Q	73	Q	Q
Medium Trunk .....	87	Q	Q	75	Q	NC
Small Trunk .....	89	Q	Q	91	NC	Q
No Trunk .....	89	Q	Q	85	Q	NC
<b>More Than Half the Trunk Space Used</b>						
Yes .....	89	Q	Q	78	Q	Q
All the Time .....	89	NC	Q	Q	NC	Q
Most of the Time .....	89	Q	NC	Q	Q	NC
Some of the Time .....	86	Q	Q	83	Q	NC
Rarely .....	92	Q	NC	87	Q	NC
No .....	86	Q	Q	81	Q	Q
<b>Things Stored or Left in Trunk</b>						
Yes .....	85	Q	Q	82	Q	Q
No .....	90	Q	Q	69	Q	Q
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	90	Q	Q	83	Q	Q
Once a Week .....	90	Q	Q	79	Q	Q
More than Once a Week .....	74	Q	NC	69	Q	NC
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	71	Q	Q	74	Q	NC
Does Fill Tank .....	90	Q	Q	80	Q	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.4.6. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle, 1994**  
(Percent)

Consumer Characteristic	Consumer Must Drive 15 Minutes Out of the Way to Buy Fuel					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	55	41	Q	44	51	Q
<b>Region</b>						
Northeast .....	56	39	Q	39	56	Q
Midwest .....	56	40	Q	50	45	Q
South .....	52	43	Q	48	45	Q
West .....	57	41	Q	36	61	Q
<b>Number of Vehicles</b>						
One .....	52	42	Q	42	51	Q
Two .....	60	37	Q	45	49	Q
Three .....	50	47	Q	44	53	Q
Four or More .....	45	51	Q	51	48	Q
<b>Sex of Respondent</b>						
Male .....	58	40	Q	43	54	Q
Female .....	53	42	Q	45	48	Q
<b>Age of Main Driver</b>						
16 to 24 .....	48	48	Q	38	53	Q
25 to 34 .....	53	44	Q	45	50	Q
35 to 44 .....	54	44	Q	39	58	Q
45 to 54 .....	55	43	Q	45	50	Q
55 or Older .....	60	32	Q	47	45	Q
<b>Education of Respondent</b>						
Elementary .....	68	Q	Q	Q	Q	Q
High School .....	58	37	Q	48	47	Q
College .....	51	45	Q	43	51	Q
Graduate School .....	55	42	Q	33	64	Q
<b>Race of Respondent</b>						
White .....	56	40	Q	43	51	Q
Black .....	50	48	Q	47	47	Q
Asian .....	Q	Q	NC	Q	Q	Q
Other .....	48	49	Q	46	48	Q
<b>Household Income</b>						
\$30,000 or Less .....	53	42	Q	44	48	Q
More than \$30,000 .....	56	41	Q	44	52	Q
<b>Type of Housing Unit</b>						
Apartment .....	47	48	Q	35	56	Q
Single-Family Detached .....	58	38	Q	49	47	Q
Townhouse .....	53	44	Q	35	64	Q
Other .....	48	50	Q	29	59	Q
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	Q	Q	Q	39	57	Q
Personal Vehicles .....	58	39	Q	45	49	Q
Both .....	53	44	Q	32	61	Q
Neither .....	Q	NC	NC	Q	NC	NC
Don't Know .....	Q	Q	Q	Q	Q	Q

See footnotes at end of table.

**Table 4.4.6. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Consumer Must Drive 15 Minutes Out of the Way to Buy Fuel					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	55	41	Q	44	51	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	38	56	Q	28	68	Q
Very Concerned .....	50	47	Q	36	59	Q
Somewhat Concerned .....	56	42	Q	48	47	Q
Not Too Concerned .....	64	Q	Q	52	48	NC
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	58	38	Q	45	51	Q
Once a Week .....	53	43	Q	42	51	Q
More than Once a Week .....	52	46	Q	45	46	Q
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	59	38	Q	41	52	Q
Does Fill Tank .....	54	42	Q	44	50	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.4.7. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle and the Modified Vehicle Costs \$1,000 More, 1994**  
(Percent)

Consumer Characteristic	Drive 15 Minutes Out of the Way for Fuel and Modified Vehicle Costs \$1,000 More					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	40	54	Q	33	61	Q
<b>Region</b>						
Northeast .....	48	45	Q	28	65	Q
Midwest .....	36	52	Q	35	61	Q
South .....	42	55	Q	34	60	Q
West .....	36	62	Q	37	59	Q
<b>Number of Vehicles</b>						
One .....	39	53	Q	35	59	Q
Two .....	43	51	Q	32	62	Q
Three .....	42	55	Q	31	67	Q
Four or More .....	Q	67	Q	35	53	Q
<b>Sex of Respondent</b>						
Male .....	41	54	Q	37	56	Q
Female .....	40	53	Q	30	66	Q
<b>Age of Main Driver</b>						
16 to 24 .....	32	68	NC	Q	60	Q
25 to 34 .....	40	57	Q	38	61	Q
35 to 44 .....	47	49	Q	27	68	Q
45 to 54 .....	48	48	Q	33	64	Q
55 or Older .....	29	54	Q	36	51	Q
<b>Education of Respondent</b>						
Elementary .....	Q	Q	NC	Q	Q	Q
High School .....	33	61	Q	31	63	Q
College .....	42	50	Q	33	63	Q
Graduate School .....	58	42	NC	35	57	Q
<b>Race of Respondent</b>						
White .....	42	52	Q	33	60	Q
Black .....	Q	60	Q	35	65	NC
Asian .....	Q	Q	NC	Q	Q	Q
Other .....	Q	67	Q	Q	55	NC
<b>Household Income</b>						
\$30,000 or Less .....	43	48	Q	34	61	Q
More than \$30,000 .....	38	57	Q	33	61	Q
<b>Type of Housing Unit</b>						
Apartment .....	37	53	Q	41	56	Q
Single-Family Detached .....	40	54	Q	34	60	Q
Townhouse .....	Q	Q	NC	Q	82	Q
Other .....	45	51	Q	33	63	Q
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	Q	Q	Q	Q	73	Q
Personal Vehicles .....	42	53	Q	34	60	Q
Both .....	Q	56	Q	34	64	Q
Don't Know .....	Q	Q	NC	Q	Q	Q

See footnotes at end of table.

**Table 4.4.7. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle and the Modified Vehicle Costs \$1,000 More, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Drive 15 Minutes Out of the Way for Fuel and Modified Vehicle Costs \$1,000 More					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	40	54	Q	33	61	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	Q	62	Q	Q	87	Q
Very Concerned .....	31	63	Q	24	68	Q
Somewhat Concerned .....	48	47	Q	44	53	Q
Not Too Concerned .....	Q	Q	Q	Q	Q	Q
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	39	58	Q	35	60	Q
Once a Week .....	38	53	Q	33	61	Q
More than Once a Week .....	49	48	Q	28	65	Q
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	45	44	Q	45	48	Q
Does Fill Tank .....	39	55	Q	32	63	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.4.8. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle and the Modified Vehicle Costs \$1,000 Less, 1994**  
(Percent)

Consumer Characteristic	Drive 15 Minutes Out of the Way for Fuel and Modified Vehicle Costs \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	68	29	Q	68	26	Q
<b>Region</b>						
Northeast .....	68	30	Q	53	37	Q
Midwest .....	72	23	Q	73	24	Q
South .....	67	29	Q	72	24	Q
West .....	58	36	Q	68	Q	Q
<b>Number of Vehicles</b>						
One .....	66	29	Q	62	30	Q
Two .....	68	29	Q	69	26	Q
Three .....	64	30	Q	76	Q	Q
Four or More .....	67	Q	NC	79	Q	NC
<b>Sex of Respondent</b>						
Male .....	65	31	Q	72	25	Q
Female .....	68	28	Q	65	27	Q
<b>Age of Main Driver</b>						
16 to 24 .....	45	47	Q	53	Q	Q
25 to 34 .....	68	31	Q	72	24	Q
35 to 44 .....	68	28	Q	71	24	Q
45 to 54 .....	77	Q	Q	66	28	Q
55 or Older .....	64	29	Q	67	23	Q
<b>Education of Respondent</b>						
Elementary .....	Q	Q	Q	Q	Q	NC
High School .....	69	26	Q	64	33	Q
College .....	65	33	Q	74	18	Q
Graduate School .....	68	Q	Q	64	Q	Q
<b>Race of Respondent</b>						
White .....	66	29	Q	70	23	Q
Black .....	76	Q	NC	53	41	Q
Asian .....	Q	Q	NC	Q	Q	NC
Other .....	66	Q	NC	Q	Q	Q
<b>Household Income</b>						
\$30,000 or Less .....	66	28	Q	61	34	Q
More than \$30,000 .....	67	30	Q	71	22	Q
<b>Type of Housing Unit</b>						
Apartment .....	64	29	Q	58	40	Q
Single-Family Detached .....	67	29	Q	70	24	Q
Townhouse .....	82	Q	Q	72	Q	Q
Other .....	58	36	Q	60	Q	Q
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	Q	Q	NC	Q	Q	Q
Personal Vehicles .....	65	30	Q	68	27	Q
Both .....	67	Q	Q	58	Q	Q
Neither .....	Q	NC	NC	Q	NC	NC
Don't Know .....	Q	Q	NC	Q	Q	NC

See footnotes at end of table.

**Table 4.4.8. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle and the Modified Vehicle Costs \$1,000 Less, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Drive 15 Minutes Out of the Way for Fuel and Modified Vehicle Costs \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	68	29	Q	68	26	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	69	Q	Q	72	Q	Q
Very Concerned .....	68	29	Q	62	34	Q
Somewhat Concerned .....	65	30	Q	71	22	Q
Not Too Concerned .....	84	Q	Q	66	Q	NC
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	64	30	Q	69	24	Q
Once a Week .....	66	31	Q	67	28	Q
More than Once a Week .....	77	Q	Q	69	Q	Q
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	61	29	Q	80	Q	NC
Does Fill Tank .....	68	29	Q	67	27	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.



**Table 4.4.9. Vehicle Choice When Consumer Must Refuel the Modified Vehicle Twice as Often as a Regular Vehicle, 1994**  
(Percent)

Consumer Characteristic	Modified Vehicle Must be Fueled Twice as Often					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	42	54	Q	37	57	Q
<b>Region</b>						
Northeast .....	37	58	Q	33	60	Q
Midwest .....	43	53	Q	42	55	Q
South .....	46	49	Q	36	58	Q
West .....	36	61	Q	36	55	Q
<b>Number of Vehicles</b>						
One .....	43	52	Q	39	53	Q
Two .....	40	55	Q	33	61	Q
Three .....	46	51	Q	36	63	Q
Four or More .....	36	62	Q	42	51	Q
<b>Sex of Respondent</b>						
Male .....	45	51	Q	37	58	Q
Female .....	39	57	Q	36	56	Q
<b>Age of Main Driver</b>						
16 to 24 .....	30	67	Q	Q	78	Q
25 to 34 .....	42	54	Q	37	60	Q
35 to 44 .....	34	63	Q	31	65	Q
45 to 54 .....	42	54	Q	33	58	Q
55 or Older .....	51	42	Q	48	42	Q
<b>Education of Respondent</b>						
Elementary .....	60	40	NC	50	Q	Q
High School .....	52	44	Q	41	54	Q
College .....	31	65	Q	36	57	Q
Graduate School .....	36	56	Q	24	71	Q
<b>Race of Respondent</b>						
White .....	42	54	Q	36	57	Q
Black .....	52	44	Q	45	52	Q
Asian .....	Q	83	Q	Q	57	Q
Other .....	31	68	Q	Q	65	Q
<b>Household Income</b>						
\$30,000 or Less .....	48	47	Q	40	53	Q
More than \$30,000 .....	38	58	Q	35	59	Q
<b>Type of Housing Unit</b>						
Apartment .....	37	58	Q	37	58	Q
Single-Family Detached .....	43	53	Q	38	56	Q
Townhouse .....	36	61	Q	Q	67	Q
Other .....	39	56	Q	31	61	Q
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	Q	Q	NC	36	60	Q
Personal Vehicles .....	43	53	Q	37	56	Q
Both .....	31	61	Q	25	69	Q
Neither .....	Q	NC	NC	Q	Q	NC
Don't Know .....	Q	Q	NC	Q	Q	Q

See footnotes at end of table.

**Table 4.4.9. Vehicle Choice When Consumer Must Refuel the Modified Vehicle Twice as Often as a Regular Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Modified Vehicle Must be Fueled Twice as Often					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	42	54	Q	37	57	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	24	72	Q	Q	79	Q
Very Concerned .....	32	63	Q	26	68	Q
Somewhat Concerned .....	38	58	Q	41	52	Q
Not Too Concerned .....	51	40	Q	57	41	Q
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	40	55	Q	39	53	Q
Once a Week .....	41	54	Q	33	61	Q
More than Once a Week .....	47	52	Q	40	56	Q
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	50	46	Q	37	56	Q
Does Fill Tank .....	40	56	Q	36	57	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.4.10. Vehicle Choice When Consumer Must Refuel the Modified Vehicle Twice as Often as a Regular Vehicle and the Modified Vehicle Costs \$1,000 More, 1994**  
(Percent)

Consumer Characteristic	Must Refuel Twice as Often and Vehicle Cost \$1,000 More					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	37	56	Q	31	63	Q
<b>Region</b>						
Northeast .....	30	62	Q	24	70	Q
Midwest .....	37	49	Q	31	62	Q
South .....	44	51	Q	33	60	Q
West .....	31	64	Q	32	61	Q
<b>Number of Vehicles</b>						
One .....	35	54	Q	29	63	Q
Two .....	38	56	Q	34	59	Q
Three .....	33	59	Q	26	73	Q
Four or More .....	40	57	Q	Q	73	NC
<b>Sex of Respondent</b>						
Male .....	40	53	Q	36	59	Q
Female .....	33	57	Q	26	67	Q
<b>Age of Main Driver</b>						
16 to 24 .....	33	67	NC	36	57	Q
25 to 34 .....	37	56	Q	30	68	Q
35 to 44 .....	38	56	Q	24	73	Q
45 to 54 .....	38	54	Q	35	60	Q
55 or Older .....	34	49	Q	34	50	Q
<b>Education of Respondent</b>						
Elementary .....	Q	Q	NC	Q	Q	NC
High School .....	35	59	Q	29	61	Q
College .....	37	53	Q	32	64	Q
Graduate School .....	41	51	Q	25	71	Q
<b>Race of Respondent</b>						
White .....	39	52	Q	33	61	Q
Black .....	Q	65	Q	Q	70	Q
Asian .....	Q	Q	NC	Q	Q	Q
Other .....	Q	81	NC	NC	87	Q
<b>Household Income</b>						
\$30,000 or Less .....	41	48	Q	31	63	Q
More than \$30,000 .....	34	59	Q	31	63	Q
<b>Type of Housing Unit</b>						
Apartment .....	37	54	Q	37	57	Q
Single-Family Detached .....	35	56	Q	31	63	Q
Townhouse .....	Q	63	NC	Q	65	Q
Other .....	42	51	Q	Q	70	Q
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	Q	Q	Q	Q	72	NC
Personal Vehicles .....	38	56	Q	31	62	Q
Both .....	Q	58	Q	Q	65	Q
Neither .....	NC	NC	NC	NC	Q	NC
Don't Know .....	Q	Q	Q	Q	Q	Q

See footnotes at end of table.

**Table 4.4.10. Vehicle Choice When Consumer Must Refuel the Modified Vehicle Twice as Often as a Regular Vehicle and the Modified Vehicle Costs \$1,000 More, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Must Refuel Twice as Often and Vehicle Cost \$1,000 More					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	37	56	Q	31	63	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	Q	78	Q	Q	80	Q
Very Concerned .....	28	66	Q	22	71	Q
Somewhat Concerned .....	50	42	Q	40	56	Q
Not Too Concerned .....	Q	Q	Q	Q	Q	Q
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	34	58	Q	36	59	Q
Once a Week .....	37	55	Q	25	69	Q
More than Once a Week .....	42	49	Q	35	56	Q
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	41	52	Q	31	69	NC
Does Fill Tank .....	36	56	Q	31	62	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.4.11. Vehicle Choice When Consumer Must Refuel the Modified Vehicle Twice as Often as a Regular Vehicle and the Modified Vehicle Costs \$1,000 Less, 1994**  
(Percent)

Consumer Characteristic	Must Fuel Twice as Often but Vehicle Costs \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	67	25	Q	72	22	Q
<b>Region</b>						
Northeast .....	52	38	Q	62	36	Q
Midwest .....	74	20	Q	66	24	Q
South .....	71	20	Q	77	21	Q
West .....	59	35	Q	80	Q	Q
<b>Number of Vehicles</b>						
One .....	64	27	Q	74	20	Q
Two .....	70	23	Q	73	22	Q
Three .....	71	Q	Q	59	34	Q
Four or More .....	53	Q	Q	77	Q	Q
<b>Sex of Respondent</b>						
Male .....	72	21	Q	81	Q	Q
Female .....	62	30	Q	64	30	Q
<b>Age of Main Driver</b>						
16 to 24 .....	51	49	NC	Q	Q	NC
25 to 34 .....	64	32	Q	77	Q	Q
35 to 44 .....	68	23	Q	77	Q	Q
45 to 54 .....	69	29	Q	65	34	Q
55 or Older .....	71	Q	Q	69	22	Q
<b>Education of Respondent</b>						
Elementary .....	79	Q	Q	Q	Q	Q
High School .....	66	25	Q	71	24	Q
College .....	68	27	Q	73	20	Q
Graduate School .....	60	Q	Q	73	Q	Q
<b>Race of Respondent</b>						
White .....	66	26	Q	71	23	Q
Black .....	74	Q	Q	72	Q	NC
Asian .....	NC	Q	NC	Q	NC	Q
Other .....	81	Q	Q	Q	Q	NC
<b>Household Income</b>						
\$30,000 or Less .....	66	22	Q	73	21	Q
More than \$30,000 .....	68	28	Q	71	23	Q
<b>Type of Housing Unit</b>						
Apartment .....	60	34	Q	80	Q	Q
Single-Family Detached .....	70	22	Q	70	22	Q
Townhouse .....	Q	Q	Q	Q	Q	NC
Other .....	53	37	Q	64	36	NC
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	Q	Q	NC	Q	Q	NC
Personal Vehicles .....	65	26	Q	71	22	Q
Both .....	82	Q	NC	76	Q	Q
Neither .....	NC	Q	NC	Q	NC	NC
Don't Know .....	Q	Q	NC	Q	Q	NC

See footnotes at end of table.

**Table 4.4.11. Vehicle Choice When Consumer Must Refuel the Modified Vehicle Twice as Often as a Regular Vehicle and the Modified Vehicle Costs \$1,000 Less, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Must Fuel Twice as Often but Vehicle Costs \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	67	25	Q	72	22	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	48	47	Q	82	Q	NC
Very Concerned .....	68	24	Q	78	Q	Q
Somewhat Concerned .....	64	26	Q	77	18	Q
Not Too Concerned .....	90	Q	NC	Q	Q	Q
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	66	24	Q	67	23	Q
Once a Week .....	67	26	Q	75	22	Q
More than Once a Week .....	69	Q	Q	79	Q	Q
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	60	33	Q	79	Q	NC
Does Fill Tank .....	68	24	Q	71	22	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.4.12. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle and the Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994**  
(Percent)

Consumer Characteristic	Consumer Must Drive 15 Minutes Out of the Way and Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	49	48	Q	52	45	Q
<b>Region</b>						
Northeast .....	68	Q	NC	54	39	Q
Midwest .....	40	60	NC	47	50	Q
South .....	54	44	Q	54	44	Q
West .....	38	54	Q	49	49	Q
<b>Number of Vehicles</b>						
One .....	42	56	Q	50	48	Q
Two .....	52	44	Q	53	40	Q
Three .....	58	Q	NC	Q	Q	NC
Four or More .....	Q	Q	NC	Q	Q	NC
<b>Sex of Respondent</b>						
Male .....	51	48	Q	50	45	Q
Female .....	48	49	Q	54	45	Q
<b>Age of Main Driver</b>						
16 to 24 .....	Q	Q	NC	Q	Q	NC
25 to 34 .....	55	43	Q	56	41	Q
35 to 44 .....	35	65	NC	62	38	NC
45 to 54 .....	64	Q	NC	58	42	NC
55 or Older .....	42	50	Q	44	48	Q
<b>Education of Respondent</b>						
Elementary .....	Q	Q	NC	Q	Q	NC
High School .....	49	48	Q	42	55	Q
College .....	52	48	NC	57	38	Q
Graduate School .....	Q	Q	Q	63	Q	NC
<b>Race of Respondent</b>						
White .....	51	46	Q	41	45	Q
Black .....	Q	Q	NC	61	Q	NC
Asian .....	Q	Q	NC	Q	Q	NC
Other .....	Q	Q	NC	Q	Q	NC
<b>Household Income</b>						
\$30,000 or Less .....	29	69	Q	37	58	Q
More than \$30,000 .....	60	37	Q	59	38	Q
<b>Type of Housing Unit</b>						
Apartment .....	Q	60	Q	45	50	Q
Single-Family Detached .....	51	47	Q	53	43	Q
Townhouse .....	Q	Q	NC	Q	Q	NC
Other .....	Q	47	Q	58	Q	NC
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	Q	NC	NC	Q	Q	NC
Personal Vehicles .....	51	46	Q	53	42	Q
Both .....	Q	Q	NC	Q	Q	NC
Neither .....	NC	NC	NC	NC	NC	NC
Don't Know .....	NC	Q	NC	Q	Q	NC

See footnotes at end of table.

**Table 4.4.12. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle and the Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Consumer Must Drive 15 Minutes Out of the Way and Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	49	48	Q	52	45	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	Q	Q	Q	Q	Q	NC
Very Concerned .....	48	52	NC	41	54	Q
Somewhat Concerned .....	50	50	NC	62	33	Q
Not Too Concerned .....	Q	Q	Q	Q	Q	NC
<b>Trunk Size</b>						
Large Trunk .....	48	19	Q	48	50	Q
Medium Trunk .....	Q	Q	Q	53	Q	Q
Small Trunk .....	Q	Q	NC	Q	Q	Q
No Trunk .....	54	45	Q	56	42	Q
<b>More Than Half the Trunk Space Used</b>						
Yes .....	49	47	Q	59	40	Q
All the Time .....	Q	Q	NC	Q	Q	NC
Most of the Time .....	Q	Q	NC	67	Q	NC
Some of the Time .....	55	42	Q	58	42	NC
Rarely .....	Q	67	Q	55	40	Q
No .....	49	51	NC	46	48	Q
<b>Things Stored or Left in Trunk</b>						
Yes .....	53	Q	Q	57	43	NC
No .....	61	39	NC	62	Q	NC
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	55	43	Q	54	45	Q
Once a Week .....	44	54	Q	47	46	Q
More than Once a Week .....	52	45	Q	60	Q	NC
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	Q	57	Q	Q	61	NC
Does Fill Tank .....	51	46	Q	54	43	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.



**Table 4.4.13. Vehicle Choice When Consumer Must Refuel Modified Vehicle Twice as Often as a Regular Vehicle and the Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994**  
(Percent)

Consumer Characteristic	Must Fuel Twice as Often and Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	51	47	Q	46	52	Q
<b>Region</b>						
Northeast .....	49	49	Q	46	51	Q
Midwest .....	33	62	Q	50	46	Q
South .....	52	46	Q	44	54	Q
West .....	68	32	NC	44	56	NC
<b>Number of Vehicles</b>						
One .....	48	48	Q	50	48	Q
Two .....	51	48	Q	44	53	Q
Three .....	44	52	Q	49	51	NC
Four or More .....	69	Q	NC	Q	66	NC
<b>Sex of Respondent</b>						
Male .....	50	47	Q	54	45	Q
Female .....	51	48	Q	39	57	Q
<b>Age of Main Driver</b>						
16 to 24 .....	Q	65	NC	Q	Q	NC
25 to 34 .....	43	56	Q	45	52	Q
35 to 44 .....	53	47	NC	49	47	Q
45 to 54 .....	62	31	Q	40	60	NC
55 or Older .....	53	44	Q	43	53	Q
<b>Education of Respondent</b>						
Elementary .....	Q	Q	NC	Q	Q	NC
High School .....	52	47	Q	42	53	Q
College .....	48	48	Q	49	49	Q
Graduate School .....	54	43	Q	43	57	NC
<b>Race of Respondent</b>						
White .....	53	44	Q	47	50	Q
Black .....	Q	93	NC	Q	54	NC
Asian .....	Q	Q	NC	Q	Q	NC
Other .....	Q	Q	Q	Q	Q	NC
<b>Household Income</b>						
\$30,000 or Less .....	50	47	Q	38	57	Q
More than \$30,000 .....	51	47	Q	49	50	Q
<b>Type of Housing Unit</b>						
Apartment .....	54	46	NC	Q	58	Q
Single-Family Detached .....	51	46	Q	48	51	Q
Townhouse .....	Q	Q	NC	Q	Q	NC
Other .....	Q	61	Q	Q	62	Q
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	Q	Q	NC	Q	Q	NC
Personal Vehicles .....	51	47	Q	47	51	Q
Both .....	Q	Q	NC	Q	Q	Q
Neither .....	NC	NC	NC	NC	Q	NC
Don't Know .....	Q	NC	NC	Q	NC	NC

See footnotes at end of table.

**Table 4.4.13. Vehicle Choice When Consumer Must Refuel Modified Vehicle Twice as Often as a Regular Vehicle and the Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Must Fuel Twice as Often and Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	51	47	Q	46	52	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	39	58	Q	41	49	Q
Very Concerned .....	57	42	Q	43	57	NC
Somewhat Concerned .....	57	41	Q	48	50	Q
Not Too Concerned .....	Q	Q	Q	Q	Q	NC
<b>Trunk Size</b>						
Large Trunk .....	29	69	Q	28	69	Q
Medium Trunk .....	47	48	Q	57	Q	Q
Small Trunk .....	41	59	NC	44	56	NC
No Trunk .....	74	23	Q	65	35	NC
<b>More Than Half the Trunk Space Used</b>						
Yes .....	55	43	Q	52	46	Q
All the Time .....	Q	Q	Q	Q	Q	NC
Most of the Time .....	66	Q	Q	56	Q	NC
Some of the Time .....	56	44	NC	62	36	Q
Rarely .....	42	58	NC	35	60	Q
No .....	47	51	Q	38	61	Q
<b>Things Stored or Left in Trunk</b>						
Yes .....	57	36	Q	57	43	NC
No .....	61	39	NC	60	38	Q
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	54	42	Q	45	51	Q
Once a Week .....	49	51	Q	47	52	Q
More than Once a Week .....	43	55	Q	45	55	NC
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	55	45	NC	49	51	NC
Does Fill Tank .....	50	47	Q	45	52	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.4.14. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel Modified Vehicle and Modified Vehicle Must be Refueled Twice as Often as a Regular Vehicle, 1994**  
(Percent)

Consumer Characteristic	Consumer Must Drive 15 Minutes Out of the Way and Fuel Twice as Often					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	24	75	Q	20	76	Q
<b>Region</b>						
Northeast .....	31	67	Q	Q	71	Q
Midwest .....	Q	82	Q	Q	81	NC
South .....	25	74	Q	Q	80	Q
West .....	Q	73	NC	Q	72	Q
<b>Number of Vehicles</b>						
One .....	Q	77	Q	24	71	Q
Two .....	26	73	Q	Q	81	Q
Three .....	Q	79	Q	Q	82	Q
Four or More .....	Q	72	NC	Q	70	NC
<b>Sex of Respondent</b>						
Male .....	24	74	Q	23	73	Q
Female .....	23	75	Q	18	79	Q
<b>Age of Main Driver</b>						
16 to 24 .....	Q	78	NC	Q	59	NC
25 to 34 .....	29	71	NC	27	69	Q
35 to 44 .....	32	68	NC	Q	82	NC
45 to 54 .....	Q	87	Q	Q	83	Q
55 or Older .....	Q	77	Q	Q	78	Q
<b>Education of Respondent</b>						
Elementary .....	Q	Q	NC	NC	Q	NC
High School .....	25	73	Q	21	76	Q
College .....	19	79	Q	19	79	Q
Graduate School .....	41	59	NC	Q	68	Q
<b>Race of Respondent</b>						
White .....	23	75	Q	20	78	Q
Black .....	Q	84	NC	Q	70	NC
Asian .....	Q	Q	NC	Q	Q	Q
Other .....	Q	67	NC	Q	Q	Q
<b>Household Income</b>						
\$30,000 or Less .....	Q	74	Q	Q	78	Q
More than \$30,000 .....	24	76	NC	20	76	Q
<b>Type of Housing Unit</b>						
Apartment .....	Q	80	NC	Q	67	Q
Single-Family Detached .....	23	75	Q	19	78	Q
Townhouse .....	Q	Q	NC	Q	86	Q
Other .....	Q	68	Q	Q	73	NC
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	NC	Q	NC	Q	Q	NC
Personal Vehicles .....	26	72	Q	22	74	Q
Both .....	Q	87	NC	Q	84	Q
Don't Know .....	Q	Q	NC	NC	Q	Q

See footnotes at end of table.

**Table 4.4.14. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel Modified Vehicle and Modified Vehicle Must be Refueled Twice as Often as a Regular Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Consumer Must Drive 15 Minutes Out of the Way and Fuel Twice as Often					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	24	75	Q	20	76	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	Q	82	Q	Q	85	Q
Very Concerned .....	Q	80	NC	20	78	Q
Somewhat Concerned .....	30	70	NC	27	70	Q
Not Too Concerned .....	Q	Q	Q	Q	Q	Q
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	Q	80	Q	21	75	Q
Once a Week .....	24	76	NC	19	79	Q
More than Once a Week .....	38	60	Q	Q	71	Q
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	Q	72	NC	Q	72	NC
Does Fill Tank .....	23	75	Q	19	77	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.4.15. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle, the Modified Vehicle Must be Refueled Twice as Often as a Regular Vehicle, and the Modified Vehicle Costs \$1,000 Less, 1994**  
(Percent)

Consumer Characteristic	15 Minutes Out of the Way to Fuel, Fuel Twice as Often, Vehicle \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	40	55	Q	31	62	Q
<b>Region</b>						
Northeast .....	Q	Q	Q	Q	Q	Q
Midwest .....	Q	Q	Q	Q	Q	NC
South .....	Q	69	Q	Q	58	Q
West .....	Q	Q	NC	Q	72	NC
<b>Number of Vehicles</b>						
One .....	Q	64	Q	Q	65	Q
Two .....	41	53	Q	37	59	Q
Three .....	Q	Q	NC	Q	Q	NC
Four or More .....	Q	Q	NC	NC	Q	NC
<b>Sex of Respondent</b>						
Male .....	52	43	Q	34	60	Q
Female .....	31	64	Q	Q	65	Q
<b>Age of Main Driver</b>						
16 to 24 .....	Q	Q	NC	Q	Q	NC
25 to 34 .....	Q	65	NC	Q	63	NC
35 to 44 .....	57	43	NC	Q	62	Q
45 to 54 .....	NC	Q	Q	Q	Q	Q
55 or Older .....	Q	Q	Q	Q	67	Q
<b>Education of Respondent</b>						
Elementary .....	Q	NC	NC	NC	NC	NC
High School .....	49	47	Q	44	44	Q
College .....	38	54	Q	Q	65	Q
Graduate School .....	Q	Q	NC	Q	80	Q
<b>Race of Respondent</b>						
White .....	35	59	Q	29	62	Q
Black .....	Q	Q	NC	Q	Q	NC
Asian .....	Q	NC	NC	NC	Q	NC
Other .....	Q	Q	NC	Q	Q	NC
<b>Household Income</b>						
\$30,000 or Less .....	Q	56	Q	Q	55	Q
More than \$30,000 .....	44	54	Q	28	65	Q
<b>Type of Housing Unit</b>						
Apartment .....	Q	Q	Q	Q	Q	Q
Single-Family Detached .....	52	44	Q	30	66	Q
Townhouse .....	NC	Q	NC	Q	Q	NC
Other .....	Q	Q	Q	Q	Q	Q
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	NC	NC	NC	Q	Q	NC
Personal Vehicles .....	50	44	Q	28	63	Q
Both .....	NC	Q	NC	Q	Q	NC
Don't Know .....	NC	Q	NC	NC	Q	NC

See footnotes at end of table.

**Table 4.4.15. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle, the Modified Vehicle Must be Refueled Twice as Often as a Regular Vehicle, and the Modified Vehicle Costs \$1,000 Less, 1994 (Continued)**  
(Percent)

Consumer Characteristic	15 Minutes Out of the Way to Fuel, Fuel Twice as Often, Vehicle \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	40	55	Q	31	62	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	Q	Q	Q	Q	Q	NC
Very Concerned .....	51	Q	NC	Q	56	Q
Somewhat Concerned .....	40	60	NC	Q	61	Q
Not Too Concerned .....	Q	Q	Q	Q	Q	NC
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	48	44	Q	Q	61	Q
Once a Week .....	34	63	Q	Q	66	Q
More than Once a Week .....	Q	Q	Q	Q	Q	Q
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	Q	Q	NC	Q	Q	NC
Does Fill Tank .....	34	60	Q	29	63	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.4.16. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle, the Modified Vehicle Must be Refueled Twice as Often as a Regular Vehicle, and the Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994**  
(Percent)

Consumer Characteristic	Drive 15 minutes out of the Way, Fuel Twice as Often, Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	38	61	Q	34	62	Q
<b>Region</b>						
Northeast .....	56	43	Q	32	66	Q
Midwest .....	35	63	Q	40	59	Q
South .....	34	64	Q	33	63	Q
West .....	Q	68	NC	33	58	Q
<b>Number of Vehicles</b>						
One .....	27	71	Q	25	71	Q
Two .....	42	57	Q	42	54	Q
Three .....	45	53	Q	39	56	Q
Four or More .....	Q	Q	NC	Q	75	NC
<b>Sex of Respondent</b>						
Male .....	39	59	Q	34	62	Q
Female .....	36	63	Q	34	61	Q
<b>Age of Main Driver</b>						
16 to 24 .....	Q	61	NC	Q	69	NC
25 to 34 .....	36	64	NC	33	65	Q
35 to 44 .....	45	53	Q	34	63	Q
45 to 54 .....	Q	71	Q	29	64	Q
55 or Older .....	37	60	Q	43	51	Q
<b>Education of Respondent</b>						
Elementary .....	Q	Q	NC	Q	Q	NC
High School .....	33	63	Q	24	71	Q
College .....	41	59	Q	39	57	Q
Graduate School .....	Q	Q	NC	43	55	Q
<b>Race</b>						
White .....	42	57	Q	35	61	Q
Black .....	Q	Q	Q	Q	Q	Q
Asian .....	NC	Q	NC	Q	Q	NC
Other .....	Q	Q	NC	Q	Q	NC
<b>Household Income</b>						
\$30,000 or Less .....	31	69	Q	25	75	NC
More than \$30,000 .....	41	57	Q	39	55	Q
<b>Type of Housing Unit</b>						
Apartment .....	32	68	NC	Q	85	NC
Single-Family Detached .....	38	60	Q	42	54	Q
Townhouse .....	Q	Q	NC	Q	Q	Q
Other .....	Q	69	NC	Q	63	Q
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	Q	Q	NC	Q	Q	NC
Personal Vehicles .....	41	59	Q	35	60	Q
Both .....	Q	76	NC	Q	74	NC
Don't Know .....	NC	Q	NC	NC	Q	NC

See footnotes at end of table.

**Table 4.4.16. Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle, the Modified Vehicle Must be Refueled Twice as Often as a Regular Vehicle, and the Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Drive 15 minutes out of the Way, Fuel Twice as Often, Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	38	61	Q	34	62	Q
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	35	65	NC	Q	67	Q
Very Concerned .....	38	61	Q	34	65	Q
Somewhat Concerned .....	39	57	Q	42	54	Q
Not Too Concerned .....	Q	Q	NC	Q	NC	NC
<b>Trunk Size</b>						
Large Trunk .....	29	67	Q	30	67	Q
Medium Trunk .....	Q	67	NC	Q	73	Q
Small Trunk .....	Q	77	NC	Q	66	Q
No Trunk .....	51	49	NC	47	47	Q
<b>More Than Half the Trunk Space Used</b>						
Yes .....	39	59	Q	43	54	Q
All the Time .....	Q	Q	NC	Q	Q	NC
Most of the Time .....	Q	62	NC	Q	Q	Q
Some of the Time .....	41	54	Q	46	53	Q
Rarely .....	34	66	Q	50	46	Q
No .....	32	68	NC	23	73	Q
<b>Things Stored or Left in Trunk</b>						
Yes .....	37	59	Q	44	49	Q
No .....	45	52	Q	36	62	Q
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	44	56	Q	37	61	Q
Once a Week .....	35	63	Q	34	60	Q
More than Once a Week .....	Q	75	NC	Q	73	Q
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	Q	81	NC	47	53	NC
Does Fill Tank .....	40	59	Q	33	63	Q

NC = No cases in responding sample.

Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.

Note: Data may not sum to totals due to rounding or due to the omission of a "Don't Know" category in which all data were Q's or NC's.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.



## 4.5. Relative Standard Error Tables

**Table 4.5.1. Relative Standard Errors for Consumer Characteristics by Level of Concern for the Environment, 1994**  
(Percent)

Consumer Characteristic	All Consumers	Level of Concern for Environment			
		Extremely Concerned	Very Concerned	Somewhat Concerned	Not Too Concerned
<b>Total</b> .....	0	0	0	0	0
<b>Census Region</b>					
Northeast .....	13	30	24	23	72
Midwest .....	9	32	22	16	45
South .....	6	24	12	10	33
West .....	13	34	17	27	64
<b>Sex of Respondent</b>					
Male .....	4	16	8	8	19
Female .....	3	9	6	6	21
<b>Age of Main Driver</b>					
16 to 24 .....	34	137	58	55	194
25 to 34 .....	11	40	21	18	48
35 to 44 .....	10	26	17	16	75
45 to 54 .....	14	41	26	22	77
55 or Older .....	8	27	17	19	35
<b>Education of Respondent</b>					
Elementary .....	96	340	222	392	479
High School .....	5	17	11	9	17
College .....	5	13	8	8	37
Graduate School .....	22	73	32	39	146
<b>Race of Respondent</b>					
White .....	1	5	3	2	7
Black .....	30	62	47	61	209
Asian .....	140	621	202	344	892
Other .....	58	131	85	104	147
<b>Household Income</b>					
\$30,000 or Less .....	7	22	14	13	33
More than \$30,000 .....	2	7	4	4	13
<b>Perception of Relative Safety of Fuels</b>					
<b>Natural Gas</b>					
Gasoline Safer .....	8	31	15	15	77
Natural Gas Safer .....	14	36	24	29	72
No Difference .....	8	23	15	13	39
Don't Know .....	10	31	20	16	33
<b>Propane</b>					
Gasoline Safer .....	5	17	10	8	30
Propane Safer .....	23	54	40	46	151
No Difference .....	8	28	14	16	43
Don't Know .....	12	38	26	21	47
<b>Electricity</b>					
Gasoline Safer .....	21	57	51	36	71
Electricity Safer .....	3	10	4	5	19
No Difference .....	21	49	43	35	111
Don't Know .....	18	56	46	31	74

See footnotes at end of table.

**Table 4.5.1. Relative Standard Errors for Consumer Characteristics by Level of Concern for the Environment, 1994 (Continued)**  
(Percent)

Consumer Characteristic	All Consumers	Level of Concern for the Environment			
		Extremely Concerned	Very Concerned	Somewhat Concerned	Not Too Concerned
<b>Total</b> .....	0	0	0	0	0
<b>Heard of Alternative-Fuel Vehicles</b>					
No .....	17	49	38	32	71
Yes .....	1	4	2	2	7
<b>How Much Heard About Alternative-Fuel Vehicles</b>					
Great Deal .....	9	17	13	22	59
Some .....	7	37	13	11	44
Little .....	6	22	15	9	25
<b>How Dangerous is Pollution Caused by Motor Vehicles</b>					
Extremely .....	9	9	13	31	63
Very .....	6	27	8	10	70
Somewhat .....	7	109	27	9	22
Not Very .....	52	380	278	193	175
Not at All .....	281	NC	2,686	1,134	486
Don't Know .....	132	472	591	216	454
<b>Are You an Environmentalist</b>					
No .....	4	24	10	5	13
Yes .....	4	7	5	9	31
<b>Member of Environmental Organization</b>					
No .....	6	14	8	17	0
Yes .....	38	61	70	101	NC

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.2. Relative Standard Errors for Consumer Characteristics by Census Region, 1994**  
(Percent)

Consumer Characteristic	All Consumers	Census Region			
		Northeast	Midwest	South	West
<b>Total</b> .....	0	0	0	0	0
<b>Sex of Respondent</b>					
Male .....	4	10	8	8	10
Female .....	3	8	7	5	9
<b>Age of Main Driver</b>					
16 to 24 .....	34	74	81	57	64
25 to 34 .....	11	29	21	18	25
35 to 44 .....	10	26	16	18	21
45 to 54 .....	14	28	27	22	38
55 or Older .....	8	19	16	13	23
<b>Education of Respondent</b>					
Elementary .....	96	603	150	164	218
High School .....	5	11	9	8	13
College .....	5	11	9	7	12
Graduate School .....	22	48	50	42	38
<b>Race of Respondent</b>					
White .....	1	3	1	3	4
Black .....	30	120	99	27	198
Asian .....	140	190	2,680	699	129
Other .....	58	147	633	119	50
<b>Number of Adults Over 18</b>					
One .....	11	27	19	21	21
Two .....	3	8	5	5	8
Three .....	20	40	55	31	42
Four .....	55	87	145	96	160
Five .....	251	192	372	905	1,041
Six .....	1,129	1,147	1,390	NC	2,212
<b>Household Income</b>					
\$30,000 or Less .....	7	20	12	10	18
More than \$30,000 .....	2	5	5	4	5
<b>Type of Housing Unit</b>					
Apartment .....	17	45	33	33	31
Single-Family Detached .....	2	5	4	4	6
Townhouse .....	59	86	229	98	119
Other .....	24	60	48	35	70
<b>Transportation Type Most Often Used</b>					
Public Transportation .....	99	92	381	182	648
Personal Vehicles .....	1	4	2	2	3
<b>Respondent Concern for the Environment</b>					
Extremely Concerned .....	21	38	43	42	46
Very Concerned .....	6	15	15	11	11
Somewhat Concerned .....	6	14	10	8	18
Not too Concerned .....	62	159	110	104	153

See footnotes at end of table.

**Table 4.5.2. Relative Standard Errors for Consumer Characteristics by Census Region, 1994  
(Continued)  
(Percent)**

Consumer Characteristic	All Consumers	Census Region			
		Northeast	Midwest	South	West
<b>Total</b> .....	0	0	0	0	0
<b>Perception of Relative Safety of Fuels</b>					
<b>Natural Gas</b>					
Gasoline Safer .....	8	17	14	13	24
Natural Gas Safer .....	14	31	33	23	31
No Difference .....	8	23	14	13	19
Don't Know .....	10	22	19	17	21
<b>Propane</b>					
Gasoline Safer .....	5	10	9	9	14
Propane Safer .....	23	31	48	34	55
No Difference .....	8	25	15	14	18
Don't Know .....	12	29	25	20	28
<b>Electricity</b>					
Gasoline Safer .....	21	46	44	28	72
Electricity Safer .....	3	6	5	5	6
No Difference .....	21	51	34	32	66
Don't Know .....	18	47	38	28	45

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.3. Relative Standard Errors for Vehicle Choice When Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994**  
(Percent)

Consumer Characteristic	Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	7	16	99	9	17	66
<b>Region</b>						
Northeast .....	27	28	125	27	36	152
Midwest .....	8	38	561	17	26	298
South .....	11	27	202	14	28	75
West .....	24	42	145	19	54	187
<b>Number of Vehicles</b>						
One .....	10	35	121	12	32	76
Two .....	10	22	205	19	21	95
Three .....	28	32	298	20	41	NC
Four or More .....	25	84	363	22	66	NC
<b>Sex of Respondent</b>						
Male .....	8	27	188	12	27	115
Female .....	11	20	113	13	21	80
<b>Age of Main Driver</b>						
16 to 24 .....	28	48	NC	40	63	NC
25 to 34 .....	23	23	274	20	32	693
35 to 44 .....	19	31	150	20	30	262
45 to 54 .....	12	50	760	25	32	169
55 or Older .....	9	40	120	13	39	58
<b>Education of Respondent</b>						
Elementary .....	46	104	132	49	350	80
High School .....	9	25	163	12	26	137
College .....	14	23	137	14	22	89
Graduate School .....	14	65	NC	28	53	528
<b>Race of Respondent</b>						
White .....	7	18	102	10	17	66
Black .....	21	47	NC	19	74	567
Asian .....	NC	0	NC	30	459	259
Other .....	34	182	205	72	89	NC
<b>Household Income</b>						
\$30,000 or Less .....	10	33	116	14	27	102
More than \$30,000 .....	9	18	166	11	21	87
<b>Type of Housing Unit</b>						
Apartment .....	25	38	319	32	36	284
Single-Family Detached .....	7	21	121	9	19	100
Townhouse .....	116	28	373	62	NC	69
Other .....	19	64	260	63	48	81
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	48	153	NC	63	80	268
Personal Vehicles .....	8	18	115	10	21	68
Both .....	31	116	197	61	52	NC
Neither .....	NC	0	NC	0	NC	NC
Don't Know .....	180	50	NC	44	259	166

See footnotes at end of table.

**Table 4.5.3. Relative Standard Errors for Vehicle Choice When Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	7	16	99	9	17	66
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	29	71	144	59	59	186
Very Concerned .....	17	29	310	19	53	130
Somewhat Concerned .....	14	27	142	15	22	181
Not Too Concerned .....	17	147	423	36	70	467
<b>Trunk Size</b>						
Large Trunk .....	13	16	166	18	24	99
Medium Trunk .....	16	74	122	22	55	85
Small Trunk .....	29	25	349	53	20	225
No Trunk .....	10	35	214	10	52	183
<b>More Than Half the Trunk Space Used</b>						
Yes .....	9	26	191	10	34	104
All the Time .....	22	86	NC	24	72	594
Most of the Time .....	25	48	293	15	730	188
Some of the Time .....	16	39	266	13	91	117
Rarely .....	13	61	419	28	33	800
No .....	12	22	113	17	19	79
<b>Things Stored or Left in Trunk</b>						
Yes .....	17	40	NC	14	84	211
No .....	16	39	154	16	82	97
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	9	29	212	12	25	86
Once a Week .....	13	21	100	16	27	85
More than Once a Week .....	15	50	712	20	39	NC
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	21	44	137	33	31	503
Does Fill Tank .....	7	18	129	9	19	65

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.4. Relative Standard Errors for Vehicle Choice When Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle and the Modified Vehicle Costs \$1,000 More, 1994**  
(Percent)

Consumer Characteristic	Half Trunk/Cargo Space and Costs \$1,000 More					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	10	39	163	10	40	236
<b>Region</b>						
Northeast .....	12	235	303	27	75	NC
Midwest .....	20	74	262	18	57	NC
South .....	18	57	217	16	97	135
West .....	33	61	NC	21	117	NC
<b>Number of Vehicles</b>						
One .....	15	117	181	11	118	350
Two .....	14	51	224	16	56	401
Three .....	22	82	NC	18	129	NC
Four or More .....	75	69	NC	274	34	300
<b>Sex of Respondent</b>						
Male .....	18	38	420	22	43	244
Female .....	11	81	164	10	73	465
<b>Age of Main Driver</b>						
16 to 24 .....	20	496	288	28	225	NC
25 to 34 .....	10	187	533	28	50	NC
35 to 44 .....	25	54	511	19	114	272
45 to 54 .....	45	51	398	14	134	NC
55 or Older .....	22	63	229	21	73	203
<b>Education of Respondent</b>						
Elementary .....	36	204	NC	NC	0	NC
High School .....	14	70	133	12	89	771
College .....	15	54	676	15	51	273
Graduate School .....	36	85	NC	44	115	329
<b>Race of Respondent</b>						
White .....	10	47	182	11	39	222
Black .....	63	57	312	0	NC	NC
Asian .....	0	NC	NC	NC	0	NC
Other .....	96	133	NC	0	NC	NC
<b>Household Income</b>						
\$30,000 or Less .....	16	75	248	7	158	NC
More than \$30,000 .....	12	45	217	18	35	180
<b>Type of Housing Unit</b>						
Apartment .....	15	348	398	8	NC	483
Single-Family Detached .....	14	34	194	15	32	250
Townhouse .....	0	NC	NC	NC	NC	NC
Other .....	37	146	304	0	NC	NC
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	0	NC	NC	54	168	NC
Personal Vehicles .....	11	46	165	9	61	490
Both .....	0	NC	NC	69	93	NC
Neither .....	0	NC	NC	NC	NC	NC
Don't Know .....	0	NC	NC	0	NC	NC

See footnotes at end of table.



**Table 4.5.4. Relative Standard Errors for Vehicle Choice When Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle and the Modified Vehicle Costs \$1,000 More, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Half Trunk/Cargo Space and Costs \$1,000 More					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	10	39	163	10	40	236
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	50	91	NC	0	NC	NC
Very Concerned .....	28	56	279	29	109	447
Somewhat Concerned .....	18	62	209	17	54	248
Not Too Concerned .....	194	177	123	228	32	NC
<b>Trunk Size</b>						
Large Trunk .....	17	47	685	20	46	376
Medium Trunk .....	23	NC	146	33	99	415
Small Trunk .....	24	74	470	22	89	274
No Trunk .....	13	168	207	12	167	NC
<b>More Than Half the Trunk Space Used</b>						
Yes .....	16	56	186	22	48	352
All the Time .....	31	236	NC	0	NC	NC
Most of the Time .....	36	151	185	NC	0	336
Some of the Time .....	25	101	232	58	78	505
Rarely .....	38	63	NC	47	47	NC
No .....	12	71	267	12	58	433
<b>Things Stored or Left in Trunk</b>						
Yes .....	17	130	NC	22	170	NC
No .....	32	101	110	35	131	352
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	11	95	261	18	41	402
Once a Week .....	15	53	259	10	165	368
More than Once a Week .....	50	53	345	32	77	453
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	10	39	375	14	343	448
Does Fill Tank .....	44	173	78	12	38	273

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.5. Relative Standard Errors for Vehicle Choice When Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle and the Modified Vehicle Costs \$1,000 Less, 1994 (Percent)**

Consumer Characteristic	Half Trunk/Cargo Space and Costs \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	3	107	186	6	61	186
<b>Region</b>						
Northeast .....	6	493	NC	17	92	NC
Midwest .....	6	119	407	10	111	336
South .....	4	295	342	7	178	201
West .....	16	233	192	16	107	599
<b>Number of Vehicles</b>						
One .....	6	154	246	11	68	175
Two .....	4	177	336	5	321	718
Three .....	11	202	NC	16	104	NC
Four or More .....	12	NC	339	15	244	470
<b>Sex of Respondent</b>						
Male .....	4	138	671	6	137	436
Female .....	5	168	161	9	64	193
<b>Age of Main Driver</b>						
16 to 24 .....	37	148	222	49	207	295
25 to 34 .....	7	322	719	12	138	NC
35 to 44 .....	9	128	NC	4	NC	684
45 to 54 .....	7	321	393	16	82	NC
55 or Older .....	4	357	276	11	86	154
<b>Education of Respondent</b>						
Elementary .....	0	NC	NC	69	106	NC
High School .....	5	130	173	9	98	170
College .....	4	224	1,498	7	93	859
Graduate School .....	9	297	528	16	411	368
<b>Race of Respondent</b>						
White .....	4	107	173	6	74	242
Black .....	7	449	NC	18	147	421
Asian .....	NC	NC	NC	119	110	243
Other .....	0	NC	NC	0	NC	NC
<b>Household Income</b>						
\$30,000 or Less .....	5	226	256	10	96	195
More than \$30,000 .....	4	117	281	6	80	363
<b>Type of Housing Unit</b>						
Apartment .....	20	168	277	21	128	NC
Single-Family Detached .....	4	119	222	6	66	194
Townhouse .....	0	NC	NC	48	NC	187
Other .....	0	NC	NC	0	NC	NC
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	0	NC	NC	0	NC	NC
Personal Vehicles .....	4	127	173	7	55	286
Both .....	14	346	NC	0	NC	NC
Neither .....	NC	NC	NC	0	NC	NC
Don't Know .....	0	NC	NC	54	NC	168

See footnotes at end of table.

**Table 4.5.5. Relative Standard Errors for Vehicle Choice When Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle and the Modified Vehicle Costs \$1,000 Less, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Half Trunk/Cargo Space and Costs \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	3	107	186	6	61	186
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	11	375	NC	34	186	NC
Very Concerned .....	7	178	NC	18	101	266
Somewhat Concerned .....	9	214	144	6	176	946
Not Too Concerned .....	0	NC	NC	26	347	280
<b>Trunk Size</b>						
Large Trunk .....	6	161	538	12	112	167
Medium Trunk .....	9	190	674	15	97	NC
Small Trunk .....	10	538	288	11	NC	368
No Trunk .....	5	346	227	7	103	NC
<b>More Than Half the Trunk Space Used</b>						
Yes .....	5	171	229	8	74	477
All the Time .....	13	NC	317	16	NC	184
Most of the Time .....	11	324	NC	38	56	NC
Some of the Time .....	8	345	213	10	125	NC
Rarely .....	7	216	NC	12	207	NC
No .....	6	167	276	9	128	195
<b>Things Stored or Left in Trunk</b>						
Yes .....	10	228	581	11	154	620
No .....	7	907	209	15	84	551
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	4	552	175	7	110	309
Once a Week .....	5	158	461	10	121	189
More than Once a Week .....	14	85	NC	18	76	NC
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	16	122	322	20	110	NC
Does Fill Tank .....	3	146	233	6	70	177

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.6. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle, 1994**  
(Percent)

Consumer Characteristic	Consumer Must Drive 15 Minutes Out of the Way to Buy Fuel					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	5	7	96	7	6	70
<b>Region</b>						
Northeast .....	11	19	204	17	11	166
Midwest .....	8	14	180	11	13	179
South .....	9	11	131	10	11	80
West .....	11	18	462	20	9	326
<b>Number of Vehicles</b>						
One .....	9	12	109	11	8	87
Two .....	6	12	202	10	9	111
Three .....	16	16	396	18	14	374
Four or More .....	23	20	360	21	21	994
<b>Sex of Respondent</b>						
Male .....	6	11	244	10	7	172
Female .....	7	9	96	9	8	71
<b>Age of Main Driver</b>						
16 to 24 .....	20	19	327	33	20	184
25 to 34 .....	10	14	366	14	12	223
35 to 44 .....	10	13	280	15	9	238
45 to 54 .....	11	17	348	14	13	184
55 or Older .....	8	19	98	11	12	85
<b>Education of Respondent</b>						
Elementary .....	20	64	586	51	62	74
High School .....	7	12	117	9	10	139
College .....	8	10	170	10	8	96
Graduate School .....	14	22	490	26	11	367
<b>Race of Respondent</b>						
White .....	5	8	96	7	6	82
Black .....	19	21	558	20	20	214
Asian .....	32	57	NC	48	49	163
Other .....	27	26	734	31	30	310
<b>Household Income</b>						
\$30,000 or Less .....	9	12	127	11	10	84
More than \$30,000 .....	6	9	139	8	7	111
<b>Type of Housing Unit</b>						
Apartment .....	16	16	223	23	12	141
Single-Family Detached .....	5	9	110	7	7	104
Townhouse .....	27	35	655	38	19	870
Other .....	18	17	445	34	13	99
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	47	48	407	41	25	555
Personal Vehicles .....	5	9	130	7	7	82
Both .....	21	25	409	36	17	232
Neither .....	0	NC	NC	0	NC	NC
Don't Know .....	70	74	252	70	43	218

See footnotes at end of table.

**Table 4.5.6. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Consumer Must Drive 15 Minutes Out of the Way to Buy Fuel					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	5	7	96	7	6	70
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	26	15	164	36	10	275
Very Concerned .....	11	11	232	16	8	143
Somewhat Concerned .....	8	13	242	10	11	135
Not Too Concerned .....	18	53	300	26	34	NC
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	7	12	138	9	8	153
Once a Week .....	8	11	138	11	8	92
More than Once a Week .....	14	17	409	17	16	132
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	11	22	316	21	15	165
Does Fill Tank .....	5	8	100	7	6	77

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.7. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle and the Modified Vehicle Costs \$1,000 More, 1994**  
(Percent)

Consumer Characteristic	Drive 15 Minutes Out of the Way for Fuel and Modified Vehicle Costs \$1,000 More					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	12	8	95	14	6	91
<b>Region</b>						
Northeast .....	23	25	187	37	11	163
Midwest .....	24	15	91	27	12	242
South .....	17	12	301	22	10	140
West .....	33	15	483	27	13	231
<b>Number of Vehicles</b>						
One .....	20	13	129	21	9	118
Two .....	16	13	147	22	9	167
Three .....	29	18	356	40	13	961
Four or More .....	58	18	572	46	26	177
<b>Sex of Respondent</b>						
Male .....	17	11	164	18	9	100
Female .....	16	10	114	20	7	175
<b>Age of Main Driver</b>						
16 to 24 .....	41	16	NC	50	22	386
25 to 34 .....	23	14	366	26	12	1,002
35 to 44 .....	18	17	317	33	9	216
45 to 54 .....	23	21	275	30	12	464
55 or Older .....	38	16	72	24	15	74
<b>Education of Respondent</b>						
Elementary .....	85	39	NC	20	514	316
High School .....	23	10	147	25	9	137
College .....	16	12	108	20	8	173
Graduate School .....	21	33	NC	32	16	173
<b>Race of Respondent</b>						
White .....	12	9	101	15	6	87
Black .....	50	23	259	40	18	NC
Asian .....	121	37	NC	387	22	318
Other .....	71	23	574	56	32	NC
<b>Household Income</b>						
\$30,000 or Less .....	18	16	127	24	10	149
More than \$30,000 .....	15	9	137	16	7	115
<b>Type of Housing Unit</b>						
Apartment .....	31	19	152	28	16	335
Single-Family Detached .....	14	9	115	17	7	96
Townhouse .....	68	30	NC	114	14	783
Other .....	27	23	403	37	15	297
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	162	66	170	106	22	518
Personal Vehicles .....	13	9	134	16	7	109
Both .....	52	27	215	48	20	709
Don't Know .....	47	193	NC	130	64	216

See footnotes at end of table.

**Table 4.5.7. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle and the Modified Vehicle Costs \$1,000 More, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Drive 15 Minutes Out of the Way for Fuel and Modified Vehicle Costs \$1,000 More					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	12	8	95	14	6	91
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	59	16	122	153	6	223
Very Concerned .....	28	10	176	31	8	132
Somewhat Concerned .....	16	16	217	18	13	300
Not Too Concerned .....	39	114	180	23	133	447
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	18	10	229	20	9	139
Once a Week .....	19	12	95	20	9	157
More than Once a Week .....	22	24	451	46	14	176
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	29	24	304	27	24	210
Does Fill Tank .....	13	8	99	15	6	100

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.8. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle and the Modified Vehicle Costs \$1,000 Less, 1994**  
(Percent)

Consumer Characteristic	Drive 15 Minutes Out of the Way for Fuel and Modified Vehicle Costs \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	4	16	118	5	19	95
<b>Region</b>						
Northeast .....	10	38	485	18	30	129
Midwest .....	7	35	184	8	37	297
South .....	7	28	232	7	34	240
West .....	14	28	210	13	63	142
<b>Number of Vehicles</b>						
One .....	8	26	181	9	25	127
Two .....	6	23	177	7	29	199
Three .....	15	46	263	10	114	142
Four or More .....	17	53	NC	12	83	NC
<b>Sex of Respondent</b>						
Male .....	7	22	168	6	29	255
Female .....	6	23	167	7	25	93
<b>Age of Main Driver</b>						
16 to 24 .....	29	32	394	34	46	564
25 to 34 .....	9	30	1,437	9	46	354
35 to 44 .....	9	33	246	9	43	219
45 to 54 .....	8	55	490	12	37	234
55 or Older .....	9	30	120	9	39	115
<b>Education of Respondent</b>						
Elementary .....	43	56	262	47	70	NC
High School .....	6	26	187	8	23	229
College .....	7	21	444	6	40	113
Graduate School .....	13	66	121	18	58	178
<b>Race of Respondent</b>						
White .....	5	17	109	5	23	100
Black .....	12	72	NC	24	34	333
Asian .....	34	96	NC	20	239	NC
Other .....	22	64	NC	37	52	469
<b>Household Income</b>						
\$30,000 or Less .....	8	29	164	10	24	221
More than \$30,000 .....	5	19	165	5	28	103
<b>Type of Housing Unit</b>						
Apartment .....	14	42	306	19	32	904
Single-Family Detached .....	5	18	151	5	24	116
Townhouse .....	15	193	571	20	138	248
Other .....	18	40	262	23	72	142
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	28	144	NC	20	195	402
Personal Vehicles .....	5	17	129	6	21	131
Both .....	19	65	672	27	66	259
Neither .....	0	NC	NC	0	NC	NC
Don't Know .....	48	152	NC	35	184	NC

See footnotes at end of table.



**Table 4.5.8. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle and the Modified Vehicle Costs \$1,000 Less, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Drive 15 Minutes Out of the Way for Fuel and Modified Vehicle Costs \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	4	16	118	5	19	95
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	17	63	732	16	78	688
Very Concerned .....	9	31	262	12	27	281
Somewhat Concerned .....	8	26	217	7	40	138
Not Too Concerned .....	12	224	500	23	71	NC
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	7	22	123	7	32	127
Once a Week .....	7	23	288	8	26	162
More than Once a Week .....	9	66	470	12	51	286
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	14	17	137	10	75	NC
Does Fill Tank .....	5	41	164	5	20	89

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.9. Relative Standard Errors for Vehicle Choice When Consumer Must Refuel the Modified Vehicle Twice as Often as a Regular Vehicle, 1994**  
(Percent)

Consumer Characteristic	Modified Vehicle Must be Fueled Twice as Often					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	7	5	85	8	5	61
<b>Region</b>						
Northeast .....	20	11	224	22	9	127
Midwest .....	12	9	175	14	10	128
South .....	10	9	115	14	7	98
West .....	21	10	263	20	11	98
<b>Number of Vehicles</b>						
One .....	11	9	151	12	8	82
Two .....	11	7	117	15	6	91
Three .....	18	15	328	23	11	691
Four or More .....	34	14	286	26	20	233
<b>Sex of Respondent</b>						
Male .....	9	8	126	12	7	114
Female .....	10	6	115	11	6	70
<b>Age of Main Driver</b>						
16 to 24 .....	38	11	352	82	9	305
25 to 34 .....	15	10	197	19	9	292
35 to 44 .....	19	7	260	20	7	206
45 to 54 .....	17	12	253	21	10	98
55 or Older .....	10	14	105	11	13	73
<b>Education of Respondent</b>						
Elementary .....	25	44	NC	36	52	169
High School .....	8	10	125	11	8	123
College .....	15	5	148	13	7	78
Graduate School .....	25	14	159	40	8	204
<b>Race of Respondent</b>						
White .....	8	5	90	9	5	60
Black .....	19	24	282	20	18	520
Asian .....	227	16	436	60	30	437
Other .....	47	16	865	52	18	704
<b>Household Income</b>						
\$30,000 or Less .....	10	10	132	13	9	90
More than \$30,000 .....	10	5	111	11	5	82
<b>Type of Housing Unit</b>						
Apartment .....	23	11	229	23	11	191
Single-Family Detached .....	8	6	101	9	6	76
Townhouse .....	42	23	655	66	16	191
Other .....	23	14	225	32	12	148
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	76	25	NC	43	24	555
Personal Vehicles .....	8	6	105	10	5	69
Both .....	42	16	195	50	13	296
Neither .....	0	NC	NC	143	89	NC
Don't Know .....	60	53	NC	55	54	218

See footnotes at end of table.

**Table 4.5.9. Relative Standard Errors for Vehicle Choice When Consumer Must Refuel the Modified Vehicle Twice as Often as a Regular Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Modified Vehicle Must be Fueled Twice as Often					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	7	5	85	8	5	61
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	42	10	249	51	7	1,205
Very Concerned .....	19	7	157	24	6	126
Somewhat Concerned .....	14	8	179	13	9	95
Not Too Concerned .....	26	38	205	24	41	738
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	11	7	107	11	8	82
Once a Week .....	11	8	124	15	6	96
More than Once a Week .....	16	14	1,007	20	13	231
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	15	17	249	24	13	165
Does Fill Tank .....	8	5	90	9	5	66

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.10. Relative Standard Errors for Vehicle Choice When Consumer Must Refuel the Modified Vehicle Twice as often as a Regular Vehicle and the Modified Vehicle Costs \$1,000 More, 1994**  
(Percent)

Consumer Characteristic	Must Refuel Twice as Often and Vehicle Cost \$1,000 More					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	11	6	62	14	5	78
<b>Region</b>						
Northeast .....	35	12	149	40	9	197
Midwest .....	20	14	67	28	10	159
South .....	16	12	177	20	9	121
West .....	32	12	192	34	12	176
<b>Number of Vehicles</b>						
One .....	21	12	76	25	8	99
Two .....	16	9	117	19	9	104
Three .....	37	16	158	44	10	1074
Four or More .....	35	22	631	65	14	NC
<b>Sex of Respondent</b>						
Male .....	15	10	113	17	8	142
Female .....	17	8	73	23	6	91
<b>Age of Main Driver</b>						
16 to 24 .....	36	14	NC	43	20	243
25 to 34 .....	23	13	165	30	9	554
35 to 44 .....	20	12	163	37	7	285
45 to 54 .....	27	16	126	26	13	254
55 or Older .....	27	17	66	26	16	61
<b>Education of Respondent</b>						
Elementary .....	77	34	NC	24	157	NC
High School .....	20	9	134	25	9	82
College .....	16	10	73	20	7	169
Graduate School .....	30	22	75	44	10	277
<b>Race of Respondent</b>						
White .....	11	7	59	14	6	86
Black .....	59	20	395	56	15	642
Asian .....	96	27	NC	354	17	385
Other .....	94	13	NC	NC	10	168
<b>Household Income</b>						
\$30,000 or Less .....	18	15	90	26	9	143
More than \$30,000 .....	14	7	84	17	6	93
<b>Type of Housing Unit</b>						
Apartment .....	28	17	139	29	15	243
Single-Family Detached .....	14	8	69	17	6	97
Townhouse .....	60	28	NC	62	21	345
Other .....	29	21	251	63	12	160
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	195	44	127	81	22	NC
Personal Vehicles .....	13	7	88	16	6	88
Both .....	51	23	155	51	18	333
Neither .....	NC	NC	NC	NC	0	NC
Don't Know .....	189	219	76	331	34	256

See footnotes at end of table.

**Table 4.5.10. Relative Standard Errors for Vehicle Choice When Consumer Must Refuel the Modified Vehicle Twice as often as a Regular Vehicle and the Modified Vehicle Costs \$1,000 More, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Must Refuel Twice as Often and Vehicle Cost \$1,000 More					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	11	6	62	14	5	78
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	111	9	137	78	8	236
Very Concerned .....	28	8	139	33	7	123
Somewhat Concerned .....	12	16	110	19	12	228
Not Too Concerned .....	31	95	319	40	84	368
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	18	9	89	18	9	146
Once a Week .....	17	10	106	26	6	118
More than Once a Week .....	26	21	149	36	16	135
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	28	21	235	39	13	NC
Does Fill Tank .....	12	7	64	15	5	73

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.11. Relative Standard Errors for Vehicle Choice When Consumer Must Refuel the Modified Vehicle Twice as Often as a Regular Vehicle and the Modified Vehicle Costs \$1,000 Less, 1994**  
(Percent)

Consumer Characteristic	Must Fuel Twice as Often but Vehicle Costs \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	5	20	70	5	24	106
<b>Region</b>						
Northeast .....	20	34	141	15	34	590
Midwest .....	7	44	150	11	39	114
South .....	7	43	109	6	44	422
West .....	18	37	188	9	144	163
<b>Number of Vehicles</b>						
One .....	9	32	91	7	43	159
Two .....	7	32	128	8	40	182
Three .....	12	79	190	18	42	242
Four or More .....	29	51	461	14	91	674
<b>Sex of Respondent</b>						
Male .....	6	37	108	5	60	162
Female .....	8	24	92	8	24	140
<b>Age of Main Driver</b>						
16 to 24 .....	35	35	NC	27	128	NC
25 to 34 .....	12	33	278	9	63	306
35 to 44 .....	11	48	148	8	73	239
45 to 54 .....	12	43	518	14	35	911
55 or Older .....	8	61	64	8	41	109
<b>Education of Respondent</b>						
Elementary .....	17	359	220	31	119	396
High School .....	7	29	84	7	32	179
College .....	9	33	167	7	42	143
Graduate School .....	19	51	260	16	85	523
<b>Race of Respondent</b>						
White .....	6	22	69	5	26	101
Black .....	14	74	86	14	52	NC
Asian .....	NC	0	NC	21	NC	272
Other .....	18	202	451	9	454	NC
<b>Household Income</b>						
\$30,000 or Less .....	9	39	71	8	43	160
More than \$30,000 .....	6	24	138	6	29	142
<b>Type of Housing Unit</b>						
Apartment .....	20	41	261	10	92	376
Single-Family Detached .....	5	27	84	6	28	101
Townhouse .....	28	128	215	16	197	NC
Other .....	23	42	172	21	43	NC
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	68	76	NC	28	80	NC
Personal Vehicles .....	6	22	73	6	29	100
Both .....	14	71	NC	19	105	890
Neither .....	NC	0	NC	0	NC	NC
Don't Know .....	53	139	NC	41	127	NC

See footnotes at end of table.

**Table 4.5.11. Relative Standard Errors for Vehicle Choice When Consumer Must Refuel the Modified Vehicle Twice as Often as a Regular Vehicle and the Modified Vehicle Costs \$1,000 Less, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Must Fuel Twice as Often but Vehicle Costs \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	5	20	70	5	24	106
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	36	38	343	13	120	NC
Very Concerned .....	11	46	156	8	66	439
Somewhat Concerned .....	10	38	87	7	50	203
Not Too Concerned .....	9	246	NC	34	72	176
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	8	32	85	8	35	87
Once a Week .....	8	31	120	7	38	432
More than Once a Week .....	12	51	299	10	65	1048
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	16	39	184	11	73	NC
Does Fill Tank .....	5	24	75	5	26	99

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.12. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle and the Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994**  
(Percent)

Consumer Characteristic	Consumer Must Drive 15 Minutes Out of the Way and Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	14	15	425	12	15	306
<b>Region</b>						
Northeast .....	23	68	NC	23	36	428
Midwest .....	36	21	NC	30	32	601
South .....	18	26	908	20	26	915
West .....	45	27	276	27	30	754
<b>Number of Vehicles</b>						
One .....	29	19	853	19	21	543
Two .....	20	27	380	19	29	303
Three .....	30	47	NC	34	45	NC
Four or More .....	38	51	NC	41	58	NC
<b>Sex of Respondent</b>						
Male .....	18	22	977	19	21	273
Female .....	21	20	435	16	22	1,048
<b>Age of Main Driver</b>						
16 to 24 .....	32	70	NC	173	23	NC
25 to 34 .....	21	31	812	26	38	658
35 to 44 .....	45	20	NC	19	39	NC
45 to 54 .....	26	57	NC	24	37	NC
55 or Older .....	35	27	279	25	25	219
<b>Education of Respondent</b>						
Elementary .....	71	128	NC	105	61	NC
High School .....	19	21	508	24	18	474
College .....	22	25	NC	16	29	343
Graduate School .....	59	41	351	26	50	NC
<b>Race of Respondent</b>						
White .....	15	17	388	14	17	270
Black .....	54	34	NC	25	54	NC
Asian .....	103	124	NC	132	97	NC
Other .....	106	49	NC	56	51	NC
<b>Household Income</b>						
\$30,000 or Less .....	46	14	827	32	18	291
More than \$30,000 .....	13	26	487	12	23	693
<b>Type of Housing Unit</b>						
Apartment .....	58	29	521	36	28	374
Single-Family Detached .....	15	19	883	15	20	394
Townhouse .....	54	117	NC	47	86	NC
Other .....	41	28	534	28	47	NC
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	0	NC	NC	150	27	NC
Personal Vehicles .....	15	18	372	14	20	251
Both .....	72	51	NC	38	68	NC
Neither .....	NC	NC	NC	NC	NC	NC
Don't Know .....	72	0	NC	76	169	NC

See footnotes at end of table.



**Table 4.5.12. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle and the Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Consumer Must Drive 15 Minutes Out of the Way and Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	14	15	425	12	15	306
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	61	38	435	55	34	NC
Very Concerned .....	27	25	NC	30	21	490
Somewhat Concerned .....	25	26	NC	14	40	293
Not Too Concerned .....	57	125	276	36	104	NC
<b>Trunk Size</b>						
Large Trunk .....	24	22	644	22	21	919
Medium Trunk .....	56	52	431	28	49	335
Small Trunk .....	60	39	NC	38	57	508
No Trunk .....	20	30	845	19	32	802
<b>More Than Half the Trunk Space Used</b>						
Yes .....	21	22	289	14	26	1,042
All the Time .....	66	64	NC	54	69	NC
Most of the Time .....	27	102	NC	25	80	NC
Some of the Time .....	23	37	724	20	39	NC
Rarely .....	142	25	184	32	43	534
No .....	21	21	NC	21	21	249
<b>Things Stored or Left in Trunk</b>						
Yes .....	30	46	553	24	41	NC
No .....	22	42	NC	20	48	NC
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	18	28	834	17	25	1,099
Once a Week .....	26	19	711	22	21	245
More than Once a Week .....	31	36	640	24	46	NC
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	47	29	565	47	27	NC
Does Fill Tank .....	14	17	551	12	18	283

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.13. Relative Standard Errors for Vehicle Choice When Consumer Must Refuel Modified Vehicle Twice as Often as a Regular Vehicle and the Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994**  
(Percent)

Consumer Characteristic	Must Fuel Twice as Often and Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	10	11	278	13	10	360
<b>Region</b>						
Northeast .....	25	26	819	28	23	641
Midwest .....	32	13	241	22	24	393
South .....	18	21	540	23	16	764
West .....	13	42	NC	32	23	NC
<b>Number of Vehicles</b>						
One .....	19	18	282	19	20	751
Two .....	15	16	674	20	15	340
Three .....	38	33	571	33	31	NC
Four or More .....	21	75	NC	71	24	NC
<b>Sex of Respondent</b>						
Male .....	15	17	317	15	19	1,158
Female .....	14	15	486	20	12	342
<b>Age of Main Driver</b>						
16 to 24 .....	63	23	NC	33	46	NC
25 to 34 .....	26	18	986	25	22	705
35 to 44 .....	18	20	NC	24	23	391
45 to 54 .....	18	49	237	32	18	NC
55 or Older .....	20	27	321	30	22	565
<b>Education of Respondent</b>						
Elementary .....	64	115	NC	62	103	NC
High School .....	16	19	1,235	21	16	308
College .....	16	15	265	17	17	1,010
Graduate School .....	25	36	676	39	25	NC
<b>Race of Respondent</b>						
White .....	10	13	294	13	12	322
Black .....	400	10	NC	43	29	NC
Asian .....	19	299	NC	166	44	NC
Other .....	74	30	560	57	30	NC
<b>Household Income</b>						
\$30,000 or Less .....	21	22	365	31	17	382
More than \$30,000 .....	12	13	387	13	13	620
<b>Type of Housing Unit</b>						
Apartment .....	26	31	NC	53	24	447
Single-Family Detached .....	12	13	272	14	13	623
Townhouse .....	42	102	NC	35	57	NC
Other .....	53	24	643	61	25	497
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	54	135	NC	42	124	NC
Personal Vehicles .....	12	13	286	14	12	631
Both .....	44	39	NC	49	36	531
Neither .....	NC	NC	NC	NC	0	NC
Don't Know .....	0	NC	NC	0	NC	NC

See footnotes at end of table.

**Table 4.5.13. Relative Standard Errors for Vehicle Choice When Consumer Must Refuel Modified Vehicle Twice as Often as a Regular Vehicle and the Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Must Fuel Twice as Often and Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	10	11	278	13	10	360
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	44	27	687	41	36	245
Very Concerned .....	16	25	968	23	14	NC
Somewhat Concerned .....	14	22	670	21	20	845
Not Too Concerned .....	107	51	371	73	58	NC
<b>Trunk Size</b>						
Large Trunk .....	37	11	988	36	10	465
Medium Trunk .....	32	31	366	25	53	139
Small Trunk .....	34	19	NC	34	24	NC
No Trunk .....	9	47	369	13	32	NC
<b>More Than Half the Trunk Space Used</b>						
Yes .....	13	17	481	14	17	551
All the Time .....	33	81	496	48	41	NC
Most of the Time .....	24	77	283	26	43	NC
Some of the Time .....	17	25	NC	16	36	855
Rarely .....	34	21	NC	41	20	493
No .....	18	16	401	28	13	907
<b>Things Stored or Left in Trunk</b>						
Yes .....	22	39	257	19	30	NC
No .....	16	31	NC	19	38	738
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	13	19	250	21	17	297
Once a Week .....	17	16	1,634	18	15	938
More than Once a Week .....	38	24	724	32	24	NC
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	27	29	NC	35	31	NC
Does Fill Tank .....	11	12	256	13	11	342

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.14. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel Modified Vehicle and Modified Vehicle Must be Refueled Twice as Often as a Regular Vehicle, 1994**  
(Percent)

Consumer Characteristic	Consumer Must Drive 15 Minutes Out of the Way and Fuel Twice as Often					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	25	5	410	28	4	213
<b>Region</b>						
Northeast .....	44	14	861	56	11	217
Midwest .....	75	7	363	68	7	NC
South .....	41	8	1,131	56	6	408
West .....	50	13	NC	51	11	444
<b>Number of Vehicles</b>						
One .....	50	8	414	40	8	207
Two .....	33	8	1,264	50	6	581
Three .....	89	10	745	107	9	667
Four or More .....	69	19	NC	71	20	NC
<b>Sex of Respondent</b>						
Male .....	36	7	668	37	7	236
Female .....	35	6	521	44	5	405
<b>Age of Main Driver</b>						
16 to 24 .....	70	12	NC	45	22	NC
25 to 34 .....	43	12	NC	46	11	546
35 to 44 .....	34	11	NC	56	6	NC
45 to 54 .....	131	7	841	127	8	241
55 or Older .....	84	10	219	78	9	214
<b>Education of Respondent</b>						
Elementary .....	284	20	NC	NC	0	NC
High School .....	42	9	578	49	7	465
College .....	42	6	508	45	6	457
Graduate School .....	39	24	NC	54	13	217
<b>Race of Respondent</b>						
White .....	28	5	371	31	4	350
Black .....	132	13	NC	70	21	NC
Asian .....	83	63	NC	364	30	244
Other .....	73	25	NC	364	50	96
<b>Household Income</b>						
\$30,000 or Less .....	52	9	234	53	7	580
More than \$30,000 .....	29	6	NC	34	5	221
<b>Type of Housing Unit</b>						
Apartment .....	69	9	NC	63	14	213
Single-Family Detached .....	32	6	413	37	5	342
Townhouse .....	104	25	NC	356	13	505
Other .....	55	16	705	54	13	NC
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	NC	0	NC	182	18	NC
Personal Vehicles .....	27	6	423	31	5	270
Both .....	144	11	NC	400	12	259
Don't Know .....	101	126	NC	NC	37	200

See footnotes at end of table.

**Table 4.5.14. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel Modified Vehicle and Modified Vehicle Must be Refueled Twice as Often as a Regular Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Consumer Must Drive 15 Minutes Out of the Way and Fuel Twice as Often					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	25	5	410	28	4	213
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	120	10	269	95	7	907
Very Concerned .....	53	7	NC	45	7	882
Somewhat Concerned .....	34	10	NC	43	10	342
Not Too Concerned .....	124	51	259	129	98	95
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	53	6	326	42	7	212
Once a Week .....	37	7	NC	45	6	789
More than Once a Week .....	38	20	779	71	14	503
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	64	17	NC	54	14	NC
Does Fill Tank .....	27	5	387	32	4	198

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.15. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle, the Modified Vehicle Must be Refueled Twice as Often as a Regular Vehicle, and the Modified Vehicle Costs \$1,000 Less, 1994 (Percent)**

Consumer Characteristic	15 Minutes Out of the Way to Fuel, Fuel Twice as Often, Vehicle \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	26	17	249	37	13	179
<b>Region</b>						
Northeast .....	45	42	482	84	37	103
Midwest .....	57	43	215	89	25	NC
South .....	66	19	565	50	26	588
West .....	40	45	NC	91	19	NC
<b>Number of Vehicles</b>						
One .....	79	22	185	85	19	152
Two .....	35	27	330	46	23	595
Three .....	90	37	NC	33	121	NC
Four or More .....	28	142	NC	NC	0	NC
<b>Sex of Respondent</b>						
Male .....	28	34	332	45	20	258
Female .....	46	18	369	63	18	254
<b>Age of Main Driver</b>						
16 to 24 .....	34	84	NC	71	40	NC
25 to 34 .....	59	26	NC	56	26	NC
35 to 44 .....	26	41	NC	71	26	520
45 to 54 .....	NC	19	282	105	43	232
55 or Older .....	204	29	125	210	25	131
<b>Education of Respondent</b>						
Elementary .....	NC	NC	NC	NC	NC	NC
High School .....	34	35	576	41	40	216
College .....	42	24	219	62	18	332
Graduate School .....	96	23	NC	150	16	536
<b>Race of Respondent</b>						
White .....	33	16	222	42	15	161
Black .....	116	55	NC	54	79	NC
Asian .....	0	NC	NC	NC	0	NC
Other .....	50	104	NC	244	37	NC
<b>Household Income</b>						
\$30,000 or Less .....	66	28	188	61	29	264
More than \$30,000 .....	27	21	831	47	15	239
<b>Type of Housing Unit</b>						
Apartment .....	96	35	372	68	35	531
Single-Family Detached .....	23	28	398	48	15	536
Townhouse .....	NC	0	NC	82	156	NC
Other .....	257	25	390	188	37	106
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	NC	NC	NC	99	129	NC
Personal Vehicles .....	22	27	214	46	15	189
Both .....	NC	0	NC	189	48	NC
Don't Know .....	NC	0	NC	NC	0	NC

See footnotes at end of table.

**Table 4.5.15. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle, the Modified Vehicle Must be Refueled Twice as Often as a Regular Vehicle, and the Modified Vehicle Costs \$1,000 Less, 1994 (Continued) (Percent)**

Consumer Characteristic	15 Minutes Out of the Way to Fuel, Fuel Twice as Often, Vehicle \$1,000 Less					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	26	17	249	37	13	179
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	95	60	154	98	28	NC
Very Concerned .....	35	41	NC	61	24	227
Somewhat Concerned .....	44	22	NC	58	26	288
Not Too Concerned .....	161	166	153	279	26	NC
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	32	38	277	53	20	225
Once a Week .....	50	20	674	60	18	616
More than Once a Week .....	62	34	488	102	46	254
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	24	137	NC	78	33	NC
Does Fill Tank .....	33	16	231	42	15	165

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

**Table 4.5.16. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle, the Modified Vehicle Must be Refueled Twice as Often as a Regular Vehicle, and the Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994**  
(Percent)

Consumer Characteristic	Drive 15 minutes out of the Way, Fuel Twice as Often, Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	17	9	474	18	8	196
<b>Region</b>						
Northeast .....	25	35	1,230	47	15	878
Midwest .....	31	15	572	32	16	1,059
South .....	33	13	792	30	12	312
West .....	52	18	NC	41	19	213
<b>Number of Vehicles</b>						
One .....	43	11	831	42	10	262
Two .....	22	15	1,137	22	15	404
Three .....	36	25	532	38	22	354
Four or More .....	47	39	NC	97	21	NC
<b>Sex of Respondent</b>						
Male .....	24	14	496	26	11	285
Female .....	24	11	1,097	25	10	272
<b>Age of Main Driver</b>						
16 to 24 .....	50	21	NC	68	22	NC
25 to 34 .....	36	19	NC	44	15	1,018
35 to 44 .....	25	22	915	33	13	445
45 to 54 .....	55	15	631	46	17	285
55 or Older .....	41	20	606	30	21	248
<b>Education of Respondent</b>						
Elementary .....	274	23	NC	229	32	NC
High School .....	35	14	331	46	10	337
College .....	20	13	2,273	22	13	244
Graduate School .....	55	29	NC	33	23	1,005
<b>Race</b>						
White .....	16	10	701	18	8	204
Black .....	101	25	414	140	20	566
Asian .....	NC	0	NC	52	100	NC
Other .....	215	15	NC	201	32	NC
<b>Household Income</b>						
\$30,000 or Less .....	39	12	1,565	44	9	NC
More than \$30,000 .....	18	12	485	19	11	159
<b>Type of Housing Unit</b>						
Apartment .....	48	16	NC	108	9	NC
Single-Family Detached .....	20	11	381	17	11	251
Townhouse .....	41	81	NC	467	18	199
Other .....	63	19	NC	52	20	661
<b>Transportation Type Most Often Used</b>						
Public Transportation .....	115	45	NC	47	68	NC
Personal Vehicles .....	19	11	1,163	21	10	181
Both .....	91	19	NC	86	20	NC
Don't Know .....	NC	0	NC	NC	0	NC

See footnotes at end of table.



**Table 4.5.16. Relative Standard Errors for Vehicle Choice When Consumer Must Drive 15 Minutes Out of the Way to Refuel the Modified Vehicle, the Modified Vehicle Must be Refueled Twice as Often as a Regular Vehicle, and the Modified Vehicle Has Half the Trunk/Cargo Space of a Regular Vehicle, 1994 (Continued)**  
(Percent)

Consumer Characteristic	Drive 15 minutes out of the Way, Fuel Twice as Often, Half Trunk/Cargo Space					
	Modified Vehicle Pollutes Half as Much as Regular Vehicle			Modified Vehicle Does Not Pollute		
	Regular Vehicle	Modified Vehicle	Don't Know	Regular Vehicle	Modified Vehicle	Don't Know
<b>All Consumers</b> .....	17	9	474	18	8	196
<b>Respondent Concern for the Environment</b>						
Extremely Concerned .....	46	21	NC	63	15	196
Very Concerned .....	27	14	878	29	12	982
Somewhat Concerned .....	28	17	431	29	18	333
Not Too Concerned .....	80	80	NC	0	NC	NC
<b>Trunk Size</b>						
Large Trunk .....	45	13	264	36	11	396
Medium Trunk .....	62	22	NC	75	16	671
Small Trunk .....	72	12	NC	56	15	350
No Trunk .....	18	22	NC	23	24	296
<b>More Than Half the Trunk Space Used</b>						
Yes .....	21	13	364	20	14	251
All the Time .....	50	66	NC	177	17	NC
Most of the Time .....	51	28	NC	72	39	150
Some of the Time .....	33	22	278	24	21	1,155
Rarely .....	41	19	1,367	34	30	566
No .....	36	11	NC	44	8	293
<b>Things Stored or Left in Trunk</b>						
Yes .....	41	21	554	31	26	247
No .....	30	26	482	36	18	868
<b>Frequency of Gas Purchase</b>						
Less than Once a Week .....	21	15	943	25	12	411
Once a Week .....	28	13	515	26	12	231
More than Once a Week .....	79	17	NC	75	16	632
<b>Amount of Gas Purchase</b>						
Does not Fill Tank .....	118	15	NC	38	28	NC
Does Fill Tank .....	17	10	453	20	8	186

NC = No cases in responding sample.

Source: Energy Information Administration, Office of Energy Markets and End Use, Joint Program in Survey Methodology Consumer Vehicle Preference Survey.

## 4.6. Data Quality

Most of the information concerning the sample selection and sample weights found in the following pages is excerpted from “Methods Report for Joint Program in Survey Methodology Study of Public Attitudes About Alternative Fuel Vehicles” provided to EIA by the University of Maryland.

### Sample Selection

The eligible population for the study consisted of telephone households in the continental United States that owned or leased one or more motor vehicles driven on a regular basis. The respondent was the adult in the household most knowledgeable about the use of the household’s vehicles.

The sample was selected using the Brick-Waksberg (1991)<sup>1</sup> modification of the Mitofsky-Waksberg (Waksberg 1978)<sup>2</sup> Random Digit dialing two-stage cluster design. A frame of all possible clusters, defined as banks of 100 telephone numbers, was generated (stratified by Census Region) from the January 1994 Bellcore Master Data File, a listing of all area code exchange combinations in the United States. A systematic selection of clusters was then made from this frame. One telephone number was randomly generated in each selected cluster and called. If it was a household, the cluster was retained; if not, the cluster was excluded.

A total of 543 clusters was retained and eight telephone numbers sampled within each. Since clusters are selected with probabilities proportionate to size and the number of second-stage households (households contained within the retained clusters) can vary by cluster, the Brick-Waksberg design does not produce an equal probability sample. The design requires weighting to adjust for these unequal probabilities.

Although the method does not achieve an equal probability sample, it has operational advantages. Unlike the Mitofsky-Waksberg design, the Brick-Waksberg method does not require sequential replacement of nonresidential telephone numbers. Instead, the total sample is generated and released based on estimates of nonresidential telephone numbers and the anticipated response rate. In this way, the cluster size is achieved without the cost of replacing non-households and nonworking numbers as they are identified.

### Response Rate

A total of 4,344 telephone numbers was selected from the 543 clusters. The disposition of these numbers is summarized in Table 4.6.1.

<sup>1</sup> Michael J. Brick and Joseph Waksberg, “Avoiding Sequential Sampling with Random Digit Dialing,” *Survey Methodology* (1991), pp. 17, 27-41.

<sup>2</sup> Joseph Waksberg, “Sampling Methods for Random Digit Dialing,” *Journal of the American Statistical Association* (1978), pp. 73, 40-46.

**Table 4.6.1. Disposition of Selected Telephone Numbers**

Phone Numbers		Households		Known Eligible	
Non-households	1,638	Known Ineligible	219	Interviews	1,712
Never Answered	90	Unknown Eligibility	493	Refusals	111
Households	2,616	Known Eligible	1,904	Not-at-homes	60
Total	4,344	Total	2,616	Misc. Problems <sup>a</sup>	21
				Total	1,904

<sup>a</sup>Language, illness, or hearing problems.

Of the 4,344 numbers, 1,638 were non-households (businesses and non-working numbers). In addition, 90 numbers were never answered after at least 20 dialings and were assumed to be non-households.

Of the 2,616 identified households, eligibility (whether the household owned or leased a vehicle) was determined for 2,123, of which 1,904 were eligible and 219 were ineligible. For 493 cases, eligibility could not be determined mainly because of refusals. The response rate is the total number of interviews divided by the number of eligible cases. The unknown eligibility category can be treated in various ways. The most conservative approach, treating 100 percent of such cases as eligible, gives a response rate of 71.4 percent. A more realistic response rate can be calculated by assuming the same proportion of these households had a vehicle (89.7 percent) as for the 2,123 households for which eligibility was determined. This response rate is 73.0 percent.

## Sample Weights

Two design weights were used to adjust for unequal probabilities of selection: (1) the inverse of the number of telephone numbers in the household and (2) the ratio of the mean number of households per cluster to the number of households in the particular cluster. (In eight cases, this weight was trimmed so that it did not exceed three times the mean weight.)

There are also two post-stratification weights: (1) a geographic weight to adjust the sample distribution by major Census region to the distribution of all households with cars and (2) a cluster weight that is the ratio of households with cars (in the cluster) to households with cars that meet the regular use screening criterion. (Most often, this weight equals 1.)

Finally, an additional factor sets the weighted sample size equal to the unweighted sample size. All weights and the adjustment factor are combined into one variable (variable name = WEIGHT) and attached to the record for each case in the data set.

## Nonsampling and Sampling Error

The statistics in this report are estimates of population values. These estimates are based upon a randomly chosen subset of the entire population of households with vehicles in the contiguous United States. As a result, estimates always differ from the true population values. The differences between estimated values and the actual population values are of two types, nonsampling errors and sampling errors. Nonsampling errors are errors of the survey process that can result from difficulties such as unit nonresponse or item nonresponse, inaccuracies in data collection, or incomplete coverage in the design of the sampling frame. Sampling error is a result of the survey design, due to the fact that data are obtained from a subset of the population of interest, rather than all members.

## Nonsampling Errors / Adjustment for Item Nonresponse

Item nonresponse occurs when an item (or several items) is missing in an otherwise completed questionnaire, possibly because the respondent does not know or, less frequently, refuses to give the answer to a particular question. Item nonresponse is also recorded when the interviewer does not ask the question or does not record the answer during the interview. For eight respondent demographic characteristics and 15 vehicle characteristic variables, values were imputed for nonresponse. No imputations were made for missing preference or attitudinal items. Imputations were made using a technique known as “hot-deck” imputation. In hot-decking, when a certain response is missing for a given respondent, another respondent, called a “donor,” is randomly chosen to furnish its reported value for that missing item. That value is then assigned to the respondent with item nonresponse.

To serve as a donor, the respondent has to be similar to the nonrespondent in characteristics correlated with the missing item. This procedure was used to reduce the bias caused by different nonresponse rates for a particular item among different types of respondents. Characteristics used to define “similar” depended on the nature of the item to be imputed. The most frequently used characteristics were: Census region, State, age of the respondent, household income, type of home, and education of the respondent. This analysis used a vector hot-deck procedure. With this procedure, the respondent that donated a particular item to a receiver also donated certain related items if any of these were missing. Thus, a vector of values, rather than a single value, is copied from the donor to the receiver. This helps to keep the hot-decked values internally consistent, avoiding the generation of implausible combinations of respondent or vehicle characteristics.

## Sampling Error

Sampling error occurs because the selected sample represents only one of the possible samples that could be selected under the same survey specifications. The estimated values are developed from one of the many possible samples that could be drawn and, therefore, will differ from true population values that would be obtained from a complete enumeration. Each possible sample yields its own estimate of the true population values, with the differences attributable to the particular set of cases selected in each sample.

One measure of the variability of a survey estimate due to the sampling process is the average magnitude of the difference between the values of the estimate for individual samples and the average value of the estimate over all samples of the same size based on the same design. In other words, sampling error is a measure of the variability of an estimate over all comparable samples, one of which was drawn. The average magnitude of the sampling error is measured by the standard error of an estimate. The standard error is the root-mean-square measure of average difference over all possible samples.

Most statistical packages assume simple random sampling. This study employed a more complex design. Therefore, in estimating sampling errors, a method is needed to take account of the sample design and the use of weights. SUDAAN (Survey Data Analysis) was used to compute the design effect (the ratio of the variance reflecting design complexities to the variance of a simple random sample of the same size) on 21 variables (five demographic, six attitudinal, and ten behavioral). The design effect was estimated at 1.13. Standard errors were computed by multiplying the standard error associated with a simple random sample design by the design effect as follows:

$$DE \times \sqrt{\frac{PCT \times (1 - PCT)}{n}} = S_{PCT}$$

where DE is the design effect, PCT is the estimate (in the form of a percent of the total), and  $S_{PCT}$  is the standard error of the estimate.

In this report, standard errors were expressed as relative standard errors (RSE). The relative standard error (RSE) is the standard error expressed as a percent of the estimate, that is, for an estimate PCT:

$$\frac{S_{PCT}}{PCT} = RSE_{PCT}$$

Estimates with RSE greater than 50 percent were withheld from the published tables due to their lack of precision. Estimates were also withheld if the number of observations was less than 10.

**Using the RSE.** To determine the standard error for an estimate, multiply the RSE for the estimate, shown in the tables in this appendix, by the estimate. The standard error can be used to construct confidence intervals and to perform hypothesis tests by using standard statistical methods.

### Calculating the Confidence Range

To calculate the 95-percent confidence range (that range which covers the true value of the estimate with 95 percent confidence):

1. Multiply the standard error by 1.96
2. Subtract the result of Step 1 from the given estimate to determine the bottom of the range
3. Add the result of Step 1 to the given estimate to determine the top of the range.

### Measuring Statistical Significance

To determine if the difference between any two estimates in this report are statistically significant:

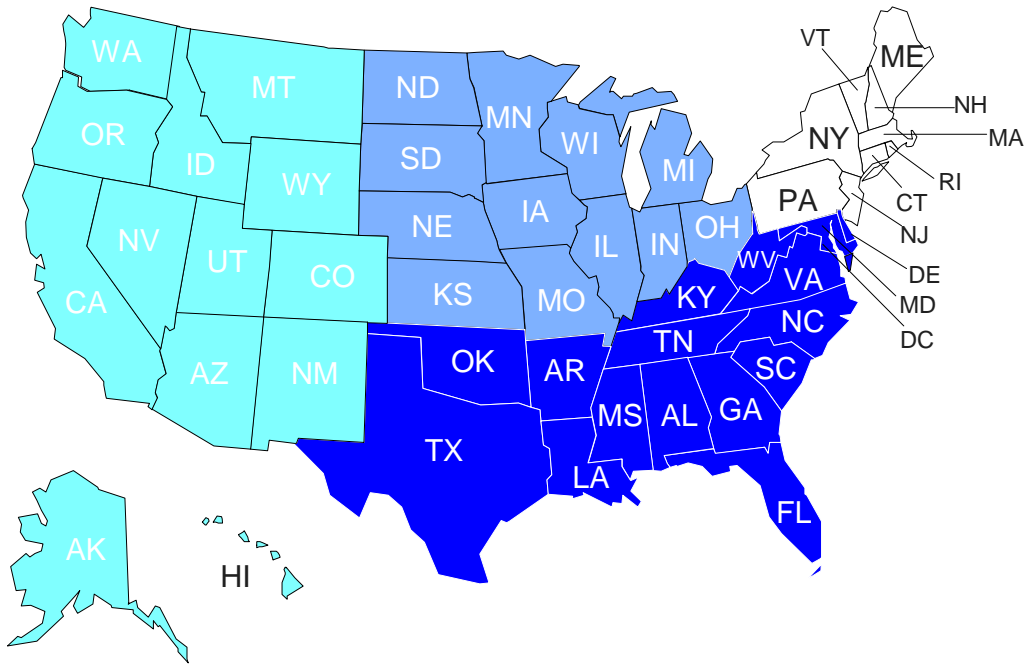
1. Calculate the standard error of each estimate
2. Square the standard error of each estimate
3. Add the two values from Step 2
4. Take the square root of the value in Step 3
5. Multiply the value in Step 4 by 1.96

If the value in Step 5 is less than the difference in the estimates, the difference between the estimates is statistically significant.

## **Section 5.**

### **U.S. Census Region Map and Glossary**

# 5.1. U.S. Census Region Map



- West Region
- Midwest Region
- South Region
- Northeast Region

## 5.2. Glossary

**Alternative Fuel:** As defined pursuant to EPACT: “methanol, denatured ethanol, and other alcohols; mixtures containing 85 percent or more (or such other percentage, but not less than 70 percent, as determined by the Secretary, by rule, to provide for requirements relating to cold start, safety, or vehicle functions) by volume of methanol, denatured ethanol, and other alcohols with gasoline or other fuels; natural gas; liquefied petroleum gas; hydrogen; coal-derived liquid fuels; fuels (other than alcohols) derived from biological materials; electricity (including electricity from solar energy); and any other fuel the Secretary determines, by rule, is substantially not petroleum and would yield substantial energy security benefits and substantial environmental benefits.”

**Alternative-Fuel Vehicle:** A vehicle that has the capability of being fueled by an alternative fuel. This category of vehicle includes dual-fuel, bi-fuel and flexible-fuel, as well as dedicated vehicles.

**Bi-Fuel Vehicle:** A vehicle with the capability of using two separate fuel systems, one that can be operated on a conventional fuel and one that can be operated on an alternative fuel.

**Clean Air Act Amendments of 1990 (CAAA):** Public Law No. 105-549. The 1990 amendments to the Clean Air Act of 1970 include provisions that require gasoline refiners to reformulate their gasolines to meet more stringent emissions standards. In cities that do not meet Federal air-quality requirements set forth in the 1990 amendments, gasolines must be reformulated during certain months, when air pollution levels are most serious. The regulations also require certain fleet operators in 22 cities nationwide to use clean fuel vehicles.

**Compressed Natural Gas (CNG):** Natural gas that has been condensed under high pressures, typically between 2,000 and 3,600 psi, and expands when released from a container; used as an alternative fuel for motor vehicles.

**Converted Vehicle:** A vehicle originally designed to operate on gasoline that has been modified to run on an alternative fuel.

**Dedicated Vehicle:** A motor vehicle that operates solely on one fuel.

**Dual-Fuel Vehicle:** Vehicles designed to run on a combination of an alternative fuel such as CNG or LPG, and a conventional fuel, such as gasoline or diesel. Dual-fuel systems are used mostly in heavy-duty or diesel engines. The vehicle generally has two separate fuel tanks, from which both fuels are injected into the combustion chamber simultaneously.

**Electric Vehicle:** A vehicle powered by electricity. Generally, the electricity is provided by batteries, which store electricity, but may also be provided by photovoltaic cells or a fuel cells, which convert light or chemical energy to electricity.

**Energy Policy Act of 1992 (EPACT):** Public Law 104-486. A broad energy act with several titles that deal with alternative transportation fuels. EPACT includes provisions for accelerating purchases of alternative-fuel vehicles by Federal fleets, certain urban area State government fleets, the fleets of providers of alternative fuels, and under certain conditions, private and municipal fleets.

**Fleet Vehicle:** Any on-road motor vehicle owned or operated by the reporting company and used in the normal operations of the company. Fleet vehicles include gasoline and/or diesel-powered vehicles **and** alternative-fuel vehicles.

**Flexible-Fuel Vehicle:** A vehicle that has the ability to operate on a mixture of an alternative fuel and gasoline or diesel or to operate exclusively on an alternative fuel or gasoline or diesel.

**Gross Vehicle Weight (GVW):** The weight of the empty vehicle plus the weight of the maximum load that would be carried on the vehicle.



**Heavy Trucks:** A truck weighing more than 26,000 lbs. GVW. If the reporting company was unable to estimate the weight of a fleet vehicle, the company's best assessment of the vehicle size classification was acceptable.

**Light-Duty Vehicles:** Those vehicles (passenger cars, trucks, vans, and sport/utility vehicles) that weigh no more than 8,500 lbs. GVW. If the reporting company was unable to estimate the weight of a fleet vehicle, the company's best assessment of the vehicle size classification was acceptable.

**Light Trucks:** A truck or van weighing between 8,501 and 14,000 lbs. GVW.

**Liquefied Natural Gas (LNG):** Natural gas that has been condensed to a liquid, typically by cryogenically cooling the gas; used as an alternative fuel for motor vehicles.

**Liquefied Petroleum Gas (LPG):** A hydrocarbon and colorless gas byproduct of natural gas production, produced from crude oil; used as an alternative fuel for motor vehicles.

**Medium Trucks:** A truck or van weighing between 14,001 lbs. GVW and 26,000 lbs. GVW. If the reporting company was unable to estimate the weight of a fleet vehicle, the company's best assessment of the vehicle size classification was acceptable.

**Metropolitan Area:** A metropolitan statistical area or consolidated metropolitan statistical area, as established by the Bureau of the Census, with a 1980 population of more than 250,000.

**Multifuel Vehicle:** Any alternative-fuel vehicle capable of operating on more than one fuel. This term is meant to encompass bi-fuel, flexible-fuel, dual-fuel, and hybrid vehicles.

**Municipal Fleets:** Fleets that are part of local government (i.e., are not part of Federal or State government). These fleets provide services to particular political jurisdictions below the State level of government.

**Nonattainment Area:** A region determined by population density in accordance with the U.S. Census Bureau that exceeds minimum acceptable national air quality standards for one or more air pollutants regulated under the Clean Air Act.

**Private Fleet:** Any nonresidential business fleet, i.e., a fleet that is not a unit of government.

**Private Fueling Facility:** A fueling facility that normally services only fleets and is not open to the general public.

**Propane:** See Liquefied Petroleum Gas (LPG).

**Public Fueling Facility:** A fueling facility that is open to the general public.