ENERGY INFORMATION ADMINISTRATION (EIA)

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HOUSEHOLD VEHICLES ENERGY USE: LATEST DATA & TRENDS

BASED ON AUGMENTATIONS OF THE JANUARY 2004 RELEASE OF THE 2001 NATIONAL HOUSEHOLD TRAVEL SURVEY CONDUCTED BY THE U.S. DEPARTMENT OF TRANSPORTATION AND OTHER RELEVANT EIA DATA

ENERGY INFORMATION ADMINISTRATION
OFFICE OF ENERGY MARKETS AND END USE
U.S. DEPARTMENT OF ENERGY
WASHINGTON, DC 20585

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CONTACTS AND ACKNOWLEDGEMENTS

This report was prepared by the Energy Information Administration (EIA) under the general direction of Margot Anderson, Director of the Office of the Energy Markets and End Use (202.586.2589). Dwight K. French, Director of the Energy Consumption Division (ECD) (202.586.1126) and Mark A. Schipper, Program Manager (202.586.1136), directed this project. Specific technical information may be obtained from Derrick S. Pinckney (202.586.5744), Survey Statistician for transportation programs.

EIA expresses its gratitude for the data support received from the National Highway Traffic Safety Administration's Corporate Average Fuel Economy (CAFE) program for critical data components of this project, without such assistance and participation none of this effort would have been possible.

Contacts for detailed technical questions on energy consumption and consumer topics may be found on http://www.eia.doe.gov/contacts/multifc.htm. For information on the National Household Travel Survey and its sampling and estimation methods, please contact Susan Liss of the Federal Highway Administration on 202.366.5060 or Patricia Hu, Director of the Center for Transportation Analysis of Oak Ridge National Laboratory of Center for Transportation Analysis, Oak Ridge National Laboratory, on 865.946.1349.

This report, Household Vehicles Energy Use: Latest Data & Trends, provides details on the nation's energy use for household passenger travel. A primary purpose of this report is to release the latest consumer-based data on household vehicles and expenditures, derived from the U.S. Department of Transportation's 2001 National Household Travel Survey (NHTS) and independent estimates of vehicle miles per gallon and fuel prices at that time.

This report also draws on data programs made available to the EIA from other Federal agencies, EIA's past Residential Transportation Energy Consumption Surveys (RTECS) and other EIA data sources and projections to assess household transport energy use from 1983 to the present time and into the near future. The data and analysis in this report center on several important intensities of use of household energy use for travel: number and type of vehicles per household; annual miles per household and per vehicle; gallons of fuel consumed and type of fuel used; prices paid for fuel and total expenditures; and fuel economy.

Only light-duty vehicles and recreational vehicles are included in this report. EIA has excluded motorcycles, mopeds, large trucks, and buses in an effort to maintain consistency with its past residential transportation series, which was discontinued after 1994.

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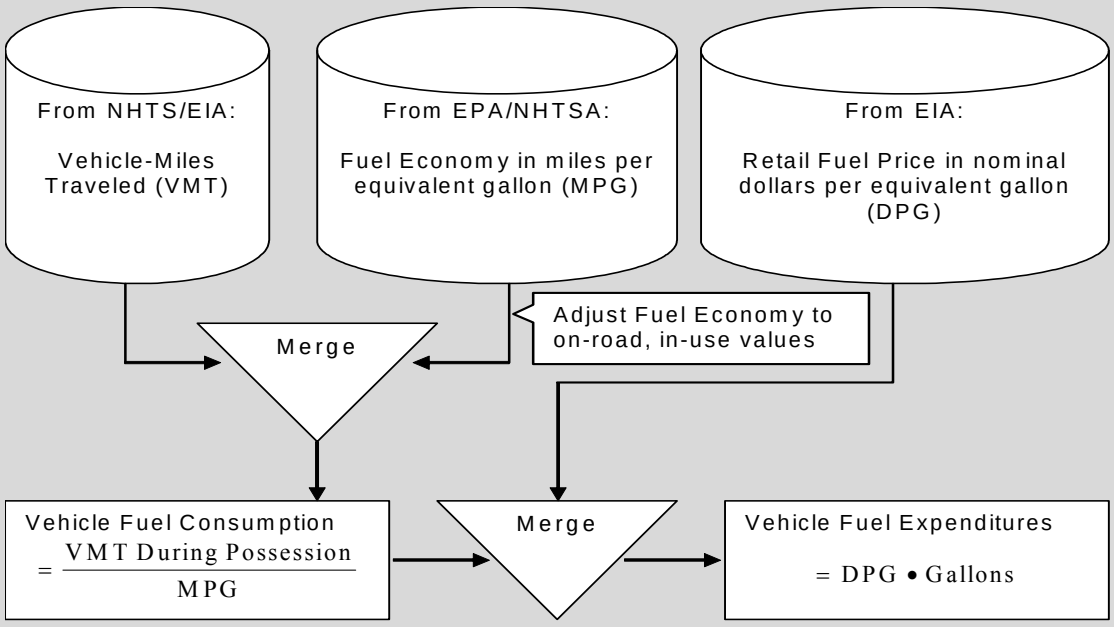
EXECUTIVE SUMMARY

INTRODUCTION

This report, *Household Vehicles Energy Use: Latest Data & Trends*, provides details on the nation's energy use for household passenger travel. A primary purpose of this report is to release the latest consumer-based data on household vehicles and expenditures, derived from the U.S. Department of Transportation's 2001 National Household Travel Survey (NHTS) and independent estimates of vehicle miles per gallon and fuel prices at that time (see Figure ES1).

This report also draws on data programs made available to the Energy Information Administration (EIA) from other Federal agencies, the five past Residential Transportation Energy Consumption Surveys[1] (RTECS) conducted by EIA and other EIA data sources and projections to assess household transport energy use from 1983 to the present time and into the near future. The data and analysis in this report center on several important intensities of use for travel: number and type of vehicles per household; annual miles per household and per vehicle; gallons of fuel consumed and type of fuel used; prices paid for fuel and total expenditures; and fuel economy.

Figure ES1. Schema for Estimating Energy and Energy-Related Statistics, 2001



Sources: NHTS – National Household Travel Survey, EPA – Environmental Protection Agency, EIA – Energy Information Administration, and NHTSA – National Highway Traffic Safety Administration.

[1] The RTECS was conducted on a multi-year basis: 1983, 1985, 1988, 1991, and 1994, after which it was discontinued by EIA.

HIGHLIGHTS

1. The energy consumed by light-duty vehicles focuses attention on the volatility of crude oil prices and the prospects for reducing reliance on oil imports, as well as the potential environmental impacts.

In 2001, the United States consumed 113.1 billion gasoline-equivalent gallons (GEG) to fuel passenger travel by light-duty vehicles, a rise of 3.3 percent per year from 1994, when 90.6 billion was consumed. That fuel consumption by light-duty vehicles, stored in a tank the size of a regulation football field, would require the tank to have walls nearly 50 miles high.[2] The *entire* transport sector is not only the second largest consumer of energy, but it also has recently become the largest contributor to the nation's greenhouse gas emissions of carbon dioxide, topping industrial emissions in 1999, primarily due to transport's heavy reliance on petroleum products, such as motor gasoline.[3]

The nation currently cannot provide for all its petroleum demand with domestically produced crude oil. The decline in domestic oil production, coupled with a rise in oil consumption, resulted in net imports of crude oil and petroleum products surpassing 11.8 million barrels per day in 2004, with imports reaching an all-time high of just over 12.9 million barrels per day, of which over 40 percent had originated at countries belonging to the Organization of Petroleum Exporting Countries (OPEC). Furthermore, motor gasoline accounted for nearly one-half (8.9 million barrels per day) of the 20 million barrels per day of petroleum products consumed domestically in 2004, with 13.6 million barrels per day of that total identified as transport sector use.

2. Costlier energy, in part, powers consumers' expenditures to higher levels, as they paid nearly equal amounts for household services and for their transport energy needs.

For consumers, energy costs are a foremost concern. Transportation costs have increased due to many factors related to travel and prices paid for transportation fuel, while being somewhat offset by improved fuel economy. In 2001, consumers paid nearly equal amounts for energy used for household services (ranging from cooking and water heating to refrigeration and lighting) and for personal transport. The average household spent $1,520 for transport and remitted $1,493 for household services, just $27 more per year, as measured in nominal dollars.

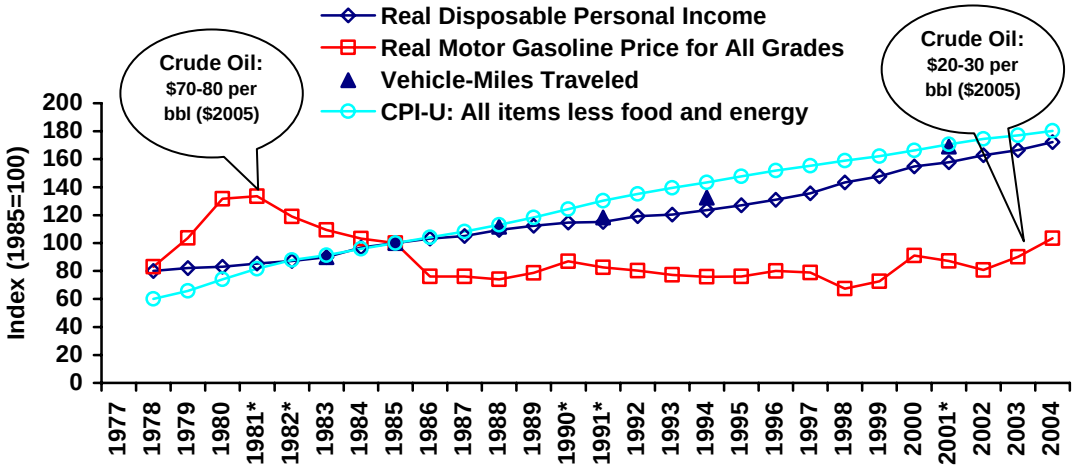
By contrast, an average household paid $1,174 for passenger travel in 1994, while having paid $1,620 for household services in 1993 – a year in which heating and cooling seasons were

[2] A ft^3 equals 7.48 gallons. See www.ncaa.org/champadmin/football/football_field.gif for field dimensions.

[3] Burning a gallon of gasoline releases 8.9 kilograms (373.8 kg per bbl) of carbon dioxide into the atmosphere. See *National Research Council*, Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards (Washington, D.C.: National Academy of Sciences, 2002), p. 85.

well within 30-year norms. It can be argued that, based on those statistics, what America drives on its roadways[4] has become as important energy-wise as what heating equipment it places in its basements and appliances in its electrical sockets.

Figure ES2. Annual Indices of Real Disposable Income, Vehicle-Miles Traveled, Consumer Price Index (CPI-U), and Real Average Retail Gasoline Price, 1978-2004, 1985=100



*Sources: Energy Information Administration, Annual Energy Review 2004; Bureau of Economic Analysis; Note * = recession year.*

While the real retail price of gasoline has risen and fallen over the past two decades, there has been an overall decline of 1.3 percent per year between 1983 and 2001, with substantial drops in 1986 and 1998 and somewhat smaller ones in 1991 and 2001 (see Figure E1 for a Chronology of World Oil Prices, as this price explains most of the variations found in refined gasoline prices). In contrast, the prices of other consumer products[5] have risen dramatically, taking a higher real percentage of consumers' budgets. Given the minor role fuel prices have played in determining vehicle use, there is little surprise that vehicle-miles traveled is better correlated with disposable income than retail prices; furthermore, the improvement in energy intensity, though unexceptional, might have further weakened a diminished price signal by mitigating the effect of fuel prices, where consumers could travel further on a single dollar of transportation fuel. Given that retail price is primarily based on the price paid for crude oil, price signals to consumers should mimic world crude oil prices, which have exceeded $50 per barrel (bbl) – at times surpassing $60 per bbl.[6]

[4] 8.3 million lane-miles. See *Federal Highway Administration*, Highway Statistics 2003 (U.S. Department of Transportation, Washington, DC) table HM-60.

[5] See components of the Consumer Price Index conducted by the U.S. Bureau of Labor Statistics.

[6] See *Federal Trade Commission*, Gasoline Price Changes: the Dynamic of Supply, Demand, and Competition, July 5, 2005, Washington, DC. Accessed http://www.ftc.gov/opa/2005/07/gaspricefactor.htm on July 25, 2005.

3. Vehicle fuel expenditures are expected to rise in the near term, all else being equal.

Based on expected future energy prices which partially reflect producers' acquisition costs, the gap between transport cost and household services cost may expand. Between 2001 and 2006, expenditures for motor gasoline are expected to increase from $1,370 per household per year to $2,327 in 2006, up nearly $960 per household. For comparison, in 2001, gasoline prices averaged $1.43 per gallon; in 2006, gasoline prices are expected to average $2.43 per gallon (a 71-percent increase in nominal terms and 52-percent increase when adjusted by inflation)[7]

4. Households, on average, have increased their mobility.

In 2001 there were 107.4 million households in the United States, of which nearly 98.9 million (92 percent) actually owned or possessed one or more vehicles, an increase of 1.8 percent per year from 1983, when 86 percent, or 72.2 million out of 84.4 million households, had possessed one or more vehicles. The increasing number of households and a greater fraction of those possessing a vehicle, all else been equal, should result in increased energy needs for the nation.

Since 1983, with some minor deviations, the growth in vehicle-miles traveled has mirrored the increases in real disposable income. For instance, between 1983 and 1985, when annual real gasoline prices dropped 4.4 percent per year, the annual growth of vehicle-miles traveled (i.e., overall travel) and disposable income rose 5.4 and 5.5 percent, respectively. Despite some inconsistencies when travel activity grew faster than disposable income, their overall growth between 1983 and 2001 is in near lock-step formation, with real disposable income registering a rise of 3.2 percent per year and travel activity growing at an annual rate of 3.6 percent.

5. Based on new vehicle sales figures, consumers' preferences for sports-utility vehicles is unmistakable, although cars still rank as the single largest segment of the nation's vehicle stock – accounting for nearly 6 out of every 10 vehicles on American roadways.

Even though sports-utility vehicles (SUVs) are increasingly popular among Americans, passenger cars still rank as their overall vehicle of choice, as they make up the majority of vehicles on America's roadways. Cars, including station wagons, represented just over 50 percent

[7] Energy Information Administration, Short-Term Energy Outlook. Accessed http://www.eia.doe.gov/emeu/steo/pub/contents.html on November 14, 2005.

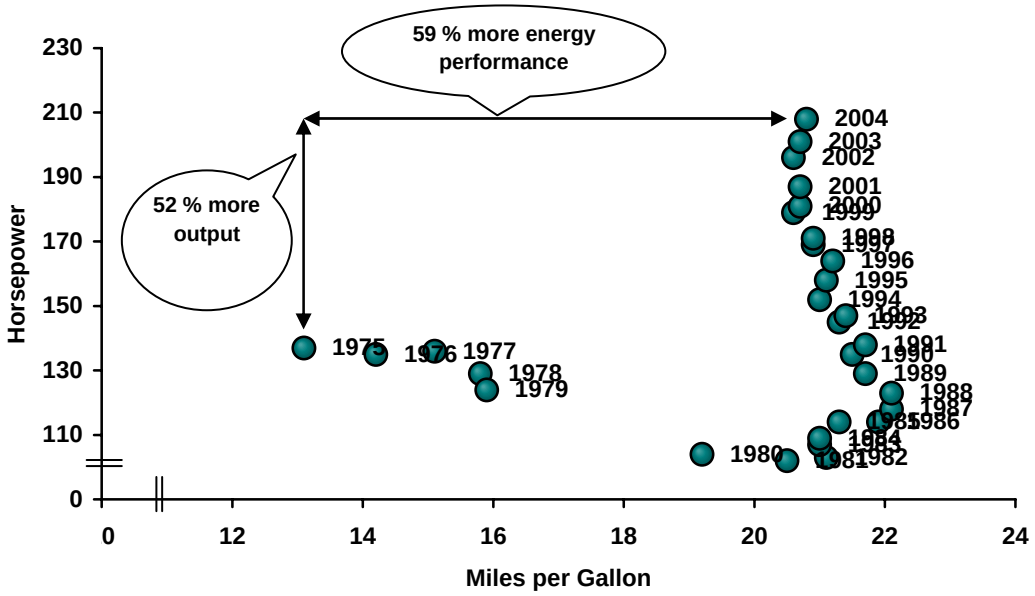
of the new vehicle purchases in 2001, as reported by the EPA, though in each of the subsequent years they have lost market share to SUVs. As of 2001, a recession year, the distribution of sales and scrappage rates had resulted in a household vehicle fleet of 191.0 million vehicles: 112.4 million (58 percent) passenger cars, 18.4 million (10 percent) vans, 23.2 million (12 percent) SUVs, 35.6 million (19 percent) pickups, and 1.4 million (1 percent) recreational vehicles.

6. The vehicles desired by consumers over the past 15 or 20 years have led to heavier, more powerful, and faster vehicles, equipped with increasingly powerful engines, generally exhibiting unexceptional improvements in energy performance (defined as gallons of fuel needed to travel one thousand miles or liters to travel 100 kilometers).

Tracking an economy's energy intensity – one measure of energy performance – as the ratio of energy per Gross Domestic Product (GDP) or the environmentally analogous intensity of carbon dioxide emitted per GDP[8] is common in energy economics, and such a technique can be applied to transport. Instead of a ratio of economy-wide energy use per GDP, a ratio of gasoline-equivalent gallons (GEG) per vehicle-miles traveled for the *entire* vehicle stock is calculated. That overall intensity of energy use has steadily improved since 1983, though the greatest strides in lowering (improving) energy intensity had occurred before 1991. Post-1991 intensity improvements (i.e., *energy performance*) slowed dramatically, yielding an overall annual improvement of 1.6 percent between 1983 and 2001, as compared to the 3.2 and 4.2 percent gains seen in the 1983-1985 and 1985-1988 time periods, respectively. Figures ES3 and ES4 provide evidence of the lopsided improvement in the nation's energy performance. Moreover, this report also decomposes the change in energy use over time.

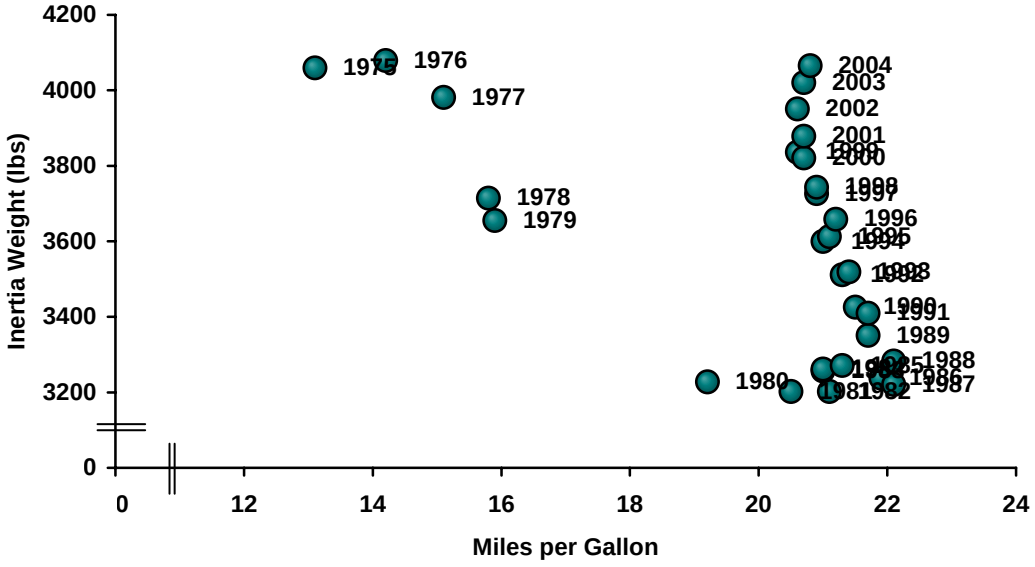
[8] Emissions from petroleum-powered vehicles are directly proportional to energy use.

Figure ES3. Sales-Weighted Horsepower and On-Road Fuel Economy for New Light-Duty Vehicles, 1975-2004 Model Years



Source: Environmental Protection Agency, Fuel Economy Trends 2004.

Figure ES4. Sales-Weighted Inertia Weight and On-Road Fuel Economy for New Light-Duty Vehicles, 1975-2004 Model Years

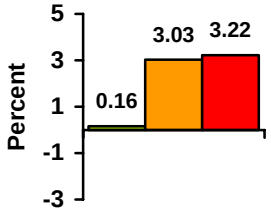


Source: Environmental Protection Agency, Fuel Economy Trends 2004.

DECOMPOSING ENERGY USE

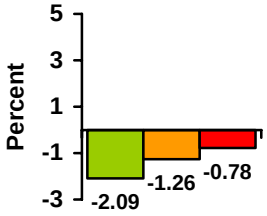
7. Over time, fuel economy's influence on driving down energy use has lessened. Decomposing the change in energy use reveals such influences that fueled the growth in energy use, as well as deflated it, shedding light on the nation's continuing economic exposure to oil.

Figure ES5. Actual Annual Energy Growth – All Effects Are Included



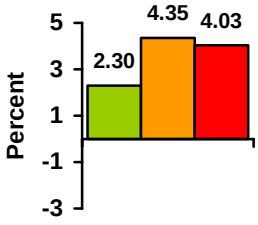
Source: Energy Information Administration.

Figure ES6. Fuel Economy Effects on Annual Energy Growth



Source: Energy Information Administration.

Figure ES7. Adjusted Annual Energy Growth – No Fuel Economy Effects



Source: Energy Information Administration.

1988-1991 | 1991-1994 | 1994-2001

Consumers' energy needs for travel using personally owned vehicles (POV) grew unevenly between 1988 and 2001, averaging 2.46 percent per year. Measuring…

the effect on the change in energy use from improving technologies shows that Fuel Economy effects had dampened energy use, but those effects have sharply diminished over time, suggesting significant savings occurred prior to 1991 and much less so in following years. By excluding the effects of technology advancements affecting fuel economy…

energy use would have surged to even higher levels, climbing higher than the actual amounts because of those exclusions – 2.30 percent per year versus 0.16 percent between 1988 and 1991; 4.35 percent versus 3.03 percent between 1991 and 1994; 4.03 percent versus 3.22 percent between 1994 and 2001, resulting in billions of gallons of energy "savings" and decreasing, though at a declining rate, the nation's exposure to oil.

In addition to Fuel Economy Effects, there are numerous other factors affecting the change in energy use – though not always as an offset. Decomposition is a means of analyzing an overall change over time. The key is identifying intermediate predictors that are measurable and dimensionally intertwined with each other in measurable ratios such that an overall ratio can be "decomposed" into the product of two or more "effects," effectively linking them together. One then can conclude that the components represent the contributions of the change in each of the effects represented by the component ratios to the overall change.

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ENERGY OVERVIEW

INTRODUCTION

This report, *Household Vehicles Energy Use: Latest Data & Trends*, provides details on the nation's energy use for passenger travel. Drawing on several databases made available to the Energy Information Administration (EIA) from other federal agencies, and EIA's past Residential Energy Consumption Surveys (RTECS), EIA reports on the number and types of vehicles per household, and for each vehicle: annual miles traveled, gallons of fuel consumed, type of fuel used, price paid for fuel, and fuel economy (see Text Box).

DATA SOURCES

The latest source for vehicle and household estimates and associated public-use files is the January 2004 release of the 2001 National Household Travel Survey (NHTS), a national study funded and coordinated by the U.S. Department of Transportation (DOT), which included the Federal Highway Administration (FHWA), Bureau of Transportation Statistics (BTS), and the National Highway Traffic Safety Administration (NHTSA). The NHTS is the integration of two national travel surveys: the Federal Highway Administration-sponsored Nationwide Personal Transportation Survey (NPTS) and the Bureau of Transportation Statistics-sponsored American Travel Survey (ATS).

For this report, EIA augmented the fundamental household and vehicle data released by the 2001 NHTS, which is the nation's inventory of local and long-distance travel. Between April 2001 and May 2002, roughly 26 thousand sample households[9] were

Author's Note

Estimates of gallons of fuel consumed, type of fuel used, price paid for fuel, and fuel economy are based on data imputed by EIA, using vehicle characteristics and vehicle-miles traveled data collected during the interview process for the 2001 National Household Travel Survey (NHTS). Rather than obtaining that information directly from fuel purchase diaries, EIA exploited its experience and expertise with modeling techniques for transportation studies, filling missing and uncollected data with information reported to other federal agencies, as described in Appendices B and C of this report.

Had these imputed data items been derived from information supplied by respondents directly, it is likely that the systematic and random sources of measurement variability associated with them would have been similar to those found with all NHTS population estimates, thereby capturing the behaviors and patterns associated with a household and its members. Since energy and energy-related data were imputed, these data are subject to additional uncertainty.

[9] The NHTS collected travel data from the civilian, non-institutionalized population of the United States. People living in medical institutions, prisons and in barracks on military bases were excluded from the sample. However, telephone numbers in dormitory rooms, and fraternity and sorority houses were included as long as no more than 10 people shared the same telephone number.

interviewed about their travel based on the use of over 53 thousand light-duty vehicles (referenced hereafter as "vehicles")[10], representing 107.4 million households in the United States, of which 92 percent (98.9 million) actually owned or possessed a vehicle during the survey period.. Although trip and travel data are mandated components of the NHTS, fuel prices and energy consumption are not. Using confidential data collected during those interviews, coupled with EIA's retail fuel prices, external data sources of test[11] fuel economy, and internal procedures for modifying test fuel economy to on-road, in-use fuel economy, EIA extended this inventory to include the energy consumption and expenditures demanded for personal transportation, thereby extending a data series previously based on EIA's Residential Transportation Energy Consumption Survey (RTECS), which was discontinued for budgetary reasons after 1994.

Until it was discontinued, the RTECS surveys provided residential transportation statistics which were summarized in the report series *Household Vehicle Energy Consumption*. Decision- and policy-makers had found such reports and public-use databases useful, for they had coupled vehicle use, travel, consumption, and expenditure information with socio-economic, demographic, and household information.[12] This rich data source tracked the continued dominance of the personal passenger vehicle as the preferred travel mode by the American public, assessed shifts in the nation's vehicle stock and its impact on overall fuel economy and consumption, and enhanced the knowledge of public and policy-

Author's Note (continued)

To measure one aspect of that uncertainty, EIA conducted a sensitivity analysis of imputed fuel economy (i.e., gasoline mileage) values. Schipper and Pinckney (2004) determined that consumption could have been either raised by 7 percent or lowered by 9 percent, if EIA in its cold-deck imputation scheme had always chosen excessively extreme fuel economy values, selecting the 5th percentile (P5) value or the 95th percentile (P95) value as the representative fuel economy for each sampled vehicle.

By using only extreme values - P5 or P95 - results are biased. While these extreme values are not acceptable to a researcher, such biased estimates, to some extent, illustrate the upper and lower uncertainty bounds associated with cold-decked estimates. Given these bounds, along with survey sampling and non-sampling errors, the use and usefulness of an enhanced NHTS should be evaluated against a researcher's project requirements.

[10] To avoid misinterpretation of averages, statistics in this report are based on the domain of households that possessed a light-duty vehicle during the survey period of the 2001 National Household Travel Survey, effectively removing 8.5 million American households that did not possess a vehicle during the survey period.

[11] Federal law, 49 USC § 32908, requires automobile manufacturers to determine the fuel economy of new vehicles offered for sale in the United States. This information is provided on a fuel economy label affixed to each vehicle's window to help consumers make informed decisions regarding fuel economy when purchasing a new vehicle. While these labels may vary somewhat in appearance, they all must provide the same information.

[12] Since 1983, and until it was discontinued after 1994, EIA's survey of residential transportation collected vehicle odometer readings to calculate annual vehicle-miles traveled; however beginning in 1988, instead of collecting fuel purchase diaries for fuel economy and fuel price data, fuel economy values were obtained by linking with EPA's tested fuel economy values; and fuel prices were obtained from a variety of pump price data series.

makers on how variations of use among different socio-economic groups might relate to potential policy initiatives, such as assessing the potential effects of public policy initiatives on lower and higher income households or elderly populations[13] within the nation.

ORGANIZATION OF REPORT

This report is organized as follows:

- **Energy Overview** presents data highlights and an analysis that disaggregates energy use based on relationships among energy-related transportation statistics.
- **Appendix A: Detailed Tables** presents tabular data on the vehicle stock and energy use for personal transportation.
- **Appendix B: Estimation Methodologies** discusses how statistics were estimated, which rely heavily on the methods employed with previous residential transportation surveys conducted by EIA.
- **Appendix C: Quality of the Data** discusses the quality of the reported and imputed vehicle data, including the effects of sampling, non-sampling, and imputations on data quality.
- **Appendix D: Description of Data** describes how researchers can access and manipulate public-use files made available by EIA and U.S. DOT.
- **Appendix E: Chronology of World Oil Market Events** presents major market events in sequence with world oil prices.
- **Glossary** provides a list of key terms used herein.

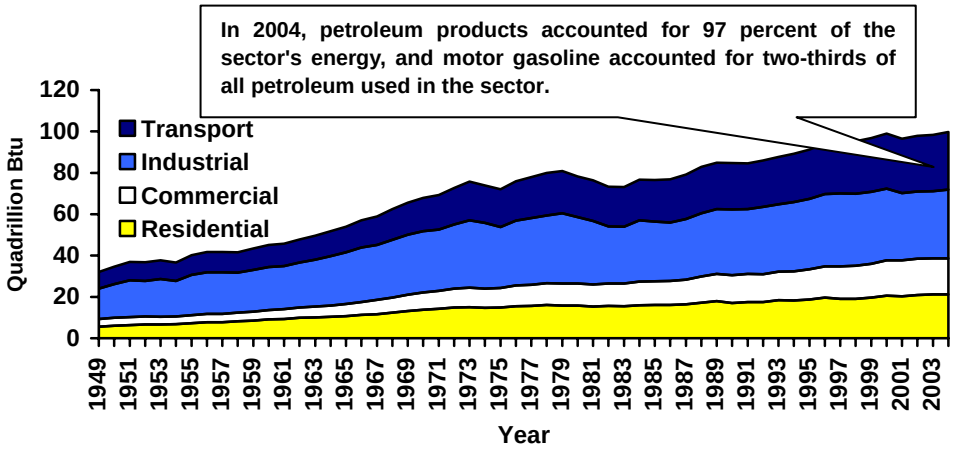
Only light-duty passenger vehicles and recreation vehicles (i.e., motor homes) are included in this report. EIA has excluded motorcycles, mopeds, large trucks, and buses in an effort to maintain consistency with its past residential transportation series, which was discontinued after 1994.

[13] Rosenbloom, S. *Older Drivers: Should We Test Them Off the Road?* University of California, Transportation Center, Access, Fall 2003, Number 23.

ENERGY PROFILE

Based on EIA data, two transportation perspectives can be considered: top-down (representing weekly, monthly, and yearly queries of energy transporters and suppliers) and bottom-up (representing multi-year queries of final consumers).

Figure 1. Total Energy Consumption by End-Use Sector, 1949-2004



Source: Energy Information Administration.

TOP-DOWN VIEW

In 2004, based on EIA's queries of energy transporters and suppliers, the United States consumed 99.7 quadrillion British thermal units (Btu) of energy, 105.2 exajoules (EJ), a slight increase from 103.7 EJ (98.3 quadrillion Btu) in 2003. Of that total amount in 2004, 33.2 quadrillion Btu (33 percent of the total) was categorized as industrial use, 27.8 quadrillion Btu (28 percent) was transportation use for all modes of transport, 21.2 quadrillion Btu (21 percent) was residential use and 17.5 quadrillion Btu (18 percent) was commercial use (see Figure 1). For transport, 97 percent of the energy supplied was petroleum-based.

The nation currently cannot provide for all its petroleum demand with domestically produced crude oil. The decline in domestic oil production, coupled with a rise in oil consumption, resulted in net imports of crude oil and petroleum products surpassing 11.2 million barrels per day in 2003, with imports reaching an all-time high of just over 12.2 million barrels per day, of which over 40 percent had originated at countries belonging to the Organization of Petroleum Exporting Countries (OPEC). Furthermore, motor gasoline accounted for nearly one-half (8.9 million barrels per day) of the 20 million barrels per day of petroleum products consumed domestically in 2003, with 13.2 million barrels per day of that total identified as transport sector use.

Despite the rich accounting of monthly and yearly energy data, sector-level estimates are too broadly defined for demand analyses trying to identify and quantify the impact of factors driving the overall change in consumption. Top-down data reveal few insights into those influences,

generally brought about by changing *activity*, *structure*, and *energy intensity* associated with households' vehicles and how the public use their privately owned vehicles (POV) for personal transportation.

BOTTOM-UP VIEW OF PERSONAL TRANSPORTATION

Consumer data fill that gap left by top-down data. Bottom-up data are based on intermittent surveys of the nation's final consumers: manufacturing plants, commercial buildings, households, and, for this report, household vehicles.[14] These consumer-based surveys can provide a wide variety of end-use characteristics that enables the insights not possible with sector-level data.

COSTS RISE FOR U.S. HOUSEHOLDS

For consumers, energy costs are a foremost concern. Transportation costs have increased due to many factors related to travel and prices paid for transportation fuel, while being somewhat offset by improved fuel economy. In 2001, consumers paid nearly equal amounts for energy used for household services (ranging from cooking and water heating to refrigeration and lighting) and for personal transport. The average household spent $1,520 on fuel purchases for transport and remitted $1,493 for household services, just $27 more per year, as measured in nominal dollars.

By contrast, an average household paid $1,174 for passenger travel in 1994, while having paid $1,620 for household services in 1993 – a year in which heating and cooling seasons were well within 30-year norms. It can be argued that, based on those statistics, what America drives on its roadways[15] has become as important energy-wise as what heating equipment it places in its basements and appliances in its electrical sockets.

PRICES EXPECTED TO MOVE HIGHER

Based on expected future energy prices which partially reflect producers' acquisition costs, the gap between transport cost and household services cost may expand. Between 2001 and 2006, expenditures for motor gasoline are expected to increase from $1,370 per household per year to $2,327 in 2006, up nearly $960 per household. For comparison, in 2001, gasoline prices averaged $1.43 per gallon; in 2006, gasoline prices are expected to average $2.43 per gallon (a 71-percent increase in nominal terms and 52-percent increase when adjusted by inflation).[16]

Consumption and expenditures among socioeconomic and demographic groupings of households, as well as geographic zones, differed markedly. For example, household with the presence of children (defined as those ages 17 and under) drove an additional 10 thousand miles and spent $650 more per year in 2001 than those without children. Households without children

[14] See http://www.eia.doe.gov/emeu/consumption/index.html; accessed July 28, 2005.

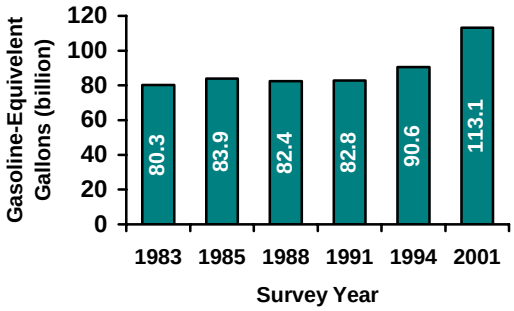
[15] 8.3 million lane-miles. See *Federal Highway Administration*, Highway Statistics 2003 (U.S. Department of Transportation, Washington, DC) table HM-60.

[16] Energy Information Administration, Short-Term Energy Outlook. Accessed http://www.eia.doe.gov/emeu/steo/pub/contents.html on November 14, 2005.

purchased $1,241 worth of transportation fuel to drive 19.6 thousand miles versus $1,902 to drive 29.2 thousand miles for those households having children.

Even though households are affected differently, their use, taken together, contributes significantly to the nation's energy demands, especially the amount of petroleum products needed to move people to and from places to acquire goods and services, as the majority of vehicle engines are fueled with these products. In 2001, the United States consumed 113.1 billion gasoline-equivalent gallons (GEG) to fuel passenger travel by light-duty vehicles, a 3.3 percent per year rise from 1994, when 90.6 billion was consumed (see Figure 2). That fuel consumption by light-duty vehicles, stored in a tank the size of a regulation football field, would require the tank to have walls nearly 50 miles high.[17]

Figure 2. Energy Consumption of Vehicles, Selected Survey Years



Source: Energy Information Administration.

DEMAND ANALYSIS TECHNIQUES

Besides filling the data gap in consumer-based transportation statistics, this report addresses aspects of energy use on which consumers, policy and decision makers often focus – how changing *activity*, *structure*, and *intensity* have affected the growth in energy use. Indeed, the volatility of crude oil prices over the past year has focused attention on the economic condition of the oil and gas industry, the increasing the nation's dependence on foreign oil supplies, and the prospects for reducing reliance on oil imports, all of which are affected to a high degree by transport's intensity of use.

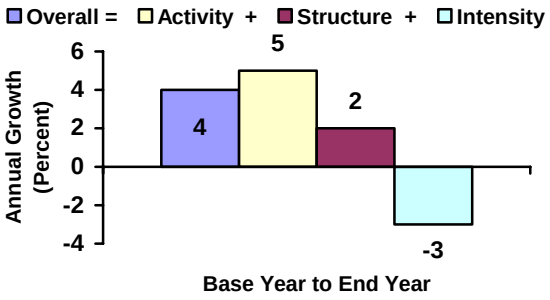
One family of demand analyses – index theory – decomposes value aggregates into their principal components, by examining changes in energy use over time by varying one component and holding all other components constant, a Laspeyres formulation of an index (see Figure 3). Because of its fundamental feature of decomposing aggregates, literature commonly refers to these types of analyses as decomposition analysis. Initiated with the work by Boyd *et al* (1988) which decomposed manufacturing energy use, economic and energy journals, as well as several economy-wide international works[18], now offer a rich resource of literature on decomposition

[17] A ft^3 equals 7.48 gallons. See www.ncaa.org/champadmin/football/football_field.gif for field dimensions.

[18] 30 Years of Energy Use in IEA Countries: Oil Crises & Climate Change, *International Energy Agency*, (OECD/IEA, Paris), 2004; Indicators of Energy Use and Efficiency: Understanding the Link Between Energy and Human Activity, *International Energy Agency*, (OECD/IEA, Paris), 1997; and selected references under IEA's indicator work include: Schipper, L., Unander, F., Murtishaw, S. and Ting, M. (2001). Indicators of Energy Use and Carbon Emissions: Explaining the Energy Economy Link, *Annual Review of Energy and Environment*, 26, 49-81; Unander F., Karbuz, S., Schipper, L., Khrushch, M., Ting, M. (2000). Manufacturing Energy Use in OECD Countries: Decomposition of Long-Term Trends, *Energy Policy* 27 (13): 769-778; Preston, J., Adler, R., Schipper, M. (1992). Energy Efficiency in the Manufacturing Sector, *Monthly Energy Review*, DOE/EIA-0035(1992/12).

results and techniques.[19] Another technique (not used here) has been used by Golob and Brownstone (2005) to show that a change in both vehicle-miles traveled and consumption per change in residential density was substantial for households in the State of California, comparing households by residential density, with all else being equal.

Figure 3. Example of a Laspeyres Decomposition



Instead of linking residential density with energy use, changes in the *structure* of households in terms of their composition (lifecycle); vehicle ownership; types of vehicles; *activity* in terms of travel, and vehicle fuel *intensities* (the inverse of fuel economy or gasoline mileage) are linked to changing energy use, representing a few components offsetting or supporting the surge in energy use to power vehicles' engines. This report presents analysis on the effects for three time periods: 1988-1991, 1991-1994 and 1994-2001. Both the 1983 and 1985 RTECS are excluded because key lifecycle information is only available from later surveys. Before analyzing those time periods, it is useful to identify variations in how Americans use energy based on the latest consumer data: the 2001 NHTS augmented by EIA.

PREDICTORS OF ENERGY NEEDS

EIA maintains a focused set of data programs and products, as a crucial part of its efforts to inform and analyze national and international energy demand and supply, with strict adherence to neutrality. Many examine the energy delivered to end-use sectors from the top-down perspective of energy suppliers, while a few examine the energy used from the bottom-up perspective of energy consumers. Whether data originate from final consumers or not distinguishes these products. In most cases, EIA's weekly, monthly, and annual data products are based on queries of energy producers and transporters on their allocation of energy supplies, whereas less frequent but demographically rich data are based on surveys of some of the nation's final consumers: households, manufacturing plants, commercial buildings, and, for this report, household vehicles.

Less frequent studies focusing on final consumers serve as primary sources of predictors of energy needs and, in turn, demands made on energy supplies for purposes of producing manufacturing throughput, conditioning commercial square footage, and fueling passenger travel. While acknowledging that end-use studies are artifacts of the year in which they are conducted, and recognizing that uncertainties remain due to infrequent implementation, summary measures

[19] Ang, B.W. and Pandiyan, G. (1997). Decomposition of Energy-Induced CO2 Emissions in Manufacturing. *Energy Economics*, 19, 363-374; Boyd, G.A., Hanson, D.A., Sterner, T. (1988). Decomposition of Changes in Energy Intensity: A Comparison of the Divisia Index and Other Methods, *Energy Economics*, 10, 309-312; Choi, K.H. and Ang, B.W. (2003). Decomposition of Aggregate Energy Intensity Changes in Two Measures: Ratio and Difference, *Energy Economics*, 25, 615-624; Huang, J. (1992). Industry Energy Use and Structural Change: A Case Study of The People's Republic of China, *Energy Economics*, 15(2), 131-136.

of energy demand are displayed in Tables 1 and 2 (including detailed tables in Appendix A), which present overall energy demand as

$$\text{Energy} = f(\text{Structure, Activity, Energy Intensity}). \quad (1)$$

Table 1. Measures of Energy Demand and Demand Activities, Selected Survey Years

	Survey Year					
	1983	**1985**	**1988**	**1991**	**1994**	**2001**
Number of Households (million)	84.4	87.3	91.6	94.6	97.3	107.4
Number of Households with Vehicles (million)	72.2	77.7	81.3	84.6	84.9	98.9
Real Disposable Personal Income (chained billion $2000)	4177.7	4645.2	5082.6	5351.7	5746.4	7333.3
Population (million)	233.8	237.9	244.5	252.2	260.3	285.1
Number of Vehicles (million)	129.3	137.3	147.5	151.2	156.8	191.0
Number of Vehicles per Household with Vehicles	1.8	1.8	1.8	1.8	1.8	1.9
Number of Vehicles per 1000 Capita	555	577	603	600	602	670
Vehicle-Miles Traveled (VMT) (billion)	1215	1353	1511	1602	1793	2287
VMT per Household with Vehicles (thousand)	16.8	17.4	18.6	18.9	21.1	23.1
VMT per Vehicle (thousand)	9.4	9.9	10.2	10.6	11.4	12.0
Load Factor	1.80	1.74	1.66	1.60	1.60	1.57
Passenger-Miles Traveled (PMT) (billion)	2194	2354	2509	2564	2869	3591
PMT per Household with Vehicles (thousand)	30.2	30.3	30.9	30.2	33.8	36.3
PMT per Vehicle (thousand)	16.9	17.1	17.0	17.0	18.3	18.8
Energy Intensity (equivalent gallons per 1000 miles)	66.2	62.1	54.6	51.8	50.5	49.5
Gasoline-Equivalent Gallons (billion)	80.3	83.9	82.4	82.8	90.6	113.1

Sources: Energy Information Administration, Office of Energy Markets and End Uses, 1983, 1985, 1988, 1991, and 1994 Residential Transportation Energy Consumption Surveys; Federal Highway Administration, U.S. Department of Transportation, 2001 National Household Travel Survey; U.S. Bureau of Economic Analysis, Table 2.1, *Survey of Current Business Population,* revised February 25, 2005; Oak Ridge National Laboratory (ORNL) under contract with the Office of Planning, Budget Formulation, and Analysis, under the Energy Efficiency and Renewable Energy (EERE) program in the U.S. Department of Energy (DOE), *Transportation Energy Data Book: Edition 24*.
Note: * = a recession year. Estimates are displayed as rounded values.

Table 2. Annual Percent Change in Measures of Energy Demand, Selected Survey Years

	Survey-to-Survey Annual Percent Change					
	1983 to 1985	1985 to 1988	1988 to 1991	1991 to 1994	1994 to 2001	1983 to 2001
Number of Households	1.7	1.6	1.1	0.9	1.4	**1.3**
Number of Households with Vehicles	3.7	1.5	1.3	0.1	2.2	**1.8**
Population	0.9	0.9	1.0	1.1	1.3	**1.1**
Real Disposable Personal Income	5.4	3.0	1.7	2.4	3.5	**3.2**
Number of Vehicles	3.0	2.4	0.8	1.2	2.9	**2.2**
Number of Vehicles per Household with Vehicles	0.0	0.0	0.0	0.0	0.8	**0.3**
Number of Vehicles per 1000 Capita	2.0	1.5	(0.2)	0.1	1.5	**1.1**
Vehicle-Miles Traveled (VMT)	5.4	3.8	2.0	3.8	3.5	**3.6**
VMT per Household with Vehicles	1.8	2.2	0.5	3.7	1.3	**1.8**
VMT per Vehicle	2.6	1.0	1.3	2.5	0.7	**1.4**
Load Factor	(1.7)	(1.6)	(1.2)	0.0	(0.3)	**(0.8)**
Passenger-Miles Traveled (PMT)	3.6	2.1	0.7	3.8	3.3	**2.8**
PMT per Household with Vehicles	0.1	0.7	(0.7)	3.7	1.0	**1.0**
PMT per Vehicle	0.7	(0.3)	(0.1)	2.6	0.4	**0.6**
Energy Intensity	(3.2)	(4.2)	(1.8)	(0.8)	(0.3)	**(1.6)**
Gasoline-Equivalent Gallons	2.2	(0.6)	0.2	3.0	3.2	**1.9**

Sources: Energy Information Administration, Office of Energy Markets and End Uses, 1983, 1985, 1988, 1991, and 1994 Residential Transportation Energy Consumption Surveys; Federal Highway Administration, U.S. Department of Transportation, 2001 National Household Travel Survey; U.S. Bureau of Economic Analysis, Table 2.1, *Survey of Current Business Population,* revised February 25, 2005; Oak Ridge National Laboratory (ORNL) under contract with the Office of Planning, Budget Formulation, and Analysis, under the Energy Efficiency and Renewable Energy (EERE) program in the Department of Energy (DOE), *Transportation Energy Data Book: Edition 24*.

STRUCTURE

Structure in transportation is defined as those characteristics that quantify and describe vehicles available for use.

HOUSEHOLDS WITH VEHICLES

In 2001 there were 107.4 million households in the United States, of which nearly 98.9 million (92 percent) actually owned or possessed one or more vehicles, an increase of 1.8 percent per year from 1983, 72.2 million out of 84.4 million households (86 percent) had possessed one or more vehicles. The increasing number of households and a greater fraction of those possessing a vehicle, all else been equal, should result in increased energy needs for the nation. Decomposition analysis, given in later sections, shows this to be true. Indeed, no other predictor is as strong in its link with energy use (see Text Box).

Rest of the World Affects the U.S. Consumer

While the relationship between both population and housing growth and energy is highly correlated, research (Smil 2003; page 63) has concluded that the energy-economy relationship, as measured in Total Primary Energy Supply and Gross Domestic Product (GDP), is neither linear nor simple; rather, it is dynamic and complex, precluding any normative conclusions among industrialized or developing countries.

As evidenced by a parked car or a vacant, shuttered residence, houses and vehicles neither consume energy nor emit greenhouse gases on their own; people do. They do so with the goal of obtaining services in their homes and using vehicles for trips (going to work, church, or obtaining food) in which goods or services are acquired. Thus, population, and especially the driving-age population, plays an important role in predicting the number of households with vehicles, number of vehicles and their resulting energy use.

The ratios of the number of vehicles per capita, per driver, and per household suggest the nation had reached a plateau from 1988 to 1994, when ratios were nearly steady. After 1994, these ratios reinitiated their ascent, returning to the pre-1988 annual growth: 1.5 percent per year. Whether this restart was propelled by the influence of economic growth and its impact on household wealth and income is unknown; however, it arguably has played an important part. To date, unity has never been reached with any ratio discussed here.

Rest of the World Affects the U.S. Consumer (continued)

Yet, the confluence of economic growth and population does affect transport needs, and vice-versa. This is readily apparent with developing and emerging economies, especially China's and India's as their economic opportunities continue to expand.

The developing Chinese and Indian economies, when pooled, encompass half the world's population, but unlike the United States, are nowhere close to any saturation point and far below the POV mobility status seen among the U.S. and other industrialized countries. As both seek higher mobility status (i.e., vehicles per capita), a rise similar to that of industrialized countries in the number of passenger vehicles, all else remaining constant, would put significant upward pressure on global oil demands.

Providing further interest to automakers and policy makers, the Chinese, unlike the Indians, have favored light-duty vehicles over two-wheelers as the first-vehicle-of-choice.

NUMBER OF VEHICLES

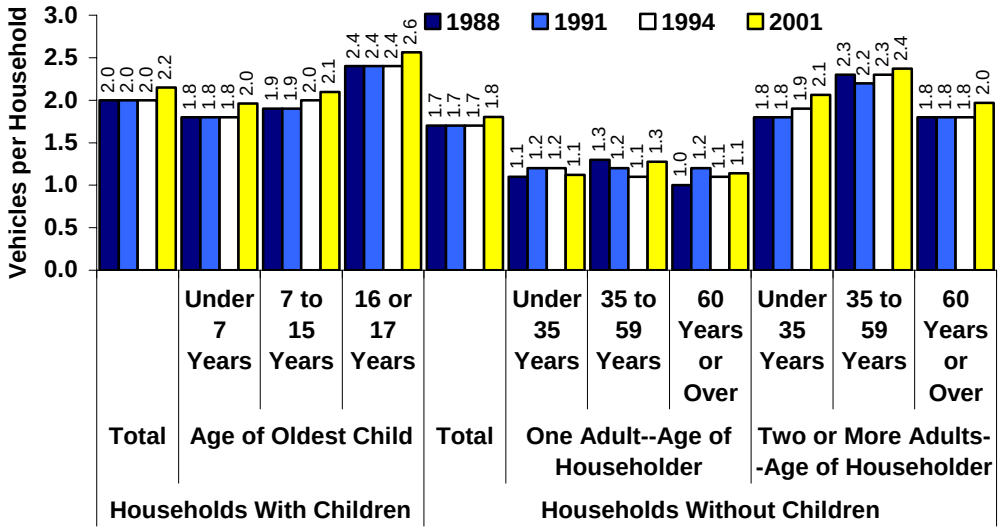
As the use of two-wheelers versus passenger cars is important when assessing POV trends in India and China, the number and types of vehicles operating on our nation's roadways are just as important. In 2001, the average number of vehicles per household increased for the first time since 1983, from 1.8 vehicles per household as reported by EIA in 1983, 1985, 1988, 1991, and 1994 to 1.9 vehicles (see Table 1). In contrast, the average automobile occupancy, as measured by a load factor[20], has continued its downward trend, albeit at a decreasing rate, in which the annual percent change has been a negative 0.3 percent, from 1.6 persons per vehicle in 1994 to 1.57 in 2001. Partially, this is a reflection of the declines in household size, as population has increased at a slightly lower annual rate than housing.

[20] Oak Ridge National Laboratory (ORNL) under contract with the Office of Planning, Budget Formulation, and Analysis, under the Energy Efficiency and Renewable Energy (EERE) program in the Department of Energy (DOE), *Transportation Energy Data Book: Edition 24*. One hundred vehicle miles of travel with a vehicle load factor of 1.80 persons is equivalent to 180 person-miles. If the occupancy falls to 1.57, then 180/1.57 vehicle miles of travel are required for the same person-miles, a 15-percent increase in vehicle miles.

Vehicle ownership varies among the nation's households. Income and lifecycle (defined as the presence and age of children) are strong predictors of the number of vehicles per household (i.e., ownership). Income provides the means for vehicle ownership, while differing lifecycles provide the motivation – thereby, creating pronounced ownership-lifecycle and ownership-income links (see Figures 4 and 5).

Average vehicle ownership rose in nearly every lifecycle category between 1994 and 2001. Not surprisingly, households with children possessed, on average, more vehicles than those without, and ones with a 16- or 17-year child yielded the highest ownership rate (2.6 vehicles per household); this is likely due in part to the effect of teenagers – 16- or 17-year-olds – who are becoming drivers. In 2001, such households recorded the highest vehicle ownership, with an average of 2.6 vehicles per household, up from 2.4 vehicles in 1988, 1991, and 1994. Single-adult childless households registered the lowest vehicle ownership, consistently. Within those households, householders 60 years or older possessed the fewest number of vehicles per household, possessing 1.1 vehicles in both 1994 and 2001. As more retirees return to the workforce, this trend may alter. Childless households with two or more adults, for instance, have reported an increase in average vehicle ownership, increasing 0.2 vehicles, from 1.8 in 1994 to 2.0 vehicles in 2001.

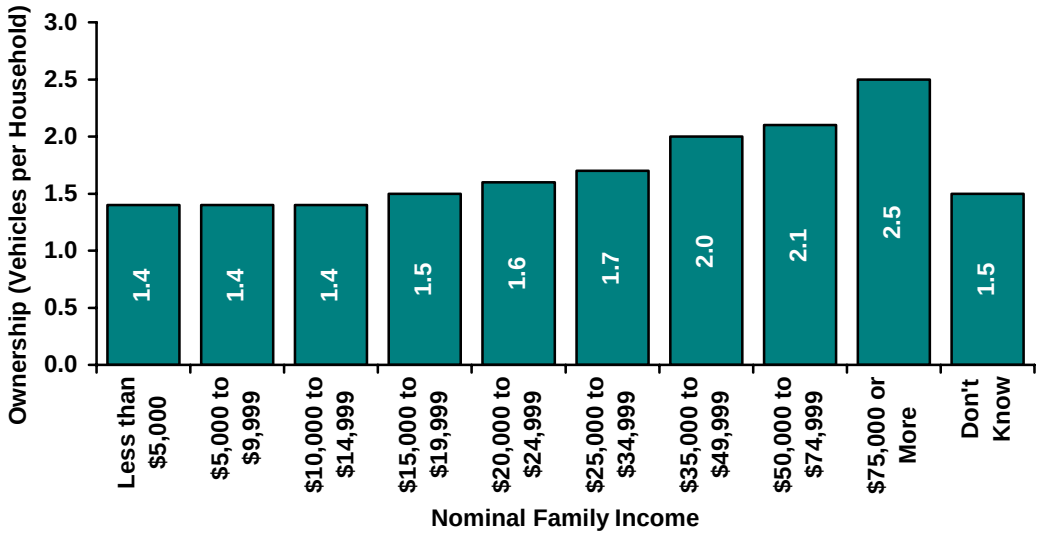
*Figure 4. Vehicle Ownership by Household Composition (**Lifecycle**), Selected Survey Years*



Source: Energy Information Administration.

Income also has a dramatic effect on vehicle ownership. Higher income translated into higher ownership rates in 2001. Ownership at lower income levels (poverty or near poverty) is remarkably stable. There are, on average, 1.4 vehicles per household for those households having a family income of less than $15 thousand. Moreover, though not universal, higher nominal family income levels (i.e., $10,000 or more) correlate with steadily larger number of vehicles per household, at a rate of about 0.1 additional vehicles per $5 thousand of additional income.

Figure 5. Vehicle Ownership by Nominal Family Income, 2001



Source: Energy Information Administration, tables in this report.

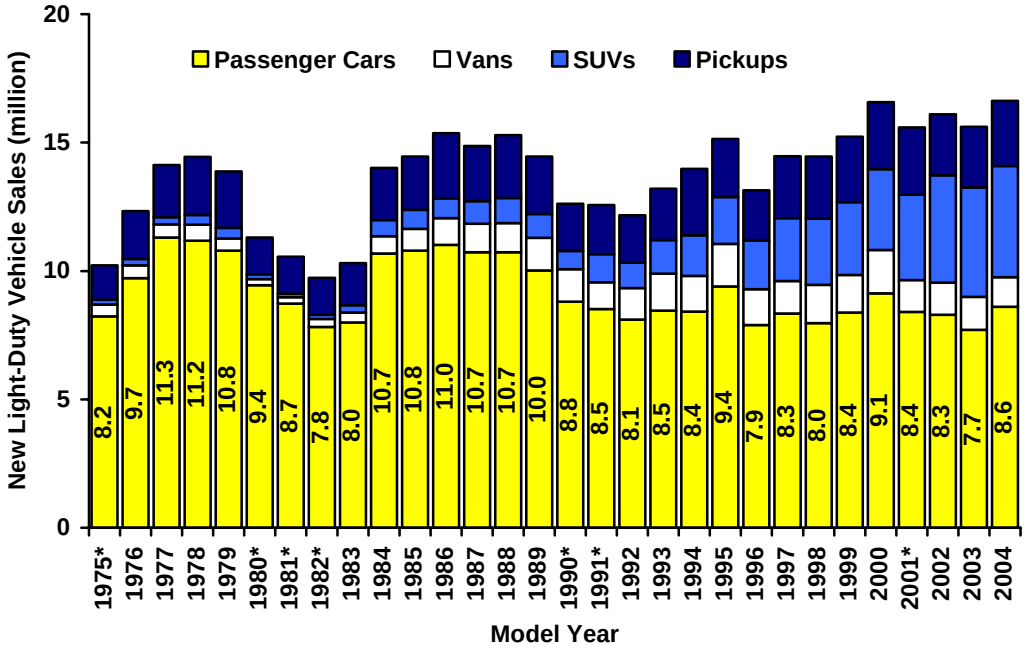
TYPES OF VEHICLES

Americans have demonstrated a preference in the vehicles they purchase for their travel needs. New vehicle sales suggest a shifting in vehicle preference away from passenger cars as automakers introduced and intensely marketed sports-utility vehicles (SUVs).[21] They are increasing in popularity as passenger cars (including cars and stations wagons) are declining in market share of the new light-duty vehicle market. In 2004, SUVs captured 26 percent (4.3 million of the 16.6 million light-duty sales) of the new vehicle market, up from 11 percent (1.6 million of the 14.0 million light-duty sales) in 1994. Passenger cars accounted for 52 percent (8.6 million); vans accounted for 7.0 percent (1.2 million); and, pickups accounted for 15 percent (2.5 million) of the remaining vehicles sold in 2004 (see Figure 6).

Even though SUVs are increasingly popular among Americans, passenger cars still rank as their overall vehicle of choice, as they make up the majority of vehicles on America's roadways. Cars, including station wagons, represented just over 50 percent of new vehicle purchases in 2001, according to the sales figures from EPA's latest *Fuel Economy Trends* report, though in each of the subsequent years they have lost market share to SUVs. As of 2001, a recession year, the distribution of sales and scrappage rates had resulted in a household vehicle fleet of 191.0 million vehicles: 112.4 million (58 percent) passenger cars, 18.4 million (10 percent) vans, 23.2 million (12 percent) SUVs, 35.6 million (19 percent) pickups, and 1.4 million (1 percent) recreational vehicles (see Figure 7).

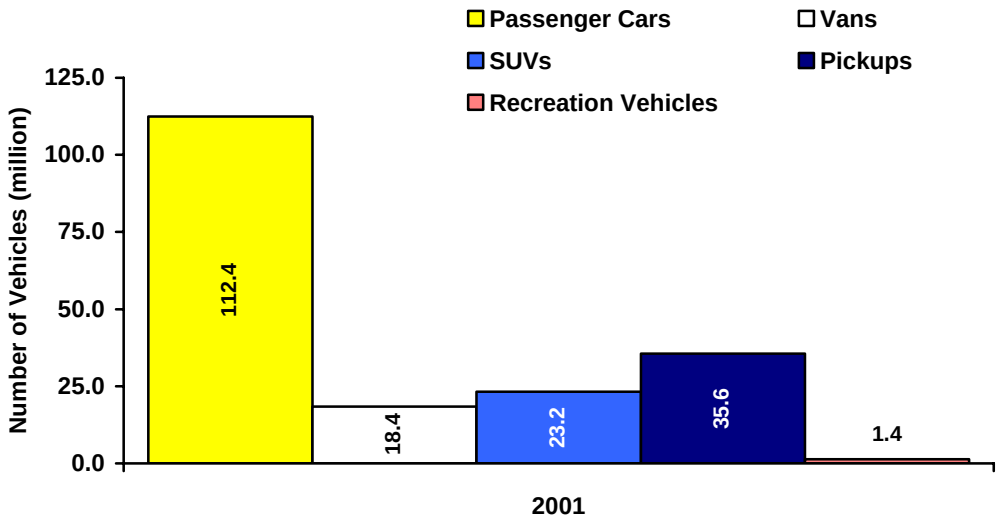
[21] How consumers chose vehicles and their components follows a complex decision process which is beyond the scope of this report.

Figure 6. Number and Share of New Vehicles Sold in the United States by Vehicle Type and Year



*Source: U.S. Environmental Protection Agency, Fuel Economy Trends, 2004; Note * = recession year.*

Figure 7. Distribution of Vehicle Stock, 2001



Source: Energy Information Administration, tables in this report.

ACTIVITY

Activity reflects the use of vehicles, as measured by annual vehicle-miles traveled, average number of trips per year, and average trip distances.

VEHICLE-MILES TRAVELED

Travel activity (How many miles do the nation's vehicles travel?) is a key factor in determining motor fuel consumption, roadway congestion and impacts on the environment. In an environment of little-to-no change in gasoline mileage, energy use is directly proportional to travel; and, likewise, most emissions are directly proportional to energy use. In 2001, light-duty vehicles accumulated over 2.2 trillion vehicle-miles, up 3.5 percent per year from 1994, when EIA reported that light-duty vehicles traveled 1.8 trillion vehicle-miles. For perspective, that's enough miles to travel 25,000 times between the Sun and the Earth.[22]

Over time, numerous factors have affected travel activity, though the presence of children in a household has continued to show a sharp effect. In 2001, average household driving varied extensively depending on the makeup (i.e., lifecycle) of a household:

- Households with children averaged 29.2 thousand miles compared with 19.6 thousand miles in households with no children;
- Households with 16- or 17-year-olds children drove more than any other (34.0 thousand miles), about 6 thousand miles more than households with younger children;
- For households without children, vehicle-miles traveled ranged from 12 thousand miles in single-adult households to 24.8 thousand miles in households with two or more adults; and,
- For single-driver households without children, vehicle-miles traveled ranged from a low of 8.0 thousand miles for drivers at least 60 years of age to 14.4 thousand miles for drivers under 35 years of age.

Roadway congestion affects all households, and it is a growing problem in urban areas. Congestion (defined by the relationship between urban vehicle-miles traveled and urban road miles or urban throughput) on the nation's roadways has risen, as evidenced by urban road miles increasing 36 percent between 1980 and 2000, while urban vehicle-miles traveled increased 95 percent.[23]

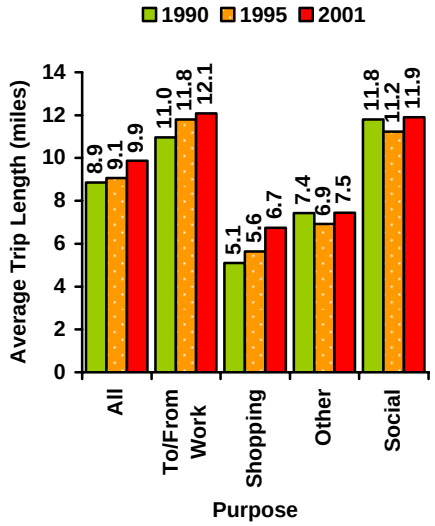
[22] An Astronomical Unit is the average distance between the Sun and the Earth. Its value is 149,597,870 km (93 million miles).

[23] U.S. Department of Transportation, Federal Highway Administration. Accessed on the world-wide web at http://www.fhwa.dot.gov/environment/cmaqpgs/amaq/03cmaq1fig3.htm on July 11, 2005.

ONE-WAY TRIPS PER YEAR AND AVERAGE ONE-WAY TRIP DISTANCES

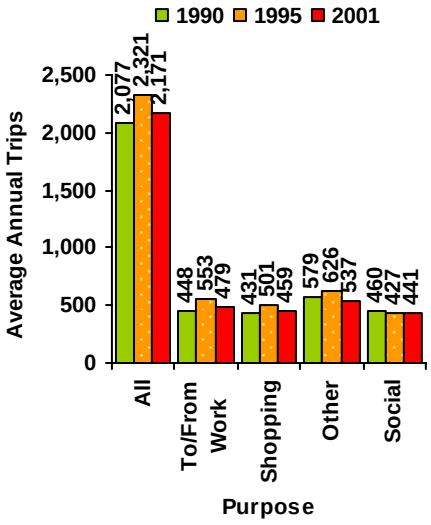
Yet, neither congestion nor higher prices have frustrated motorists to the extent that travel plans have been disrupted, as year-to-year demand for total transport fuel continues to increase even as prices continue to rise; survey-to-survey load factors have declined; and, survey-to-survey trip[24] lengths have increased to their highest levels since 1990 (see Figures 8 and 9). Such national statistics provide evidence that behavior changes are slow to come about, because vehicle stock changes occur slowly and Americans still need to carry out their lives, traveling back and forth to work, church, or the local grocery store as needed. Figure 10 provides further explanation: depressed motor gasoline prices coupled with a steady rise in income.

Figure 8. Average Vehicle Trip Length, Selected Survey Years



Source: Federal Highway Administration, Summary of Travel Trends (December 2004).

Figure 9. Average Annual Vehicle Trips per Household, Selected Survey Years



Source: Federal Highway Administration, Summary of Travel Trends (December 2004).

Whether American consumers are immune to price increases or any change in vehicle stock or travel heretofore is not sufficient to affect travel, it is seemingly inevitable that price signals, if the price of gasoline moves sharply higher than previously experienced, should generate a measurable change in travel behavior.[25]

[24] A trip is defined as any time the respondent went from one address to another by private motor vehicle, public transportation, bicycle, walking, or other means. A trip purpose is the main reason that motivates a trip.

[25] "The energy intensity of the United States economy has been reduced by about half since the early 1970s in response to sharply higher prices. Much of the displacement was achieved by 1985. Progress in reducing energy intensity has continued since then, but at a lessened pace. This more-modest rate of decline in intensity should not be surprising, given the generally lower level of real oil prices that prevailed between 1985 and 2000. With real energy prices again on the rise, more rapid decreases in the intensity of use in the years ahead seem virtually inevitable." Quoted from a speech by Allan Greenspan, Chairman, U.S. Federal Reserves (April 5, 2005).

As gasoline prices rise on the heels of a decade or more of depressed prices, what are the signals to which consumers have been listening? While the real retail price of gasoline has risen and fallen over the past two decades, there has been an overall decline of 1.3 percent per year between 1983 and 2001, with substantial drops in 1986 and 1998 and somewhat smaller ones in 1991 and 2001 (see Figure E1 for a Chronology of World Oil Prices). In contrast, the prices of other consumer products[26] have risen dramatically, taking a higher real percentage of consumers' budgets (see Figure 10). Given the minor role fuel prices have played in determining vehicle use, there is little surprise that vehicle-miles traveled is better correlated with disposable income than retail prices; furthermore, the improvement in energy intensity, though unexceptional, might have further weakened a diminished price signal by mitigating the effect of fuel prices, where consumers could travel further on $1 of transportation fuel. Given that retail price is primarily based on the price paid for crude oil[27], price signals to consumers should mimic world crude oil prices, which have exceeded $50 per barrel (bbl) – at times surpassing $60 per bbl.

Retail prices include Federal, State, and Local excise taxes. Hence, fuel taxes represent yet another signal to consumers. Federal excise taxes are 18.4 cents per gallon and State excise taxes average about 21 cents per gallon.[28] Since 1988, Federal and State excise taxes on gasoline have been collected at the wholesale level, not the retail level. This means that retailers must pay all taxes at the terminal[29] when they purchase fuel through a truckload sale. This protects the U.S. Treasury from missing any uncollected taxes and any need to conduct audits of gas station owners. It is the retailers' responsibility to recover their expense; that is why when the consumer purchases fuel they see only the total cost. The retailer is not remitting any funds to a governmental entity when a consumer makes a purchase; consequently, final purchase receipts exclude any listing of fuel tax . Though consumers would still react to retail prices, uncertainty exists with the measured impact from excise taxes, as the lack of visibility might partially dampen the impact such taxes could have on the demand for gasoline.

Besides fuel price, which signals do consumers recognize? Statistically, real disposable income[30] is one such signal. Based on 1983, 1985, 1988, 1991, 1994, and 2001 point estimates, it can explain 99 percent of the variation in vehicle-miles traveled. From such a result, it could be argued that the change in vehicle-miles per unit change of real disposable income, as measured in chained dollars, is 0.3, the estimate of the slope, β_1, of the regression $Y = \beta_0 + \beta_1 X$, with Y denoting travel and X denoting real disposable income. Since 1983, with some minor deviations, the growth in vehicle-miles traveled has mirrored the increases in real disposable income. For instance, between 1983 and 1985, when annual real gasoline prices dropped 4.4 percent per year,

[26] See components of the Consumer Price Index conducted by the U.S. Bureau of Labor Statistics.

[27] See *Federal Trade Commission*, Gasoline Price Changes: the Dynamic of Supply, Demand, and Competition, July 5, 2005, Washington, DC. Accessed http://www.ftc.gov/opa/2005/07/gaspricefactor.htm on July 25, 2005.

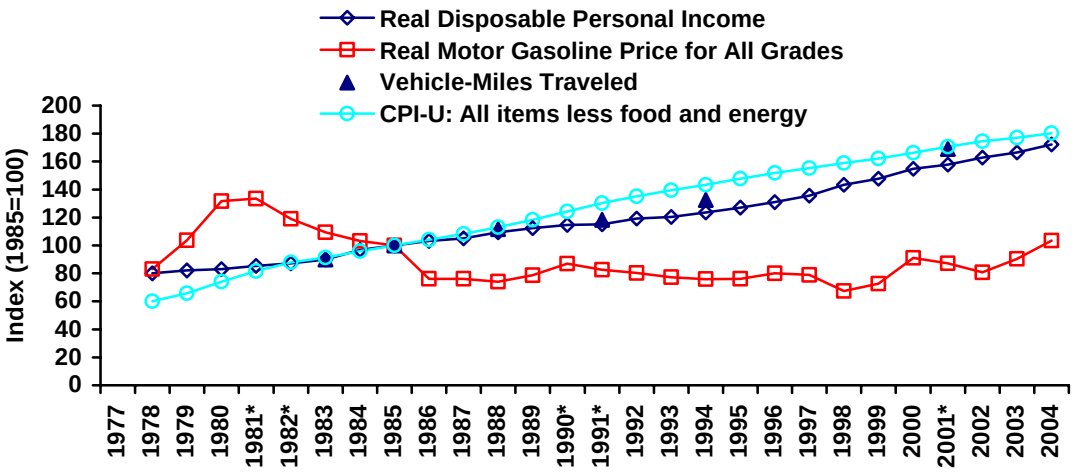
[28] See Energy Information Administration, Petroleum Marketing Monthly June 2004, Table EN1. Note: 90 percent or more of Federal excise taxes are returned to States.

[29] Terminal, or "rack" – sales of product by the truckload (typically about 8,000 gallons) at the loading rack of a product terminal, supplied from a refinery, pipeline, or port.

[30] Total after-tax income, as measured in chained dollars, received by persons; it is the income available to persons for spending or saving.

the annual growth of vehicle-miles traveled (i.e., overall travel) and disposable income rose 5.4 and 5.5 percent, respectively. Despite some inconsistencies when travel activity grew faster than disposable income, their overall growth between 1983 and 2001 is in near lock-step formation, with real disposable income registering a rise of 3.2 percent per year and travel activity growing at an annual rate of 3.6 percent.

Figure 10. Annual Indices of Real Disposable Income, Vehicle-Miles Traveled, Consumer Price Index (CPI-U), and Real Average Retail Gasoline Price, 1978-2004, 1985=100



Sources: Energy Information Administration, Annual Energy Review 2004; Bureau of Economic Analysis.
*Note * = recession year.*

ENERGY INTENSITY

Energy intensity indicates the energy performance of the nation's vehicle stock.

ENERGY PERFORMANCE: GALLONS PER VEHICLE-MILE TRAVELED

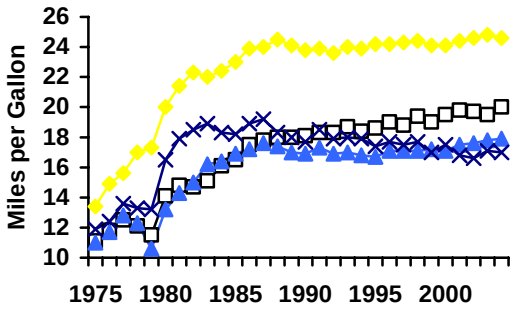
Tracking an economy's energy intensity – its energy performance – as the ratio of energy per GDP (or the environmentally based intensity of carbon dioxide per GDP[31]) is common in energy economics, and such a technique can be applied to transport. Instead of a ratio of economy-wide energy use per GDP, one can use a ratio of gasoline-equivalent gallons (GEG) per vehicle-miles traveled for the *entire* vehicle stock (see Figures 11-14). This intensity has steadily improved since 1983, though the greatest strives toward lowering (improving) energy intensity had occurred before 1991. Post-1991 improvements (i.e., energy performance) slowed dramatically, yielding an overall annual improvement of 1.6 percent between 1983 and 2001, as compared to the 3.2 and 4.2 percent gains seen in the 1983-1985 and 1985-1988 time periods, respectively.

No other vehicle energy predictor seems to draw as much public scrutiny. There is some justification behind this: it is one of the most visible measures used by decision and policy makers to regulate energy use and consumers to identify a vehicle's energy performance. From "stickers"

[31] Greenhouse gas emissions from petroleum-powered vehicles are directly proportionally to energy use.

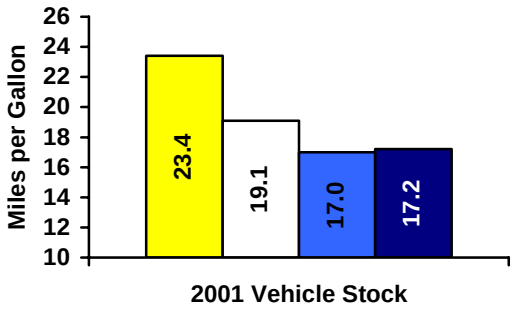
on each new vehicle to identify its on-road fuel economy and the joint publication of fuel economies by the U.S. DOE and U.S. EPA at www.fueleconomy.gov to the Gas Guzzler tax (USC 26 § 4064) based on these same "sticker" values and NHTSA's Corporate Average Fuel Economy (CAFE) program, progress on energy intensity (measured as GEG per mile), the inverse of fuel economy (measured as miles per GEG) is one measure of which the public is highly informed and concerned, where even the plans to revise EPA's measurement tests for determining on-road fuel economy create national interest.[32]

Figure 11. Sales-Weighted On-Road Fuel Economy by Vehicle Type, 1975-2004 Model Years



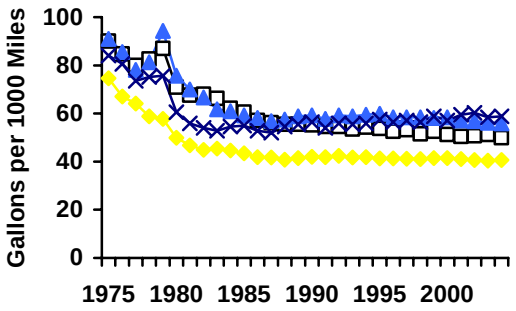
Source: U.S. Environmental Protection Agency, Fuel Economy Trends 2004.

Figure 12. Average On-Road, In-Use Fuel Economy by Vehicle Type, 2001



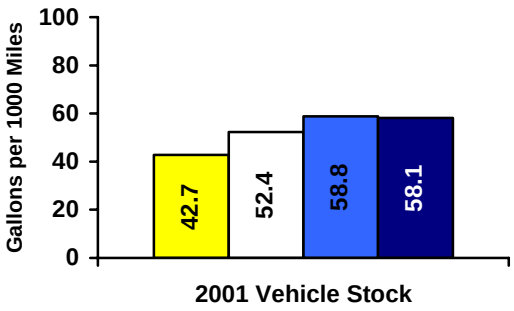
Source: Energy Information Administration, tables in this report.

Figure 13. Sales-Weighted On-Road Energy Intensity by Vehicle Type, 1975-2004 Model Years

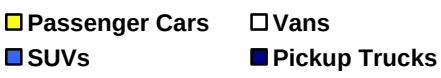


Source: U.S. Environmental Protection Agency, Fuel Economy Trends 2004.

Figure 14. Average On-Road, In-Use Energy Intensity by Vehicle Type, 2001



Source: Energy Information Administration, tables in this report.



[32] See Fialka, J., *The Wall Street Journal*; page D1, May 12, 2005.

While changes in energy intensity are often used to *suggest* efficiency, care should be used to avoid any confusion with technical efficiency and economic efficiency. Technical efficiency is where the maximum output is achieved with minimal input; economic efficiency is the production and distribution of goods or services at the lowest possible cost. Thus, technical efficiency is not necessarily a sufficient condition for economic efficiency, or vice-versa. For example, an engine developed for superior technical efficiency might require a fuel that utterly violates economic efficiency; and an economically efficient engine might be far from technically efficient.

Propulsion efficiency of jet engines is one technology area in which technical efficiency seems to have gone hand-in-hand with economic efficiency, as the ratio of thrust-aircraft velocity per heat added has steadily improved.[33] This efficacy, especially with respect to thrust, has enabled larger aircraft for airline passenger travel, all at a significant decrease in heat added, which translates into less fuel consumed per passenger-mile.[34]

Propulsion efficiency of vehicles has trod a highly similar path; engine efficacy (as suggested by horsepower (HP)) of each succeeding models years has generally increased, as suggested by the trajectories of the sales-weighted on-road fuel economy values presented in Figures 17, 19, 21, and 23. For a number of reasons beyond the scope of this report, that progress mostly excluded improvements in energy intensity, as energy performance (as measured by energy intensity) only slightly improved. Even though automakers have continued to make improvements in technology, "consumer preference over the past 15 or 20 years has led automakers to increase vehicle size, weight, and horsepower while holding gasoline mileage [the inverse of energy intensity] more or less constant," though vans do show some improvement (see Figures 18, 20, 22, and 24).[35] As load factors for vehicles deteriorated over the 1983 to 2001 time period, fewer people were transported in heavier, more powerful, slightly more-fuel-efficient vehicles.

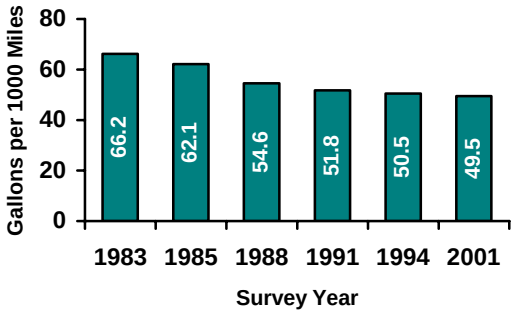
Automakers did increase vehicles' energy performance but that has been offset by consumers' increased travel needs. Energy intensity improved 1.6 percent per year, from 66.2 GEG per 1000 miles in 1983 to 49.5 GEG in 2001, while per-vehicle travel offset this improvement by increasing 1.4 percent per year, from 9.4 thousand miles per vehicle to 12.0 thousand miles, as the number of vehicles in total increased 2.2 percent per year – simply put, more vehicles are traveling farther. Hence, travel activity is a much better predictor of future energy needs than energy intensity, as fuel economy of vehicles sold in America is relatively stable, though pickups do exhibit a trajectory of declining sales-weighted fuel economy.

[33] Edwards, C.F., Technological Potential and Challenges to Low GHG Transportation, International Petroleum IPECA Transportation and Climate Change Conference, October 13, 2004. See http://www.ipieca.org/ for details.

[34] Mattingly, J.D., Elements of Gas Turbine Propulsion, McGraw Hill (1996), as presented by C.F. Edwards at the IPIECA Transportation and Climate Change Conference, October 13, 2004.

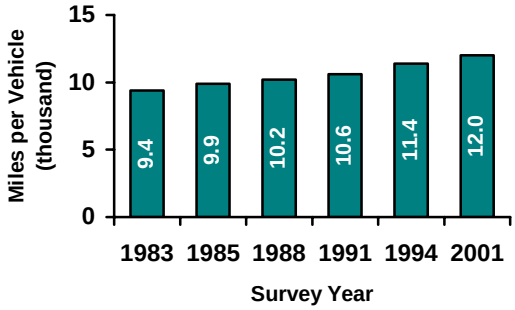
[35] See Congress of the United States, Congressional Budget Office, The Economic Costs of Fuel Economy Standards Versus a Gasoline Tax, December 2003.

Figure 15. Average On-Road, In-Use Energy Intensity, Selected Survey Years



Source: Energy Information Administration.

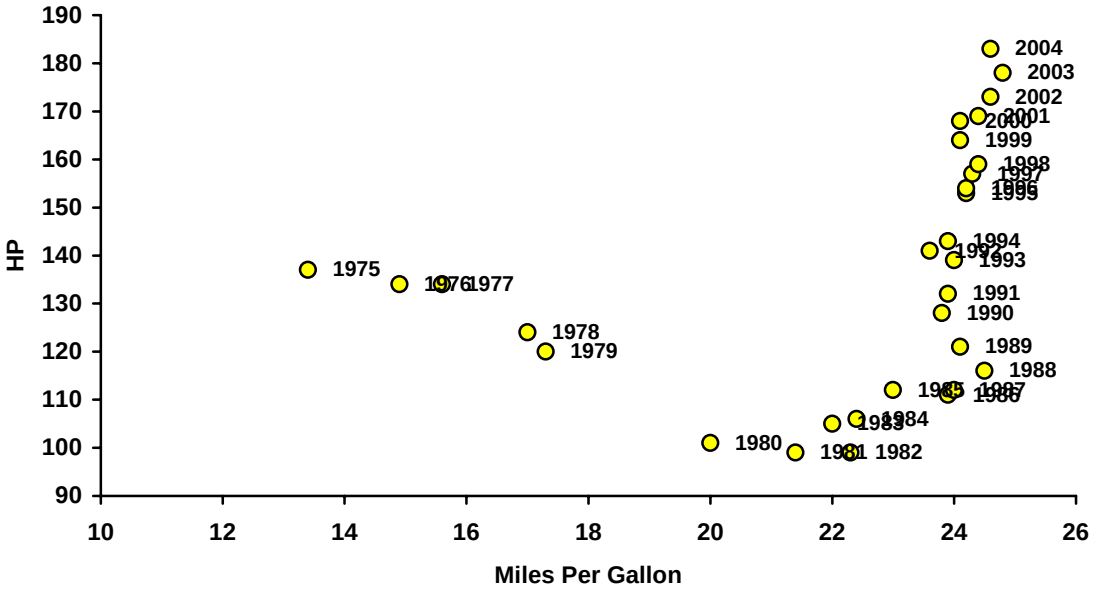
Figure 16. Average Vehicle-Miles Traveled per Vehicle, Selected Survey Years



Source: Energy Information Administration.

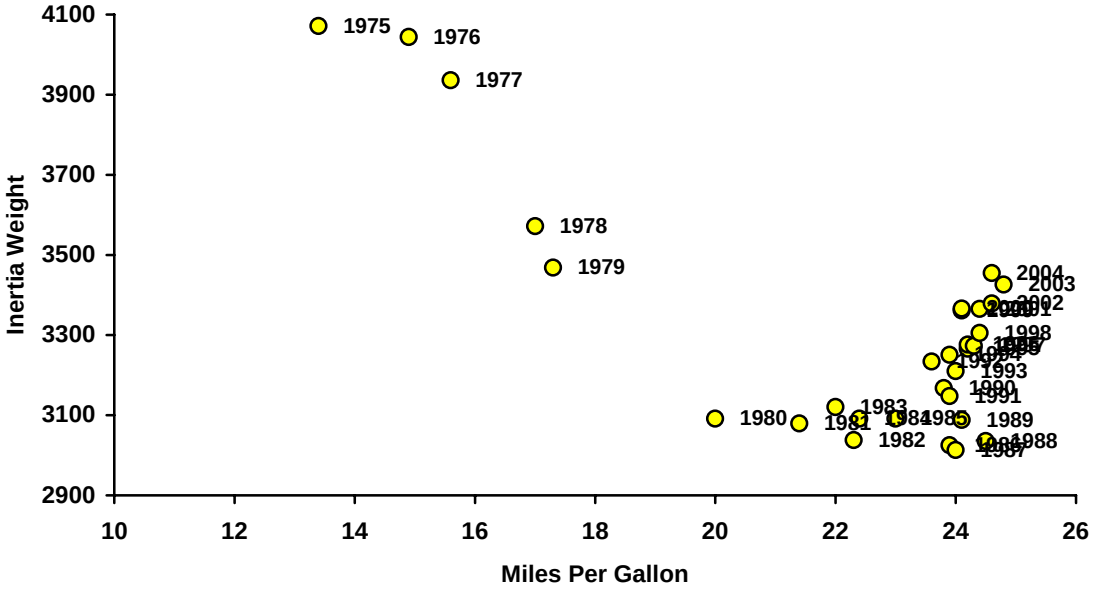
Is this increased travel an effect of the exurbanization in America and its associated upward pressure on increased trip lengths? Are Americans increasingly on the move? How much does vehicles' energy performance and Americans' travel affect overall energy use? Decomposition analysis provides some answers for the latter questions, while the first is decidedly more intractable given the lack of sub-national data on travel and energy use.

Figure 17. Sales-Weighted Horsepower and On-Road Fuel Economy for Passenger Cars, 1975-2004 Model Years



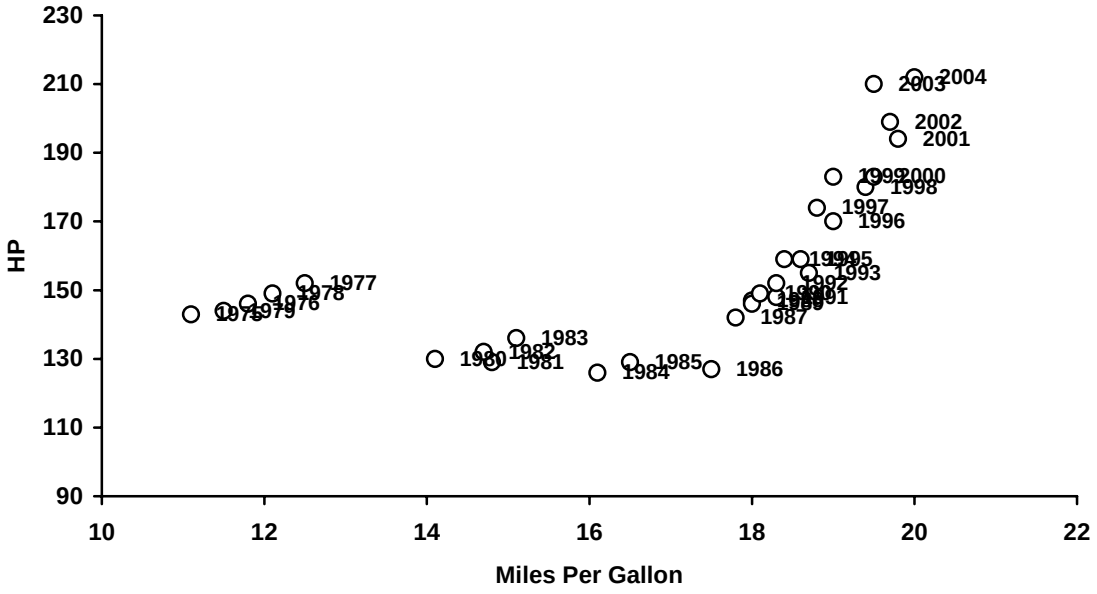
Source: U.S. Environmental Protection Agency, Fuel Economy Trends 2004.

Figure 18. Sales-Weighted Vehicle Weight and On-Road Fuel Economy for Passenger Cars, 1975-2004 Model Years



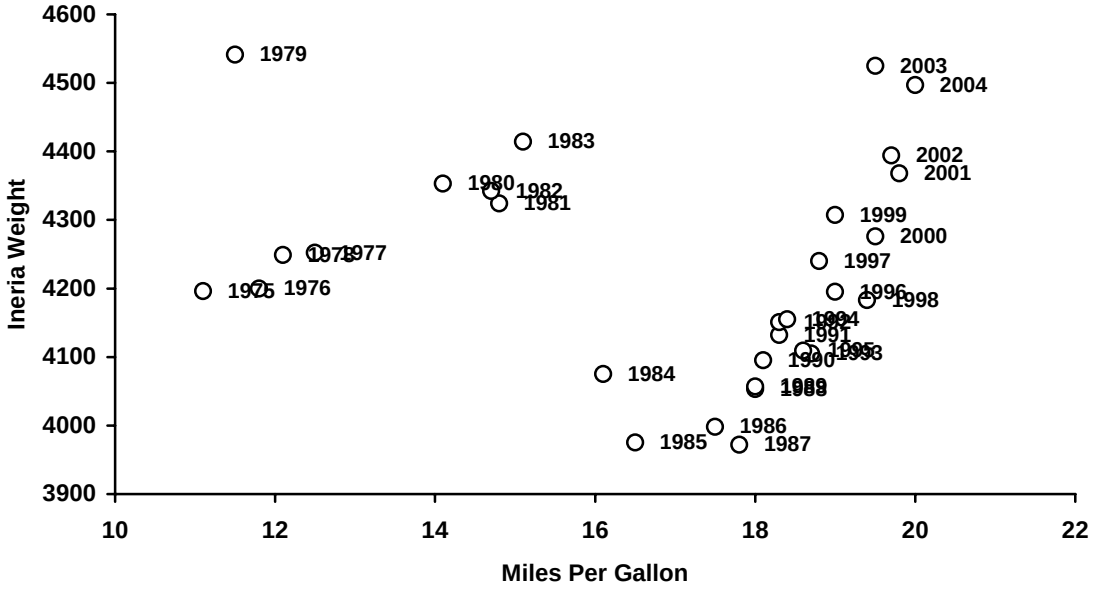
Source: U.S. Environmental Protection Agency, Fuel Economy Trends 2004.

Figure 19. Sales-Weighted Horsepower and On-Road Fuel Economy for Vans, 1975-2004 Model Years



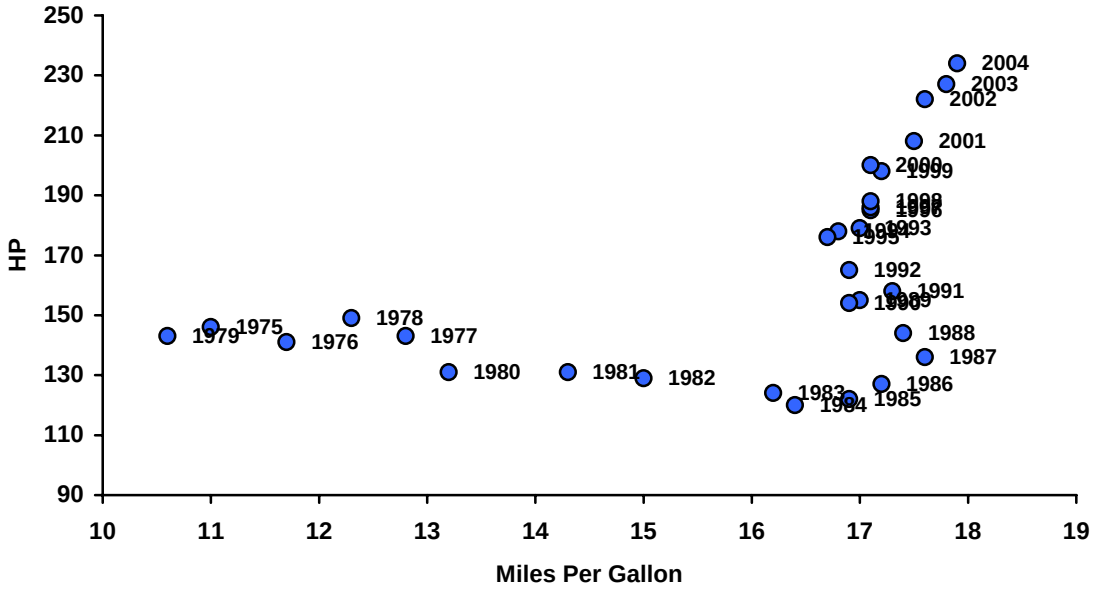
Source: U.S. Environmental Protection Agency, Fuel Economy Trends 2004.

Figure 20. Sales-Weighted Vehicle Weight and On-Road Fuel Economy for Vans, 1975-2004 Model Years



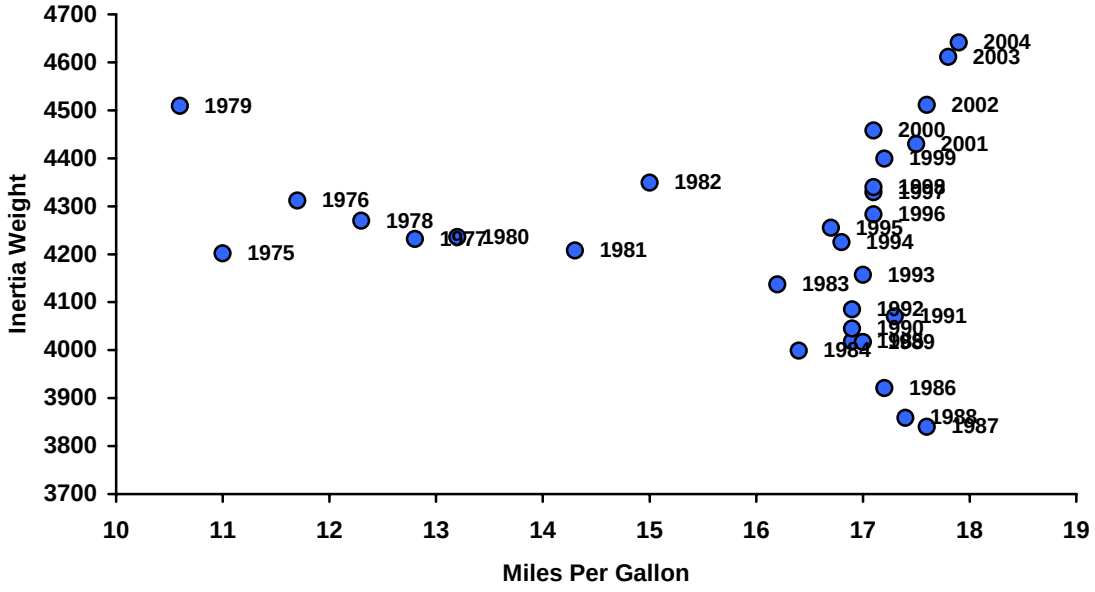
Source: U.S. Environmental Protection Agency, Fuel Economy Trends 2004.

Figure 21. Sales-Weighted Horsepower and On-Road Fuel Economy for SUVs, 1975-2004 Model Years



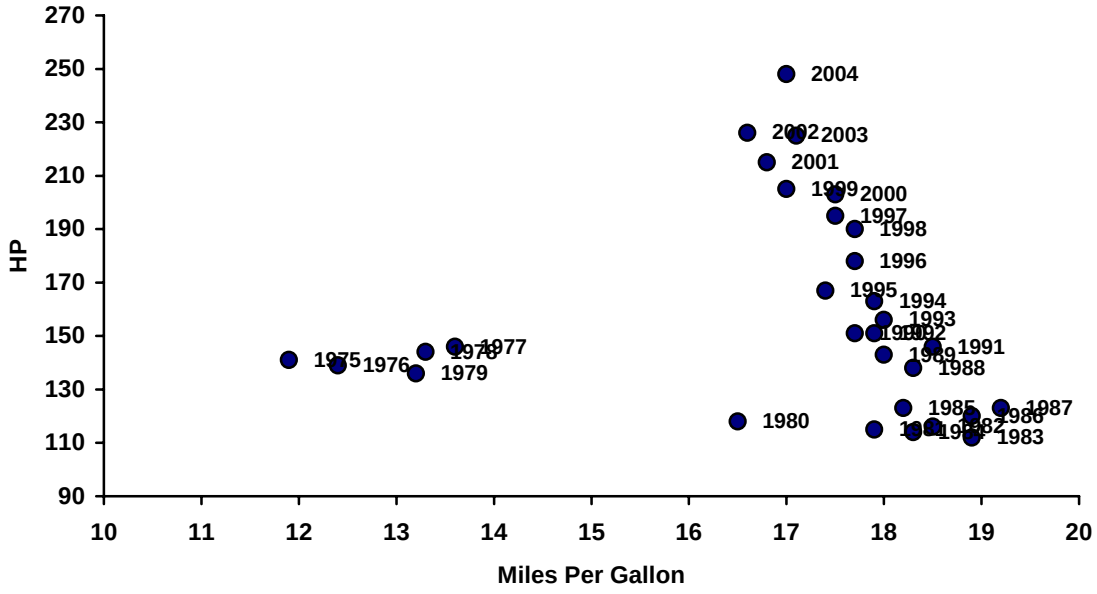
Source: U.S. Environmental Protection Agency, Fuel Economy Trends 2004.

Figure 22. Sales-Weighted Vehicle Weight and On-Road Fuel Economy for SUVs, 1975-2004 Model Years



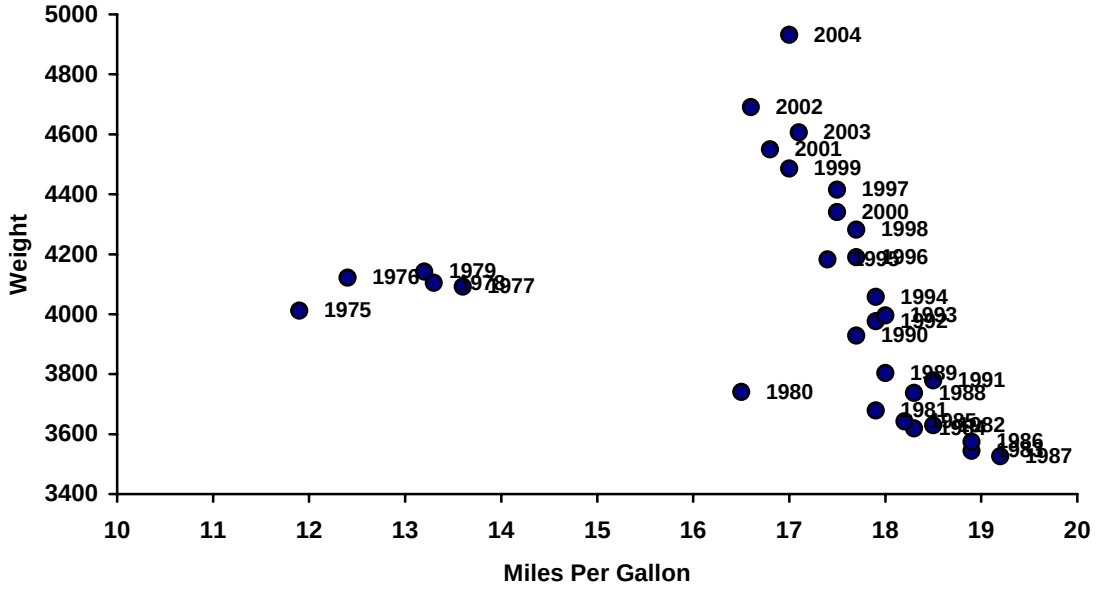
Source: U.S. Environmental Protection Agency, Fuel Economy Trends 2004.

Figure 23. Sales-Weighted Horsepower and On-Road Fuel Economy for Pickups, 1975-2004 Model Years



Source: U.S. Environmental Protection Agency, Fuel Economy Trends 2004.

Figure 24. Sales-Weighted Vehicle Weight and On-Road Fuel Economy for Pickups, 1975-2004 Model Years



Source: U.S. Environmental Protection Agency, Fuel Economy Trends 2004.

DECOMPOSING ENERGY NEEDS

Decomposition analysis is a logical means to link changes *structure*, *activity* and *energy intensity* to changes in energy use. These links should not to be confused with total energy efficiency, economic or technical efficiency to changes in energy use. To decompose energy use, a few of the demand predictors available in this report are linked to energy, effectively creating structure-energy, activity-energy, and intensity-energy links.

Unfortunately, restrictions on the data limit the scope of this work. Had greater sample sizes been available in the RTECS conducted in 1983 through 1994, it might have been possible to analytically link a wider array of measures. The sample sizes of RTECS, though, rarely supported point estimates crossed on more than a few characteristics. Because survey sample sizes – generally on the order of 3,000 households and 6,000 vehicles – become exceedingly thin as one calculates energy and energy-related statistics by household and vehicle characteristics – such as lifecycle, vehicle type, geographic region (e.g., urban versus rural), and income – decomposition of energy needs is limited to only a few key components (see Tables 4 through 9).

Decomposition is a means of analyzing an overall change over time. The key is identifying intermediate predictors that are measurable and dimensionally intertwined with each other in ratios such that an overall statistic can be "decomposed" into the product of two or more "effects," effectively linking them together. It is then possible to examine a change over time in the overall statistics (in this case, energy use) in terms of changes in the component ratios. Note that the use of the term "predictor" has been replaced by "effect" to emphasize that conclusions are statistical in nature, not causal. The multiplied components in Equation 2 are one example of the decomposition process.

Key Terms

These terms and general formulation for quantifying concluding effects on the changes in energy use were adapted from *Oil Crises & Climate Challenges: 30 Years of Energy Use in IEA Countries*, an economy-wide decomposition conducted by the Paris-based International Energy Agency, using Laspeyeres indices.

***Activity**: Basic unit of accounting for which energy is used, which, in this report, is the amount of travel, as measured by miles per vehicle.*

***Energy Intensity**: Energy consumed per unit of activity; gasoline-equivalent gallons per vehicle-mile traveled, as measured on-road and in-use..*

***Structure**: Refers to the mix of activities within the residential transportation sector; for example, number of households, fraction of housing belonging to a given lifecycle category, average number of vehicles owned per household, and fraction of vehicles in the nation's vehicle stock by type.*

$$Gallons_{\dots} = Households_{\dots} \bullet \sum_{i}\left(\frac{Households_{i..}}{Households_{\dots}} \bullet \frac{Vehicles_{i..}}{Households_{i..}} \bullet \left(\sum_{j}\frac{Vehicles_{ij.}}{Vehicles_{i..}} \bullet \sum_{k}\left(\frac{Vehicles_{ijk}}{Vehicles_{ij.}} \bullet \frac{Miles_{ijk}}{Vehicles_{ijk}} \bullet \frac{Gallons_{ijk}}{Miles_{ijk}}\right)\right)\right) \quad (2)$$

Equation 3 presents a simplified form of Equation 2.

$$Gallons_{\dots} = Households_{\dots} \bullet \sum_{i}\sum_{j}\sum_{k} \frac{Households_{i..}}{Households_{\dots}} \bullet \frac{Vehicles_{i..}}{Households_{i..}} \bullet \frac{Vehicles_{ij.}}{Vehicles_{i..}} \bullet \frac{Vehicles_{ijk}}{Vehicles_{ij.}} \bullet \frac{Miles_{ijk}}{Vehicles_{ijk}} \bullet \frac{Gallons_{ijk}}{Miles_{ijk}} \quad (3)$$

where *i* denotes a household lifecycle (up to 9 categories), *j* denotes vehicle type (up to 4 types), and *k* identifies a vintage category of vehicles (up to 2 categories). In the following analysis, combinations of years of survey data, household lifecycle, vehicle type, and vintage are explored to partition the overall change in energy needs. To avoid any confusion with the combinations, a mnemonic – *Decomposition # Survey Years # Lifecycles # Vehicle Types # Vintages* – serves to identify each combination under analysis.

- *Decomposition 4942* represents a decomposition covering 4 years of survey data, 9 categories of household lifecycle, 4 vehicle types and 2 vintage groupings (new versus old);

- *Decomposition 4941* represents a decomposition covering 4 years of survey data, 9 categories of household lifecycle, 4 vehicle types, and no vintage categorization; and

- *Decomposition 4921* represents a decomposition covering 4 years of survey data, 9 categories of household lifecycle, 2 vehicle types (e.g., cars versus all other vehicle types) and no categorization of vintage.

Using EIA data, seventy-two (9 x 4 x 2) separate decompositions can be completed for each base and end year combination. Because most of those decompositions give similar results, only a few have been completed and displayed.

In decompositions found herein, 4 years of survey data – 1988, 1991, 1994, and 2001 – are deemed eligible for use because necessary data (e.g., household lifecycle details) were not obtained in 1983 and 1985. For vehicle-possessing households, lifecycles are restricted to 9 categories:

1. Age of oldest child is younger than 7 years of age,

2. Age of oldest child is 7 to 15 years,

3. Age of oldest child is 16 or 17 years,

4. Householder is younger than 35 years in a household with one adult and no children,

5. Householder is 35 to 59 years of age in a household with one adult and no children,

6. Householder is 60 years or older in a household with one adult and no children,

7. Householder is younger than 35 years in a household with two or more adults and no children,

8. Householder is 35 to 59 years of age in a household with two or more adults and no children, and

9. Householder is 60 years or older in a household with two or more adults and no children.

Vehicle types are grouped as passenger cars, vans, SUVs, and pickups (defined as recreational vehicles and pickup trucks).

MEASURING AN EFFECT

To assess the effects of each component, one only needs to calculate the ratio of the overall energy use based on varying only one component (*activity*, *structure*, or *energy intensity*) to the actual amount in a given year. This is typically done using the earlier year (base year) for comparison. For example, the energy intensity effect is assessed for a base year, 0, and end year, t, by the following:

$$\text{Energy Intensity Effect} = \frac{Gallons_{\ldots t}\left|Activity_0, Structure_0, Intensity_t\right.}{Gallons_{\ldots 0}\left|Activity_0, Structure_0, Intensity_0\right.} \quad (4)$$

Base years given herein are 1988, 1991, or 1994. They are denoted as *0*; while an end year (*t*) is defined as any survey fielded in a succeeding year (e.g., 1991 for 1988, 1994 for 1991 and so on).

Given the formulation of the Energy Intensity Effect denoted in Equation 4, calculations are analogous for the other remaining effects:

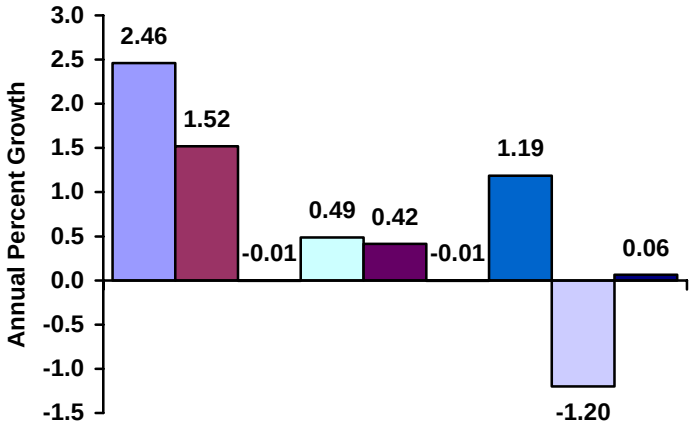
- Housing Effect,
- Lifecycle Effect,
- Ownership Effect,
- Vehicle Type Effect,
- Vintage Effect, and
- Vehicle Use Effect.

Interactions are difficult to interpret, because they represent all possible combinations of the above listed effects. Typically, Interactions are minor and may, in some analyses, be excluded from calculation, because they can be calculated by subtraction. As evidence of the minor interactions among effects, literature has shown that vehicle travel is relatively insensitive to energy intensity improvements, explaining that a "10 percent increase in fuel economy would lead to a 1 to 2 percent increase in vehicle travel."[36] For completeness, all Interaction Effects, though small, are displayed in this report. The limited ability to interpret interactions is commonly cited as a justification for using Divisia Indices, rather than Laspeyres. Given the

[36] Greene, D. and Schafer, A., Reducing Greenhouse Gas Emissions from U.S. Transportation, *Pew Center*, May 2003.

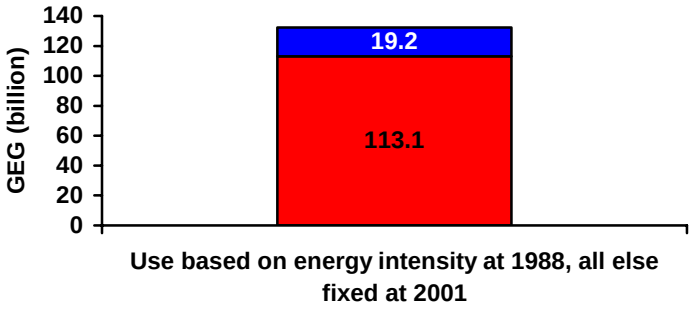
small contributions from Interactions during the time periods of interest, especially after annualizing its value to make assessments, the Laspeyres computation is used in this report.

Figure 25. Decomposition 4942 of Energy Needs, 1988 and 2001



Source: Calculated by Energy Information Administration.

Figure 26. Energy Savings from Energy Intensity Effect, 2001



Source: Calculated by Energy Information Administration.

Decomposition 4942

2.46 PERCENT PER YEAR
OVERALL ENERGY GROWTH

1.52 PERCENT PER YEAR
HOUSING EFFECT

-0.01 PERCENT PER YEAR
LIFECYCLE EFFECT

0.49 PERCENT PER YEAR
OWNERSHIP EFFECT

0.42 PERCENT PER YEAR
VEHICLE TYPE EFFECT

-0.01 PERCENT PER YEAR
VINTAGE EFFECT

1.19 PERCENT PER YEAR
VEHICLE USE EFFECT

-1.20 PERCENT PER YEAR
ENERGY INTENSITY EFFECT

0.06 PERCENT PER YEAR
INTERACTIONS

Concluded Energy Savings based on the Intensity Effect

19.2 million gasoline-equivalent gallons (GEG)

SUMMARY OF DECOMPOSTION 4942

Decomposition provides a cleaner view of changes in energy use, helping to quantify effects and drive further analyses by assessing the relative importance of each component. First, the vehicle vintage shows limited impact on the change in energy use, meaning the proportion of vehicles, by vintage categories, is unchanging from survey to survey, as no variation in energy use is readily detectable by Equation 4, which calculates a -0.01 percent per year effect for Vintage. Based on vehicle sales figures and assuming a steady-state in the scrappage of vehicles, it is not surprising that vintage is less important to the nation's energy use than energy intensity, given that the sales figures for the past decade show that the nation's yearly purchases averaged 15.2 million vehicles with a standard deviation of 1.1 million vehicles, meaning new vehicle sales levels have been relatively constant, even for the 2001 recession year. Vintage categories,

therefore, are dropped for all remaining decomposition analyses, which are denoted as *Decomposition ###1*.

Second, the Energy Intensity Effect (-1.2 percent per year) played a significant part in reducing the nation's energy use between 1988 and 2001. That improvement, however, was offset by 1 activity and 3 structural effects: Vehicle Use (1.19 percent), Housing (1.52 percent), Ownership (0.49 percent), and Vehicle Type (0.42 percent) – combined, they account for 3.61 percent per year growth in energy use. Even though the Lifecycle Effect is seemingly equivalent to the minimal influence shown by vehicle vintages, this effect is carried forward to further analyses because of the substantial changes occurring in the nation's population mix, such as the elderly tending to stay closer to their family members.[37]

Energy savings is one measure that quantifies the Energy Intensity Effect. The IEA defines concluded "energy savings" as the difference between the hypothetical amount of energy that would have been used in a given year if energy intensities had remained at base-year values and the actual energy use. From 1988 to 2001, the improvement in energy intensity, all else being equal, would have resulted in an energy savings of 19.2 billion gallons, meaning the nation would have consumed 132.3 billion gallons if energy intensities had remained fixed at base-year values. Because the nation actually consumed 113.1 billion gallons, improvements to energy intensity "saved" 19.2 billion gallons.

SUMMARY OF DECOMPOSTION 4941

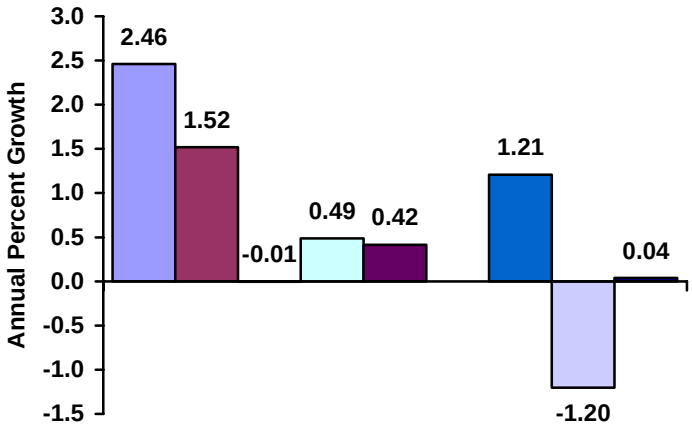
As expected, given the results of the *Decomposition 4942*, dropping vintage categories (denoted as *Decomposition 4941* shown in Figure 27) from the decomposition had little impact on partitioning out effects, meaning the proportion of vehicles (defined by vintage) in the end year (2001) is markedly similar to the base year (1988). In contrast, the Energy Intensity Effect still played a significant part in reducing the nation's energy use between 1988 and 2001. The improvement in energy intensity, all else being equal, would have resulted in an energy savings of 19.3 billion gallons, meaning the nation would have consumed 132.4 billion gallons if energy intensities had remained fixed at 1988 levels. Comparing effects between *Decompostions 4942* and *4941* on a one-to-one basis yields:

- Housing Effect having no measurable difference,
- Lifecycle Effect having no measurable difference,
- Ownership Effect having no measurable difference,
- Vehicle Type Effect having no measurable difference,
- Vehicle Use Effect having a 0.02 percent per year difference,

[37] Wellner, A.S., Is 'Increasing Mobility' a Threat to U.S. Elder Care?, accessed online at www.prb.org on August 10, 2005; Douglas A. Wolf and Charles F. Longino, Jr., Our 'Increasingly Mobile Society'? The Curious Persistence of a False Belief, *The Gerontologist* 45, no. 1 (2005): 5-11.

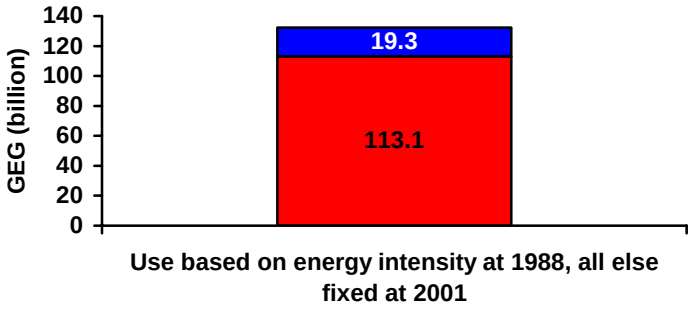
- Energy Intensity Effect having no measurable difference, and
- Interactions balance out numerically with the Vehicle Use Effect, a negative -0.02 percent difference.

Figure 27. Decomposition 4941 of Energy Needs, 1988 and 2001



Source: Calculated by Energy Information Administration.

Figure 28. Energy Savings from Energy Intensity, 2001



Source: Calculated by Energy Information Administration.

Decomposition 4941

2.46 PERCENT PER YEAR
OVERALL ENERGY GROWTH

1.52 PERCENT PER YEAR
HOUSING EFFECT

-0.01 PERCENT PER YEAR
LIFECYCLE EFFECT

0.49 PERCENT PER YEAR
OWNERSHIP EFFECT

0.42 PERCENT PER YEAR
VEHICLE TYPE EFFECT

-- PERCENT PER YEAR
VINTAGE EFFECT

1.21 PERCENT PER YEAR
VEHICLE USE EFFECT

-1.20 PERCENT PER YEAR
ENERGY INTENSITY EFFECT

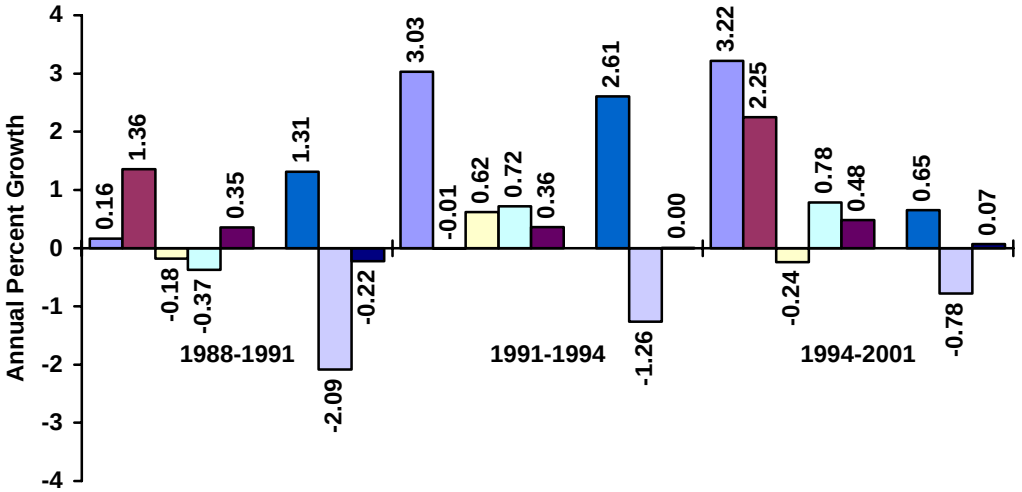
0.04 PERCENT PER YEAR
INTERACTIONS

Concluded Energy Savings based on the Intensity Effect

19.3 million gasoline-equivalent gallons (GEG)

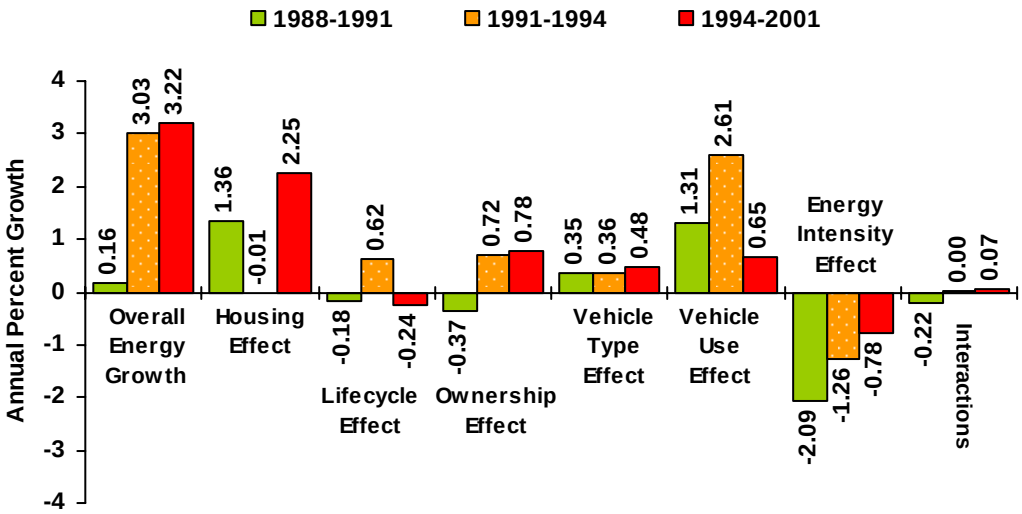
Decomposing survey-to-survey energy use is yet another approach. While a longer term view on changes in energy use provides insights into energy "savings" from a slowly changing vehicle stock, it precludes shorter term views. Additional insights are obtained by decomposing energy use using Equation 4 for shorter time periods: 1988-1991, 1991-1994, and 1994-2001 (see Figures 29 and 30).

Figure 29. Decomposition 4941 of Energy Use, 1988-1991, 1991-1994, and 1994-2001



Grouping effects from *Decomposition 4941* by time period provides a much cleaner comparison of the magnitude of the trends occurring between 1988 and 2001 (see Figure 30).

Figure 30. Decomposition 4941 of Energy Use by Effect, 1988-1991, 1991-1994, and 1994-2001



Source: Calculated by Energy Information Administration.

Growth in energy use is uneven over the three time periods: 1988-1991, 1991-1994, and 1994-2001. Even though energy use grew 2.46 percent per year between 1988 and 2001, it was much slower between 1988 and 1991 (0.16 percent per year) than in subsequent years, which experienced much stronger growth, up over 3 percent per year between 1991 and 2001.

Clearly, not all years are the same. One artifact of intermittent end-use data collection is jumps and drops in statistics due to the economic activity or national hardship events occurring during the survey years.[38] For instance, it could be argued that the recession between July 1990 and March 1991 resulted in a retreat of energy use in 1991; however, teasing out the effects on energy use shows that several factors offset energy use: the Energy Intensity Effect (-2.09 percent per year) the Lifecycle Effect (-0.18 percent per year) and the Ownership Effect (-0.37 percent per year). Without these effects, growth in energy use would have been over 3 percent per year, even with a recession, all else remaining constant. Given the expected impacts on economic wealth and financial security during a recession, a negative contribution to energy use between 1988 and 1991 from vehicle ownership is not surprising.

Table 3. Comparing Component Effects, 1988-1991, 1991-1994, and 1994-2001

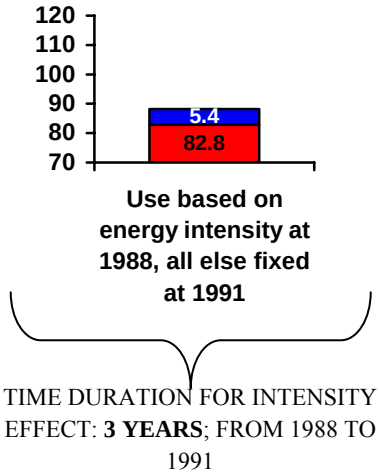
1988 – 1991	1991-1994	1994-2001
0.16 PERCENT PER YEAR OVERALL ENERGY GROWTH	3.03 PERCENT PER YEAR OVERALL ENERGY GROWTH	3.22 PERCENT PER YEAR OVERALL ENERGY GROWTH
1.36 PERCENT PER YEAR HOUSING EFFECT	-0.01 PERCENT PER YEAR HOUSING EFFECT	2.25 PERCENT PER YEAR HOUSING EFFECT
-0.18 PERCENT PER YEAR LIFECYCLE EFFECT	0.62 PERCENT PER YEAR LIFECYCLE EFFECT	-0.24 PERCENT PER YEAR LIFECYCLE EFFECT
-0.37 PERCENT PER YEAR OWNERSHIP EFFECT	0.72 PERCENT PER YEAR OWNERSHIP EFFECT	0.78 PERCENT PER YEAR OWNERSHIP EFFECT
0.35 PERCENT PER YEAR VEHICLE TYPE EFFECT	0.36 PERCENT PER YEAR VEHICLE TYPE EFFECT	0.48 PERCENT PER YEAR VEHICLE TYPE EFFECT
-- PERCENT PER YEAR VINTAGE EFFECT	-- PERCENT PER YEAR VINTAGE EFFECT	-- PERCENT PER YEAR VINTAGE EFFECT
1.31 PERCENT PER YEAR VEHICLE USE EFFECT	2.61 PERCENT PER YEAR VEHICLE USE EFFECT	0.65 PERCENT PER YEAR VEHICLE USE EFFECT
-2.09 PERCENT PER YEAR ENERGY INTENSITY EFFECT	-1.26 PERCENT PER YEAR ENERGY INTENSITY EFFECT	-0.78 PERCENT PER YEAR ENERGY INTENSITY EFFECT
-0.22 PERCENT PER YEAR INTERACTIONS	0.00 PERCENT PER YEAR INTERACTIONS	0.07 PERCENT PER YEAR INTERACTIONS

[38] The 2001 NHTS was conducted over the 14-month period from March 2001 to May 2002. Unfortunately, that timing turned out to be problematic due to the September 11, 2001 terrorist attacks on the World Trade Center in New York and the Pentagon in Washington, DC. These attacks disrupted transport services for months, especially curtailing long-distance travel. It is not certain what impacts the attacks had on urban travel, but it seems likely that both the amount of travel and modal choice were affected. That may have distorted the survey results to some unknown extent. Information courtesy of John Pucher and John L. Renne, *Transportation Quarterly*, Vol. 57, No. 3, 2003.

ENERGY SAVINGS

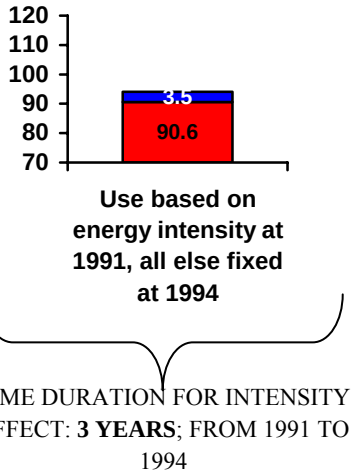
Based on the Intensity Effects, the nation has "saved" several billions of gallons of fuel from its deployment of less fuel intensive vehicles. That effect, however, has been offset in the United States., as newer vehicles sought by consumers have become heavier, more powerful, and faster, while only moderately less fuel intensive.

Figure 31. Concluded Energy Savings, 1991 (Billion GEG)



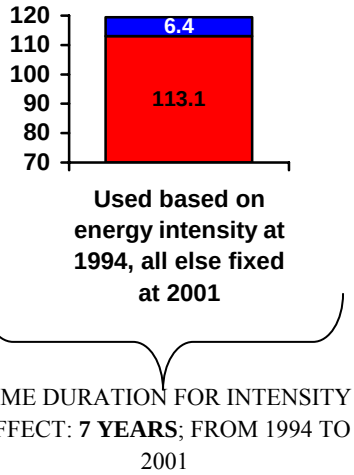
TIME DURATION FOR INTENSITY EFFECT: **3 YEARS**; FROM 1988 TO 1991

Figure 32. Concluded Energy Savings, 1994 (Billion GEG)



TIME DURATION FOR INTENSITY EFFECT: **3 YEARS**; FROM 1991 TO 1994

Figure 33. Concluded Energy Savings, 2001 (Billion GEG)



TIME DURATION FOR INTENSITY EFFECT: **7 YEARS**; FROM 1994 TO 2001

Figures 31, 32, and 33 track the concluded energy savings by the nation's vehicle stock due to lower energy intensities (i.e., improved energy performance). Over those times, energy was saved because automakers had produced vehicles with greater energy performance. The savings, however, are not equally dispersed. In terms of volumes, the nation "saved" the greatest amount of fuel between 1994 and 2001 because of improved energy performance; yet, those improvements took 7 years, whereas the period between 1988 and 1991, in which vehicles also achieved significant savings, improved such that 5.4 billion gallons was saved in only 3 years. Based on those savings, the nation experienced a diminished efficacy of energy performance, with superior achievements occurring prior to 1991. Indeed, the energy savings registered with 1991 energy intensities (see Figure 32) further illustrates the downward trend in savings due to energy performance of vehicles, with much less than the early period's saved amount (3.5 billion versus 5.4 billion), over the same time duration: 3 years.

COMPARING EFFECTS OVER TIME AND INTO THE FUTURE

Trends in the use of energy have been uneven for transport, as evidenced by the comparison of effects over time. Given the economic growth of the United States, as measured by GDP and real personal disposable income, the surge in energy use for transport is not particularly difficult to imagine – increased travel, increased ownership of vehicles that are heavier and more powerful than their predecessors, and shifts in vehicle stock toward SUVs would seemly point to increased

energy use. But, some effects – even offsetting ones – have shown some variations which could point the way toward better managing future energy use:

- The number of households with vehicles continues to increase, exhibiting an upward pressure on transport's energy use, as measured by the Housing Effect. This effect is expected to continue, depending on the population growth and life expectancy of the nation.

- As the nation becomes populated with increasing number of elderly, the composition of households may prove to be a significant offset to energy use, as the decomposition of Lifecycle Effect between 1994 and 2001 does impart some evidence that an aging population might continue to play an offsetting role.

- As economic growth spreads among households, increasing the amount of real disposable income, the number of vehicles per household (Ownership Effect) should continue to move energy use higher, though some saturation point in vehicle stock is inevitable, effectively leveling this effect.

- Gains in the use of energy for transport have mimicked consumers' desire for heavier and more powerful vehicles, as the Vehicle Type Effect revealed a consistent pressure on energy use. Based on 2001 to 2004 new vehicle purchases, it is highly likely this effect will continue in the nearer term, though recent trends in fuel prices could eventually dampen this effect.

- In an environment in which Americans have increasingly moved to the exurbs, vehicle use continues to rise with people simply driving longer distances, though the dip assessed in the 1994 to 2001 time period could be tied to the lingering effects from the events occurring in September 2001. As the willingness of Americans to walk, share a commute, or take advantage of other forms of higher load sharing vehicles (e.g., buses) changes, this trend may fluctuate.

- The nation's growth in energy use was reduced 2.09 percent per year, 1.26 percent per year, and 0.78 percent per year for the time periods 1988-1991, 1991-1994, and 1994-2001, respectively. Lowering energy intensity has proven to be one of the largest, and most consistent, effects working to reduce the energy used by the nation for transport, though the greatest strives toward lowering energy intensity occurred before 1991. Post-1991 intensity improvements slowed dramatically. As new vehicles enter the vehicle stock, they will most likely dictate the future impact on energy use. Based on sales-weighted fuel mileage estimated by the EPA, it is highly likely that impact on lessening energy use will further erode, as the fuel mileage is relatively unchanging or decreasing.

This report has touched on only a few of the possible structure-energy, activity-energy, and intensity-energy links possible. Indeed, other reports and economic research have included vehicle occupancy as another effect, determining whether vehicles are transporting more or less people in their everyday use. As evidenced by the growth of GDP and transport use, economic growth is tied to the consumer's ability to acquire goods and services; doing so in a sustainable manner – whether fuel prices are rising to record levels or not – is a worthwhile goal for the strategic use of energy by the nation's 296 million final consumers.

DATA FOR DECOMPOSITION 4941

*Table 4. Number of Households with Vehicles by Household Composition (**Lifecycle**), Selected Survey Years*

	Survey Year							
	1988		1991		1994		2001	
	Number of HH (million)	Share	Number of HH (million)	Share	Number of HH (million)	Share	Number of HH (million)	Share
Total	81.3	100.0	84.6	100.0	84.6	100.0	98.9	100.0
With Children								
Eldest Child < 7	9.5	11.7	10.6	12.5	9.2	10.9	10.2	10.3
Eldest Child 7 to 15	14.7	18.1	16.7	19.8	16.4	19.4	19.8	20.0
Eldest Child 16 or 17	5.7	7.0	5.7	6.8	6.4	7.6	7.1	7.2
Without Children								
Two Adults, < 35	8.1	9.9	7.4	8.8	7.2	8.5	6.5	6.6
Two Adults, 35 to 59	12.8	15.8	12.5	14.7	15	17.7	17.3	17.5
Two Adults, 60 plus	13.5	16.6	13.1	15.4	13.6	16.1	15.4	15.6
One Adult ,< 35	5.0	6.1	4.2	4.9	3.4	4.0	3.3	3.4
One Adult, 35 to 59	5.3	6.5	6.5	7.7	6.6	7.8	9.0	9.1
One Adult, 60 plus	6.7	8.2	8.0	9.4	7.0	8.2	10.0	10.2

*Table 5. Number of Vehicles and Vehicle Ownership by Household Composition (**Lifecycle**), Selected Survey Years*

	Survey Year							
	1988		1991		1994		2001	
	Number of Vehicles (million)	Vehicles per HH	Number of Vehicles (million)	Vehicles per HH	Number of Vehicles (million)	Vehicles per HH	Number of Vehicles (million)	Vehicles per HH
Total	147.5	1.8	151.2	1.8	156.8	1.9	191.0	1.9
With Children								
Eldest Child < 7	17.3	1.8	19.0	1.8	17.1	1.9	20.0	2.0
Eldest Child 7 to 15	28.7	1.9	32.3	1.9	32.3	2.0	41.5	2.1
Eldest Child 16 or 17	13.8	2.4	13.8	2.4	15.2	2.4	18.2	2.6
Without Children								
Two Adults, < 35	14.3	1.8	13.2	1.8	13.8	1.9	13.4	2.1
Two Adults, 35 to 59	29.4	2.3	27.8	2.2	33.9	2.3	41.0	2.4
Two Adults, 60 plus	24.2	1.8	23.1	1.8	24.9	1.8	30.3	2.0
One Adult ,< 35	5.7	1.1	5.0	1.2	4.1	1.2	3.7	1.1
One Adult, 35 to 59	7.1	1.3	7.6	1.2	7.6	1.2	11.5	1.3
One Adult, 60 plus	7.0	1.0	9.6	1.2	7.9	1.1	11.4	1.1

*Table 6. Shares of Vehicles by Type and Household Composition (**Lifecycle**), Selected Survey Years*

	Vehicle Shares			
	1988	1991	1994	2001
Households with Children, Eldest < 7	100.0	100.0	100.0	100.0
Passenger Cars	73.6	70.8	65.4	55.5
Vans	5.4	8.3	8.9	10.8
SUV	3.4	6.2	8.6	16.0
Pickups	17.7	14.6	17.1	17.8
Households with Children, Eldest 7 to 15	100.0	100.0	100.0	100.0
Passenger Cars	70.1	63.8	58.6	49.7
Vans	7.7	10.4	14.8	16.1
SUV	4.0	6.3	7.6	15.4
Pickups	18.3	19.5	18.9	18.8
Households with Children, Eldest 16 or 17	100.0	100.0	100.0	100.0
Passenger Cars	73.4	66.1	64.2	55.0
Vans	6.1	8.4	9.9	13.0
SUV	3.5	4.4	5.7	13.3
Pickups	16.9	21.1	20.2	18.7
Households without Children, Two Adults, < 35	100.0	100.0	100.0	100.0
Passenger Cars	75.4	77.4	74.2	67.7
Vans	2.3	1.5	1.9	2.7
SUV	4.0	5.5	8.5	13.3
Pickups	18.3	15.6	15.3	16.3
Households without Children, Two Adults, 35 to 59	100.0	100.0	100.0	100.0
Passenger Cars	71.1	69.3	66.7	56.7
Vans	4.2	4.4	4.1	6.9
SUV	3.6	5.1	6.4	12.5
Pickups	21.1	21.3	22.8	23.9
Households without Children, Two Adults, 60 plus	100.0	100.0	100.0	100.0
Passenger Cars	75.8	75.2	72.6	63.2
Vans	3.6	4.5	5.6	9.1
SUV	1.7	2.5	3.1	6.9
Pickups	18.9	17.7	18.7	20.8
Households without Children, One Adult, < 35	100.0	100.0	100.0	100.0
Passenger Cars	80.3	79	73.6	68.8
Vans	2.9	1.6	2.5	1.7
SUV	4.5	8.1	6.3	12.9
Pickups	12.3	11.3	17.6	16.6
Households without Children, One Adult, 35 to 59	100.0	100.0	100.0	100.0
Passenger Cars	77.5	78.2	74.2	63.4
Vans	4.2	4.6	6.0	5.6
SUV	1.7	2.7	4.3	11.4
Pickups	16.6	14.5	15.5	19.6
Households without Children, One Adult, 60 plus	100.0	100.0	100.0	100.0
Passenger Cars	89.0	88.0	88.7	82.2
Vans	0.1	0.8	0.4	4.3
SUV	1.8	1.3	0.7	3.8
Pickups	9.0	9.8	10.2	9.7
All Households	100.0	100.0	100.0	100.0
Passenger Cars	74.1	71.6	67.9	58.8
Vans	4.7	6.0	7.3	9.6
SUV	3.2	4.8	6.1	12.2
Pickups	18.0	17.6	18.7	19.4

*Table 7. Vehicle-Miles Traveled per Vehicle by Type and Household Composition (**Lifecycle**), Selected Survey Years*

	Vehicle-Miles Traveled per Vehicle (thousand)			
	1988	1991	1994	2001
Households with Children, Eldest < 7	11.3	11.2	12.1	13.7
Passenger Cars	11.5	11.2	12.0	12.9
Vans	11.5	10.8	12.2	16.4
SUV	13.5	12.5	12.7	14.2
Pickups	9.9	11.0	12.0	14.1
Households with Children, Eldest 7 to 15	10.9	11.7	12.3	13.5
Passenger Cars	11.1	11.9	12.1	13.3
Vans	11.8	13.0	13.9	13.9
SUV	12.3	11.6	13.0	14.5
Pickups	9.6	10.6	11.4	12.7
Households with Children, Eldest 16 or 17	11.9	11.7	12.5	13.4
Passenger Cars	12.3	11.7	12.8	12.8
Vans	13.2	10.6	13.6	14.2
SUV	11.9	16.9	11.8	14.9
Pickups	9.4	11.3	11.5	13.3
Households without Children, Two Adults, < 35	11.4	11.9	12.7	13.7
Passenger Cars	11.2	12.1	12.5	13.6
Vans	9.7	14.7	15.6	15.6
SUV	14.3	9.4	13.1	13.8
Pickups	11.9	11.4	12.6	13.9
Households without Children, Two Adults, 35 to 59	10.2	10.7	11.6	11.8
Passenger Cars	10.3	10.9	11.5	11.5
Vans	9.2	10.7	12.3	12.3
SUV	10.5	11.5	12.6	13.1
Pickups	10.2	10.0	11.5	11.8
Households without Children, Two Adults, 60 plus	7.9	8.5	9.3	9.5
Passenger Cars	8.2	8.8	9.3	9.3
Vans	8.4	10.8	10.4	10.4
SUV	8.4	8.7	12.7	11.0
Pickups	6.5	6.8	8.5	9.1
Households without Children, One Adult, < 35	12.1	11.9	13.0	13.2
Passenger Cars	12.2	12.1	13.2	12.5
Vans	9.8	12.5	12.0	14.3
SUV	13.7	10.5	15.3	14.6
Pickups	11.1	11.9	11.5	15.0
Households without Children, One Adult, 35 to 59	9.3	10.7	11.2	10.9
Passenger Cars	9.8	10.9	11.2	10.3
Vans	7.3	8.3	10.5	10.9
SUV	10.1	14.8	10.3	12.9
Pickups	7.4	9.4	12.0	11.3
Households without Children, One Adult, 60 plus	6.9	6.1	7.6	7.1
Passenger Cars	6.7	6.1	7.6	6.8
Vans	22.1	7.9	6.2	8.3
SUV	10.1	4.9	7.2	10.1
Pickups	7.5	5.3	7.5	8.0

*Table 8. Gasoline-Equivalent Gallons per 1000 Miles by Type and Household Composition (**Lifecycle**), Selected Survey Years*

	Gasoline-Equivalent Gallons per 1000 Mile			
	1988	1991	1994	2001
Households with Children, Eldest < 7	52.3	49.9	50.1	48.5
Passenger Cars	48.4	45.1	44.4	41.4
Vans	66.0	60.7	54.8	50.9
SUV	60.2	61.3	63.9	58.3
Pickups	63.8	61.9	62.0	58.1
Households with Children, Eldest 7 to 15	55.8	52.2	51.3	49.6
Passenger Cars	51.5	47.2	45.6	41.8
Vans	64.0	56.4	53.9	51.8
SUV	66.3	62.7	62.2	59.7
Pickups	67.9	64.1	62.8	59.9
Households with Children, Eldest 16 or 17	52.7	52.4	50.2	49.1
Passenger Cars	49.1	46.5	45.3	42.2
Vans	63.8	62.2	58.3	52.3
SUV	64.6	61.9	59.2	59.1
Pickups	64.7	64.5	60.4	58.2
Households without Children, Two Adults, < 35	50.7	47.4	46.2	46.1
Passenger Cars	47.3	44.1	42.0	40.7
Vans	76.5	55.3	53.2	52.6
SUV	58.7	61.2	59.9	58.4
Pickups	59.1	59.3	57.3	57.0
Households without Children, Two Adults, 35 to 59	55.4	51.9	51.3	50.1
Passenger Cars	50.9	47.6	45.5	43.3
Vans	70.3	62.8	62.3	53.3
SUV	67.6	56.6	58.6	58.1
Pickups	66.2	63.2	63.9	60.3
Households without Children, Two Adults, 60 plus	58.6	54.6	53.2	52.1
Passenger Cars	55.6	50.8	49.6	45.7
Vans	73.7	58.9	58.5	52.8
SUV	65.5	68.4	64.5	59.8
Pickups	69.7	71.3	63.7	68.4
Households without Children, One Adult, < 35	49.2	48.3	46.2	46.9
Passenger Cars	46.1	43.7	41.8	40.9
Vans	58.3	69.3	71.9	54.7
SUV	66.1	72.0	57.7	56.5
Pickups	61.7	62.7	58.0	59.7
Households without Children, One Adult, 35 to 59	55.2	51.5	48.8	48.5
Passenger Cars	51.9	48.0	44.5	42.7
Vans	78.9	68.5	66.6	54.7
SUV	91.1	56.2	68.5	56.4
Pickups	65.4	67.3	57.3	58.9
Households without Children, One Adult, 60 plus	60.0	57.2	50.7	49.3
Passenger Cars	56.7	55.1	49.5	46.6
Vans	51.6	64.9	55.2	53.6
SUV	60.6	81.4	63.8	57.2
Pickups	88.6	75.0	60.8	63.6

*Table 9. Number of Sampled Vehicles by Type and Household Composition (**Lifecycle**), Selected Survey Years*

	Number of Sampled Vehicles			
	1988	1991	1994	2001
Households with Children, Eldest < 7	796	802	629	3,852
Passenger Cars	578	557	414	1,995
Vans	45	60	55	451
SUV	27	48	54	644
Pickups	146	137	106	762
Households with Children, Eldest 7 to 15	1,265	1,350	1,168	8,446
Passenger Cars	870	864	683	3,933
Vans	97	134	168	1,385
SUV	55	85	87	1,367
Pickups	243	267	230	1,761
Households with Children, Eldest 16 or 17	639	582	547	3,900
Passenger Cars	474	385	356	2,090
Vans	36	44	48	495
SUV	22	23	32	548
Pickups	107	130	111	767
Households without Children, Two Adults, < 35	655	529	505	2,418
Passenger Cars	494	392	378	1,543
Vans	14	9	9	74
SUV	24	34	37	359
Pickups	123	94	81	442
Households without Children, Two Adults, 35 to 59	1,265	1,183	1,219	10,124
Passenger Cars	903	829	812	5,595
Vans	53	50	53	703
SUV	45	60	76	1,344
Pickups	264	244	278	2,482
Households without Children, Two Adults, 60 plus	924	914	851	8,068
Passenger Cars	700	675	619	4,950
Vans	36	43	49	719
SUV	15	28	25	594
Pickups	173	168	158	1,805
Households without Children, One Adult, < 35	187	198	136	668
Passenger Cars	148	142	103	433
Vans	4	5	3	15
SUV	8	13	8	96
Pickups	27	38	22	124
Households without Children, One Adult, 35 to 59	220	251	236	2,527
Passenger Cars	177	193	178	1,531
Vans	8	10	15	141
SUV	4	9	9	301
Pickups	31	39	34	554
Households without Children, One Adult, < 60 plus	218	275	262	2,733
Passenger Cars	194	240	231	2,192
Vans	1	5	1	123
SUV	4	4	2	119
Pickups	19	26	28	299

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ABBREVIATIONS

ATS	American Travel Survey
EIA	Energy Information Administration
EPA	Environmental Protection Agency
BBL	Barrel
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
BTS	Bureau of Transportation Statistics
BTU	British Thermal Unit
CAFE	Corporate Average Fuel Economy
CPI-U	Consumer Price Index for Urban Areas
DOE	Department of Energy
DOT	Department of Transportation
FHWA	Federal Highway Administration
GEG	Gasoline-Equivalent Gallon
GHG	Greenhouse Gases
HP	Horsepower
IEA	International Energy Agency
NHTS	National Household Travel Survey
NHTSA	National Highway Traffic Safety Administration
NPTS	Nationwide Personal Transportation Survey
MPG	Miles per Gallon
ORNL	Oak Ridge National Laboratory
PMT	Passenger-Miles Traveled
POV	Privately Owned Vehicle
RTECS	Residential Energy Transportation Survey
VMT	Vehicle-Miles Traveled

APPENDIX A: DETAILED TABLES

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Table A1. U.S. Number of Vehicles, Vehicle-Miles, Motor Fuel Consumption and Expenditures, 2001

2001 Household and Vehicle Characteristics	Number of Vehicles		Vehicle-Miles Traveled		Motor Fuel Consumption			Motor Fuel Expenditures	
	(million)	(percent)	(billion)	(percent)	(billion gallons)	(percent)	(quadrillion Btu)	(billion dollars)	(percent)
Household Characteristics									
Total	191.0	100.0	2,287	100.0	113.1	100.0	14.1	150.3	100.0
Census Region and Division									
Northeast	31.7	16.6	378	16.5	18.1	16.0	2.3	24.3	16.2
New England	10.0	5.2	122	5.3	5.8	5.2	0.7	8.1	5.4
Middle Atlantic	21.7	11.4	256	11.2	12.3	10.9	1.5	16.2	10.8
Midwest	47.1	24.7	560	24.5	27.8	24.5	3.5	37.4	24.9
East North Central	32.4	17.0	385	16.8	19.1	16.8	2.4	25.7	17.1
West North Central	14.7	7.7	175	7.7	8.7	7.7	1.1	11.7	7.8
South	70.2	36.8	871	38.1	43.2	38.2	5.4	54.4	36.2
South Atlantic	38.8	20.3	481	21.0	23.4	20.7	2.9	29.3	19.5
East South Central	11.7	6.1	143	6.3	7.3	6.4	0.9	9.3	6.2
West South Central	19.7	10.3	247	10.8	12.5	11.1	1.6	15.8	10.5
West	41.9	21.9	478	21.0	24.0	21.2	3.0	34.2	22.7
Mountain	12.2	6.4	138	6.1	7.3	6.4	0.9	10.1	6.7
Pacific	29.7	15.6	340	14.9	16.7	14.8	2.1	24.1	16.0
Urban Status									
Urban	143.5	75.1	1,676	73.3	81.7	72.3	10.2	109.1	72.5
Rural	47.6	24.9	611	26.7	31.4	27.7	3.9	41.2	27.5
Household Size									
1 Person	26.6	13.9	254	11.1	12.3	10.9	1.5	16.4	10.9
2 Persons	65.5	34.3	722	31.6	36.4	32.2	4.6	48.2	32.1
3 Persons	38.1	20.0	492	21.5	23.9	21.1	3.0	31.8	21.2
4 Persons	37.0	19.4	495	21.7	24.3	21.5	3.0	32.4	21.6
5 Persons	15.9	8.3	214	9.4	10.6	9.3	1.3	14.1	9.4
6 or More Persons	7.9	4.1	110	4.7	5.6	5.0	0.7	7.4	4.8
Household Composition (EIA)[1]									
Households With Children	79.8	41.8	1,078	47.1	53.1	46.9	6.6	70.7	47.0
Age of Oldest Child									
Under 7 Years	20.0	10.5	275	12.0	13.3	11.8	1.7	17.7	11.8
7 to 15 Years	41.5	21.7	560	24.5	27.8	24.6	3.5	37.1	24.6
16 to 17 Years	18.2	9.5	244	10.7	12.0	10.6	1.5	15.9	10.6
Households Without Children	111.2	58.2	1,209	52.9	60.0	53.1	7.5	76.6	51.0
One Adult	26.6	13.9	254	11.1	12.3	10.9	1.5	16.3	10.9
Age of Householder									
Under 35 Years	3.7	1.9	48	2.1	2.3	2.0	0.3	3.0	2.0
35 to 59 Years	11.5	6.0	124	5.4	6.0	5.3	0.8	8.0	5.3
60 Years or More	11.4	6.0	82	3.6	4.0	3.5	0.5	5.3	3.5
Two or More Adults	84.7	44.3	955	41.8	47.7	42.2	6.0	63.2	42.1

Table A1. U.S. Number of Vehicles, Vehicle-Miles, Motor Fuel Consumption and Expenditures, 2001 (Continued)

2001 Household and Vehicle Characteristics	Number of Vehicles		Vehicle-Miles Traveled		Motor Fuel Consumption			Motor Fuel Expenditures	
	(million)	(percent)	(billion)	(percent)	(billion gallons)	(percent)	(quadril-lion Btu)	(billion dollars)	(percent)
Age of Householder									
Under 35 Years	13.4	7.0	184	8.0	8.5	7.5	1.1	11.3	7.5
35 to 59 Years	41.0	21.5	484	21.2	24.3	21.5	3.0	32.1	21.4
60 Years or More	30.3	15.9	287	12.5	14.9	13.2	1.9	19.8	13.2
Household Composition (NHTS)[2]									
One adult, no children	16.4	8.6	182	7.9	8.7	7.7	1.1	11.5	7.7
Two or more adults, no children	43.8	22.9	544	23.8	26.7	23.6	3.3	35.4	23.6
One adult, youngest child 0-5	1.8	1.0	25	1.1	1.1	1.0	0.1	1.5	1.0
2+ adults, youngest child 0-5	31.5	16.5	434	19.0	21.3	18.8	2.7	28.4	18.9
One adult, youngest child 6-15	3.5	1.8	47	2.1	2.2	1.9	0.3	2.9	1.9
2+ adults, youngest child 6-15	35.2	18.4	475	20.8	23.7	21.0	3.0	31.6	21.0
One adult, youngest child 16-21	1.7	0.9	22	0.9	1.0	0.9	0.1	1.3	0.9
2+ adults, youngest child 16-21	14.7	7.7	186	8.2	9.0	8.0	1.1	12.1	8.0
One adult, retired, no children	9.5	5.0	65	2.8	3.3	2.9	0.4	4.3	2.9
2+ adults, retired, no children	32.8	17.2	307	13.4	16.1	14.2	2.0	21.3	14.1
Race of Householder									
White	149.5	78.3	1,774	77.6	88.6	78.4	11.1	117.9	78.4
Black	16.6	8.7	200	8.8	9.4	8.3	1.2	12.2	8.1
Other	24.9	13.0	313	13.6	15.1	13.3	1.9	20.2	13.5
Hispanic Descent									
Yes	15.0	7.9	194	8.5	9.4	8.3	1.1	12.6	8.4
No	176.0	92.1	2,093	91.5	103.7	91.7	13.0	137.7	91.6
Family Income									
Less than $5,000	2.4	1.3	23	1.0	1.1	0.9	0.1	1.4	0.9
$5,000 to $9,999	5.6	2.9	55	2.4	2.6	2.3	0.3	3.5	2.3
$10,000 to $14,999	6.7	3.5	62	2.7	3.0	2.7	0.4	4.0	2.7
$15,000 to $19,999	9.6	5.1	102	4.5	5.0	4.4	0.6	6.5	4.3
$20,000 to $24,999	9.0	4.7	93	4.1	4.5	4.0	0.6	5.9	4.0
$25,000 to $34,999	23.0	12.0	257	11.2	12.5	11.0	1.6	16.6	11.0
$35,000 to $49,999	37.3	19.5	450	19.7	22.3	19.8	2.8	29.6	19.7
$50,000 to $74,999	36.9	19.4	487	21.1	24.0	21.2	3.0	31.9	21.2
$75,000 or More	50.9	26.6	658	28.9	31.9	29.2	4.0	44.1	29.4
Don't Know	9.6	5.0	100	4.4	6.2	4.5	0.8	6.8	4.5
Income Relative to Poverty Line									
Below 100 Percent	11.4	6.0	116	5.1	5.6	5.0	0.7	7.4	4.9
100 to 150 Percent	10.8	5.6	120	5.2	5.8	5.1	0.7	7.7	5.1
Above 150 Percent	157.4	82.4	1,928	84.3	95.5	84.5	11.9	126.9	84.5
Don't Know	11.5	6.0	123	5.4	6.2	5.4	0.8	8.3	5.5
Number of Drivers									
1	37.8	19.8	379	16.6	18.7	16.2	2.3	24.3	16.2

Table A1. U.S. Number of Vehicles, Vehicle-Miles, Motor Fuel Consumption and Expenditures, 2001 (Continued)

2001 Household and Vehicle Characteristics	Number of Vehicles		Vehicle-Miles Traveled		Motor Fuel Consumption			Motor Fuel Expenditures	
	(million)	(percent)	(billion)	(percent)	(billion gallons)	(percent)	(quadril-lion Btu)	(billion dollars)	(percent)
2	109.6	57.4	1,342	58.7	67.4	59.7	8.4	89.5	59.6
3	32.0	16.8	407	17.8	19.7	17.5	2.5	10.4	17.5
4 or More	11.6	6.0	159	6.9	7.3	6.6	0.9	26.1	6.7
Age of Primary Driver									
16 to 17 Years	2.4	1.3	29	1.3	1.3	1.1	0.2	16.8	11.2
18 to 22 Years	8.6	4.5	125	5.5	5.5	4.9	0.7	7.3	4.9
23 to 29 Years	16.8	8.8	226	9.9	10.3	9.1	1.3	13.9	9.3
30 to 39 Years	33.5	17.5	486	21.3	22.6	20.0	2.8	30.0	20.0
40 to 49 Years	38.7	20.3	503	22.0	25.1	22.2	3.1	33.3	22.2
50 to 59 Years	31.6	16.5	373	16.3	18.9	16.7	2.4	25.1	16.7
60 to 69 Years	19.4	10.2	187	8.2	10.0	8.8	1.3	13.3	8.9
70 to 79 Years	13.4	7.0	96	4.2	5.2	4.6	0.7	7.0	4.7
80 Years and Over	4.9	2.6	19	0.8	1.2	1.1	0.2	2.0	1.3
Don't Know	21.7	11.4	243	10.6	13.1	11.6	1.6	1.6	1.1
Sex of Householder									
Male	80.0	42.0	970	42.4	48.5	42.8	6.1	64.5	42.9
Female	111.0	58.0	1,317	57.6	64.6	57.2	8.1	85.8	57.1
Vehicle Characteristics									
Model Year									
2001 to 2002	12.5	6.5	184	8.0	9.2	8.1	1.2	12.2	8.1
2000	16.0	8.4	233	10.2	11.5	10.2	1.4	15.2	10.1
1999	14.6	7.7	213	9.3	10.5	9.3	1.3	13.9	9.3
1998	13.9	7.3	196	8.6	9.5	8.4	1.2	12.6	8.4
1997	12.7	6.7	174	7.6	8.3	7.4	1.0	11.0	7.3
1996	11.6	6.1	151	6.6	7.3	6.4	0.9	9.7	6.4
1995	12.8	6.7	161	7.0	7.7	6.8	1.0	10.2	6.8
1992 to 1994	31.1	16.2	373	16.3	18.2	16.1	2.3	24.1	16.1
1989 to 1991	24.5	12.9	252	11.0	12.2	10.8	1.5	16.2	10.8
1986 to 1988	16.1	8.4	149	6.5	7.4	6.5	0.9	9.9	6.6
1983 to 1985	8.4	4.4	71	3.0	3.6	3.2	0.5	4.9	3.2
1980 to 1982	2.8	1.4	20	1.0	1.1	1.0	0.1	1.5	1.0
1977 to 1979	3.0	1.6	16	0.7	1.1	1.0	0.1	1.5	1.0
1976 or Earlier	5.4	2.8	61	2.7	3.1	2.7	0.4	4.2	2.8
Don't Know	5.6	2.9	33	1.5	2.4	2.1	0.3	3.2	2.1
Type of Vehicle									
Passenger Car	112.4	58.8	1,286	56.2	55.0	48.7	6.9	73.2	48.7
Van (Large and Minivans)	18.4	9.6	243	10.6	12.7	11.2	1.6	16.9	11.3
Sport Utility Vehicle	23.2	12.2	317	13.9	18.6	16.5	2.3	24.9	16.5
Pickup Truck	35.6	18.7	433	18.9	25.2	22.2	3.2	33.2	22.1
Recreational Vehicle	1.4	0.7	8	0.4	1.6	1.4	0.3	2.1	1.4

Table A1. U.S. Number of Vehicles, Vehicle-Miles, Motor Fuel Consumption and Expenditures, 2001 (Continued)

2001 Household and Vehicle Characteristics	Number of Vehicles		Vehicle-Miles Traveled		Motor Fuel Consumption			Motor Fuel Expenditures	
	(million)	(percent)	(billion)	(percent)	(billion gallons)	(percent)	(quadril-lion Btu)	(billion dollars)	(percent)
Fuel Economy (miles per gallon)									
10.9 or Less	6.1	3.2	15	0.7	2.3	2.0	0.3	3.0	2.0
11 to 12.9	7.7	4.0	23	1.0	2.0	1.8	0.3	2.5	1.7
13 to 15.9	28.4	14.9	241	10.5	16.3	14.4	2.0	21.7	14.4
16 to 18.9	40.3	21.0	464	20.3	26.6	23.5	3.3	35.5	23.6
19 to 21.9	43.0	22.5	533	23.3	26.1	23.1	3.3	34.9	23.2
22 to 24.9	34.7	18.2	513	22.4	22.1	19.5	2.8	29.4	19.6
25 to 29.9	23.2	12.2	367	16.0	13.6	12.0	1.7	18.1	12.1
30 or More	7.7	4.0	131	5.7	4.1	3.6	0.5	5.2	3.5

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A2. U.S. Per Household Vehicle-Miles Traveled, Vehicle Fuel Consumption and Expenditures, 2001

2001 Household Characteristics	Number of Households with Vehicles (million)	Average per Household with Vehicles			
		Number of Vehicles	Vehicle-Miles Traveled (thousands)	Consumption (gallons)	Expenditures (dollars)
Total	98.9	1.9	23.1	1,143	1,520
Census Region and Division					
Northeast	17.7	1.8	21.4	1,027	1,373
New England	5.4	1.9	22.6	1,086	1,500
Middle Atlantic	12.3	1.8	20.8	1,001	1,317
Midwest	23.6	2.0	23.7	1,176	1,585
East North Central	16.3	2.0	23.6	1,164	1,577
West North Central	7.3	2.0	24.0	1,205	1,603
South	36.2	1.9	24.1	1,193	1,504
South Atlantic	20.4	1.9	23.6	1,146	1,436
East South Central	5.7	2.1	25.1	1,273	1,632
West South Central	10.1	2.0	24.5	1,244	1,564
West	21.4	2.0	22.3	1,119	1,592
Mountain	6.1	2.0	22.6	1,194	1,656
Pacific	15.4	1.9	22.1	1,090	1,558
Urban Status					
Urban	77.6	1.8	21.6	1,054	1,405
Rural	21.3	2.2	28.7	1,469	1,934
Household Size					
1 Person	22.4	1.2	11.3	550	732
2 Persons	33.4	2.0	21.6	1,091	1,443
3 Persons	17.2	2.2	28.6	1,391	1,849
4 Persons	16.0	2.3	30.9	1,519	2,025
5 Persons	6.7	2.4	31.9	1,567	2,090
6 or More Persons	3.2	2.5	34.4	1,762	2,313
Household Composition (EIA)[1]					
Households With Children	37.1	2.2	29.2	1,429	1,903
Age of Oldest Child					
Under 7 Years	10.2	2.0	26.8	1,307	1,735
7 to 15 Years	19.8	2.1	28.4	1,403	1,869
16 to 17 Years	7.1	2.6	34.0	1,676	2,239
Households Without Children	61.7	1.8	19.6	972	1,241
One Adult	22.4	1.2	12.0	550	731
Age of Householder					
Under 35 Years	3.3	1.1	14.4	679	909
35 to 59 Years	9.0	1.3	13.6	667	889
60 Years or More	10.0	1.1	8.0	401	530
Two or More Adults	39.3	2.2	24.8	1,212	1,612
Age of Householder					

Table A2. U.S. Per Household Vehicle-Miles Traveled, Vehicle Fuel Consumption and Expenditures, 2001 (Continued)

2001 Household Characteristics	Number of Households with Vehicles (million)	Average per Household with Vehicles			
		Number of Vehicles	Vehicle-Miles Traveled (thousands)	Consumption (gallons)	Expenditures (dollars)
Under 35 Years	6.5	2.1	28.0	1,297	1,738
35 to 59 Years	17.3	2.4	28.0	1,400	1,855
60 Years or More	15.4	2.0	18.4	966	1,286
Household Composition (NHTS)[2]					
One adult, no children	13.7	1.2	13.3	634	839
2+ adults, no children	20.1	2.2	27.1	1,334	1,761
One adult, youngest child 0-5	1.5	1.2	16.7	733	1,000
2+ adults, youngest child 0-5	15.1	2.1	28.7	1,410	1,880
One adult, youngest child 6-15	2.6	1.3	18.1	827	1,115
2+ adults, youngest child 6-15	15.0	2.3	31.7	1,580	2,107
One adult, youngest child 16-21	0.9	1.9	24.4	1,082	1,444
2+ adults, youngest child 16-21	5.1	2.9	36.5	1,801	2,353
One adult, retired, no children	8.3	1.1	7.8	395	518
2+ adults, retired, no children	16.6	2.0	18.5	964	1,283
Race of Householder					
White	75.8	2.0	23.4	1,170	1,554
Black	9.7	1.7	20.6	968	1,258
Other	13.4	1.9	23.4	1,121	1,507
Hispanic Descent					
Yes	8.3	1.8	23.4	1,127	1,506
No	90.6	1.9	23.1	1,145	1,520
Family Income					
Less than $5,000	1.7	1.4	13.5	620	824
$5,000 to $9,999	4.1	1.4	13.4	647	854
$10,000 to $14,999	4.7	1.4	13.2	644	851
$15,000 to $19,999	6.3	1.5	16.2	788	1,032
$20,000 to $24,999	5.6	1.6	16.6	794	1,054
$25,000 to $34,999	13.3	1.7	19.3	940	1,248
$35,000 to $49,999	18.9	2.0	23.8	1,183	1,566
$50,000 to $74,999	17.2	2.1	28.3	1,393	1,855
$75,000 or More	20.6	2.5	31.9	1,549	2,141
Don't Know	6.5	1.5	15.4	957	1,031
Income Relative to Poverty Line					
Below 100 Percent	7.9	1.4	14.7	942	937
100 to 150 Percent	6.7	1.6	17.9	1,363	1,134
Above 150 Percent	77.8	2.0	24.8	1,546	1,631
Don't Know	6.5	1.8	18.9	957	1,277
Number of Drivers					
1	31.7	1.2	12.0	590	767
2	52.6	2.1	25.5	1,281	1,703

Table A2. U.S. Per Household Vehicle-Miles Traveled, Vehicle Fuel Consumption and Expenditures, 2001 (Continued)

2001 Household Characteristics	Number of Households with Vehicles (million)	Average per Household with Vehicles			
		Number of Vehicles	Vehicle-Miles Traveled (thousands)	Consumption (gallons)	Expenditures (dollars)
3.....	11.1	2.9	36.7	1,775	2,354
4 or More	3.2	3.6	49.7	2,086	3,166

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A3. U.S. Per Vehicle Average Miles Traveled, Vehicle Fuel Consumption and Expenditures, 2001

2001 Household and Vehicle Characteristics	Number of Vehicles (million)	Average per Vehicle			Miles per Gallon
		Vehicle-Miles Traveled (thousands)	Consumption (gallons)	Expenditures (dollars)	
Household Characteristics					
Total	191.0	12.0	592	787	20.2
Census Region and Division					
Northeast	31.7	11.9	571	766	20.9
New England	10.0	12.3	586	810	21.0
Middle Atlantic	21.8	11.7	564	746	20.8
Midwest	47.1	11.9	588	793	20.2
East North Central	32.4	11.9	585	792	20.3
West North Central	14.7	11.9	594	793	20.0
South	70.2	12.4	615	776	20.2
South Atlantic	38.9	12.4	603	756	20.6
East South Central	11.7	12.3	623	795	19.7
West South Central	19.7	12.5	636	804	19.7
West	41.9	11.4	572	814	19.9
Mountain	12.2	11.3	594	829	19.1
Pacific	29.7	11.4	564	808	20.3
Urban Status					
Urban	143.5	11.7	570	760	20.5
Rural	47.6	12.8	658	867	19.5
Household Size					
1 Person	26.6	9.6	464	616	20.6
2 Persons	65.5	11.0	556	737	19.8
3 Persons	38.1	12.9	626	834	20.6
4 Persons	37.0	13.4	657	876	20.3
5 Persons	15.9	13.5	663	882	20.3
6 or More Persons	7.9	13.9	699	938	19.9
Household Composition (EIA)[1]					
Households With Children	79.8	13.5	665	886	20.3
Age of Oldest Child					
Under 7 Years	20.0	13.7	666	885	20.6
7 to 15 Years	41.5	13.5	669	892	20.2
16 to 17 Years	18.2	13.4	656	871	20.4
Households Without Children	111.2	10.9	539	716	20.2
One Adult	26.6	9.6	464	616	20.6
Age of Householder					
Under 35 Years	3.7	13.2	619	821	21.3
35 to 59 Years	11.5	10.9	526	700	20.6
60 Years or More	11.4	7.1	352	467	20.3
Two or More Adults	84.7	11.3	563	747	20.0
Age of Householder					

Table A3. U.S. Per Vehicle Average Miles Traveled, Vehicle Fuel Consumption and Expenditures, 2001 (Continued)

2001 Household and Vehicle Characteristics	Number of Vehicles (million)	Average per Vehicle			Miles per Gallon
		Vehicle-Miles Traveled (thousands)	Consumption (gallons)	Expenditures (dollars)	
Under 35 Years	13.4	13.7	633	844	21.7
35 to 59 Years	41.0	11.8	591	783	20.0
60 Years or More	30.3	9.5	493	655	19.2
Household Composition (NHTS)[2]					
One adult, no children	16.4	11.1	530	703	20.9
2+ adults, no children	43.8	12.4	610	809	20.4
One adult, youngest child 0-5	1.8	13.3	603	790	22.1
2+ adults, youngest child 0-5	31.5	13.8	676	901	20.4
One adult, youngest child 6-15	3.5	13.3	617	822	21.6
2+ adults, youngest child 6-15	35.2	13.5	675	898	20.0
One adult, youngest child 16-21	1.7	12.5	581	775	21.6
2+ adults, youngest child 16-21	14.7	12.7	614	818	20.6
One adult, retired, no children	9.5	6.8	345	458	19.8
2+ adults, retired, no children	32.8	9.4	488	648	19.2
Race of Householder					
White	149.5	11.9	593	788	20.0
Black	16.6	12.1	564	735	21.4
Other	24.9	12.5	604	814	20.8
Hispanic Descent					
Yes	15.0	12.9	622	836	20.8
No	176.0	11.9	589	783	20.2
Family Income					
Less than $5,000	2.4	9.4	438	578	21.4
$5,000 to $9,999	5.6	9.9	472	627	20.9
$10,000 to $14,999	6.7	9.4	455	605	20.5
$15,000 to $19,999	9.6	10.6	510	674	20.7
$20,000 to $24,999	9.0	10.3	502	661	20.6
$25,000 to $34,999	23.1	11.1	542	718	20.6
$35,000 to $49,999	37.3	12.1	598	793	20.2
$50,000 to $74,999	36.9	13.1	650	865	20.2
$75,000 or More	48.9	13.1	652	870	20.0
Don't Know	11.5	10.7	538	718	19.9
Income Relative to Poverty Line					
Below 100 Percent	13.3	10.4	501	665	20.8
100 to 150 Percent	11.5	11.3	539	714	20.9
Above 150 Percent	154.6	12.3	608	808	20.2
Don't Know	11.5	10.7	538	718	19.9
Number of Drivers					
1	37.8	10.0	483	642	20.8
2	109.6	12.3	615	817	19.9
3	32.0	12.7	616	819	20.6

Table A3. U.S. Per Vehicle Average Miles Traveled, Vehicle Fuel Consumption and Expenditures, 2001 (Continued)

2001 Household and Vehicle Characteristics	Number of Vehicles (million)	Average per Vehicle			Miles per Gallon
		Vehicle-Miles Traveled (thousands)	Consumption (gallons)	Expenditures (dollars)	
4 or More	11.2	13.8	663	889	20.8
Age of Primary Driver					
16 to 17 Years	2.4	11.6	529	701	22.0
18 to 22 Years	8.6	14.2	634	842	22.4
23 to 29 Years	16.1	14.1	647	862	21.8
30 to 39 Years	33.5	13.6	671	893	20.3
40 to 49 Years	38.7	13.0	647	860	20.0
50 to 59 Years	31.6	11.9	595	790	19.9
60 to 69 Years	19.4	10.0	516	685	19.4
70 to 79 Years	13.3	7.6	395	523	19.3
80 Years and Over	3.9	6.0	310	413	19.3
Don't Know	23.4	10.9	558	743	19.6
Sex of Householder					
Male	80.3	12.1	603	802	20.1
Female	110.8	11.9	584	775	20.4
Vehicle Characteristics					
Model Year					
2001 to 2002	12.5	14.8	735	976	20.1
2000	16.0	14.5	716	949	20.3
1999	14.6	14.6	717	951	20.3
1998	13.9	14.1	686	910	20.6
1997	12.8	13.7	653	864	20.9
1996	11.6	13.0	627	831	20.7
1995	12.8	12.6	598	795	21.0
1992 to 1994	31.1	12.0	585	777	20.5
1989 to 1991	24.5	10.3	496	662	20.7
1986 to 1988	16.1	9.3	460	614	20.1
1983 to 1985	8.4	8.4	433	581	19.5
1980 to 1982	2.8	7.1	393	526	18.0
1977 to 1979	3.0	5.4	375	503	14.4
1976 or Earlier	5.4	11.2	574	770	19.6
Don't Know	5.6	5.9	433	574	13.7
Type of Vehicle					
Passenger Car	112.4	11.4	489	651	23.4
Vans (Large and Minivans)	18.4	13.2	692	923	19.1
Sport Utility Vehicle	23.2	13.7	802	1,069	17.0
Pickup Truck	35.6	12.1	706	933	17.2
Recreational Vehicle	1.4	5.9	1,113	1,483	5.3
Fuel Economy (miles per gallon)					
10.9 or Less	6.1	2.4	366	485	6.5
11 to 12.9	7.6	3.1	257	343	12.1

Table A3. U.S. Per Vehicle Average Miles Traveled, Vehicle Fuel Consumption and Expenditures, 2001 (Continued)

2001 Household and Vehicle Characteristics	Number of Vehicles (million)	Average per Vehicle			Miles per Gallon
		Vehicle-Miles Traveled (thousands)	Consumption (gallons)	Expenditures (dollars)	
13 to 15.9	28.4	8.5	575	764	14.7
16 to 18.9.....	40.2	11.5	662	879	17.4
19 to 21.9	43.0	12.4	609	809	20.4
22 to 24.9	34.7	14.8	637	847	23.2
25 to 29.9	23.3	15.7	585	780	26.9
30 or More	7.7	17.0	518	691	32.9

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A4. U.S. Vehicles by Model Year, 2001 (Million Vehicles)

2001 Household and Vehicle Characteristics	All Model Years	Model Year														
		2001 to 2002	2000	1999	1998	1997	1996	1995	1992 to 1994	1989 to 1991	1986 to 1988	1983 to 1985	1980 to 1982	1977 to 1979	1976 or earlier	Don't Know
Household Characteristics																
Total	191.0	12.5	16.0	14.6	13.9	12.8	11.6	12.8	31.1	24.5	16.1	8.4	2.8	3.0	5.4	5.6
Census Region and Division																
Northeast	31.7	2.4	3.3	2.4	2.4	2.4	2.2	2.2	5.2	4.2	2.4	0.9	0.2	0.2	0.8	0.4
New England	10.0	0.7	0.9	0.8	0.9	0.8	0.7	0.7	1.7	1.1	0.8	0.2	0.1	0.1	0.2	0.1
Middle Atlantic	21.8	1.7	2.4	1.7	1.5	1.6	1.4	1.5	3.6	3.1	1.6	0.7	0.1	0.1	0.6	0.3
Midwest	47.1	3.0	3.6	3.6	3.6	3.2	2.7	3.2	8.3	6.1	3.9	2.0	0.7	0.8	1.4	1.1
East North Central	32.4	2.2	2.7	2.6	2.5	2.2	2.0	2.1	5.8	4.0	2.6	1.2	0.4	0.5	1.1	0.6
West North Central	14.7	0.8	0.9	1.0	1.1	1.1	0.8	1.0	2.4	2.1	1.3	0.8	0.3	0.4	0.3	0.5
South	70.2	4.6	6.1	5.7	5.3	4.7	4.5	4.9	11.4	8.7	5.7	3.2	0.9	0.9	1.9	1.8
South Atlantic	38.9	2.6	3.5	3.2	3.0	2.6	2.6	2.8	5.9	4.9	3.3	1.7	0.5	0.4	1.0	0.9
East South Central	11.7	0.6	0.8	0.8	0.8	0.8	0.8	0.8	2.0	1.4	1.1	0.6	*0.2*	0.3	0.4	0.4
West South Central	19.7	1.4	1.8	1.7	1.4	1.3	1.1	1.3	3.5	2.4	1.4	0.9	0.3	0.2	0.5	0.5
West	41.9	2.5	3.0	2.9	2.6	2.5	2.2	2.6	6.2	5.6	4.0	2.3	0.9	1.0	1.3	2.2
Mountain	12.2	0.8	0.9	0.8	0.7	0.8	*0.7*	0.8	1.9	1.5	1.0	0.7	0.3	0.3	0.4	0.7
Pacific	29.7	1.8	2.1	2.1	1.9	1.7	1.5	1.8	4.3	4.1	3.0	1.7	0.6	0.7	*0.9*	1.6
Urban Status																
Urban	143.5	9.8	12.4	11.4	10.5	9.9	8.9	9.8	23.4	18.4	11.7	5.7	1.8	1.9	4.1	3.8
Rural	47.6	2.6	3.7	3.3	3.4	2.9	2.7	3.1	7.7	6.1	4.4	2.7	0.9	1.1	1.3	1.8
Household Size																
1 Person	26.6	1.5	1.8	1.9	1.8	1.7	1.4	1.7	4.2	4.0	2.5	1.5	0.4	0.6	0.7	0.8
2 Persons	65.5	4.7	5.7	5.4	4.9	4.5	4.1	4.6	10.4	7.8	5.3	2.7	0.9	1.0	1.5	2.1
3 Persons	38.1	2.5	3.4	2.8	2.7	2.5	2.5	2.6	6.2	4.9	3.1	1.6	0.4	0.6	1.3	1.0
4 Persons	37.0	2.4	3.2	3.1	2.9	2.5	2.2	2.4	6.2	4.6	2.8	1.4	0.6	0.4	1.0	1.1
5 Persons	15.9	1.0	1.3	1.0	0.9	1.2	1.0	1.1	2.8	2.1	1.3	0.7	0.2	0.2	*0.6*	0.4
6 or More Persons	7.9	0.4	0.5	0.5	0.6	0.4	0.4	0.4	1.2	1.1	1.0	0.4	0.2	0.1	0.3	0.3
Household Composition (EIA)[1]																
Households With Children	79.8	5.2	6.9	6.2	5.7	5.5	5.0	5.2	13.2	10.0	6.8	3.3	1.2	1.0	2.4	2.1
Age of Oldest Child																
Under 7 Years	20.0	1.5	1.9	1.7	1.6	1.5	1.2	1.5	3.5	2.1	1.5	0.6	0.2	0.2	0.6	0.5
7 to 15 Years	41.5	2.6	3.6	3.2	2.8	2.8	2.7	2.5	6.7	5.4	3.7	1.9	0.7	0.6	1.2	1.2
16 to 17 Years	18.2	1.2	1.4	1.2	1.3	1.2	1.2	1.2	3.1	2.5	1.6	0.8	0.3	0.2	0.5	0.5
Households Without Children	111.2	7.3	9.1	8.5	8.2	7.3	6.6	7.6	17.8	14.6	9.2	5.1	1.6	1.9	3.0	3.5
One Adult	26.6	1.5	1.8	1.9	1.8	1.7	1.4	1.7	4.2	4.0	2.5	1.5	0.4	0.6	0.7	0.8
Age of Householder																
Under 35 Years	3.7	0.3	0.3	0.3	*0.3*	0.3	0.1	0.3	0.6	0.4	0.2	0.1	*0.1*	0.0	0.1	*0.1*
35 to 59 Years	11.5	0.7	0.8	0.8	0.7	0.7	0.7	0.7	1.7	1.6	1.1	0.7	*0.2*	0.3	0.3	0.4
60 Years or More	11.4	0.5	0.7	0.8	0.8	0.6	0.6	0.7	1.9	2.0	1.1	0.7	0.2	0.3	0.4	0.3
Two or More Adults	84.7	5.8	7.3	6.6	6.3	5.6	5.1	6.0	13.6	10.6	6.7	3.6	1.2	1.3	2.3	2.7

Table A4. U.S. Vehicles by Model Year, 2001 (Million Vehicles) (Continued)

2001 Household and Vehicle Characteristics	All Model Years	Model Year															
		2001 to 2002	2000	1999	1998	1997	1996	1995	1992 to 1994	1989 to 1991	1986 to 1988	1983 to 1985	1980 to 1982	1977 to 1979	1976 or earlier	Don't Know
Age of Householder																
Under 35 Years	13.4	1.0	1.2	1.1	1.1	0.9	0.8	1.1	2.2	1.8	0.8	0.4	0.1	0.1	0.5	0.3
35 to 59 Years	41.0	2.8	3.7	3.1	2.9	2.6	2.5	2.8	6.6	5.1	3.3	1.7	0.6	0.8	0.9	1.5
60 Years or More	30.3	1.9	2.4	2.4	2.4	2.0	1.8	2.0	4.9	3.7	2.6	1.4	0.5	0.5	0.9	0.9
Household Composition (NHTS)[2]																
One adult, no children	16.4	1.0	1.1	1.2	1.1	1.2	0.9	1.1	2.6	2.4	1.5	0.9	0.2	0.3	0.4	0.5
2+ adults, no children	43.8	3.4	4.0	3.7	3.3	2.9	2.7	3.2	6.8	5.3	3.2	1.7	0.6	0.5	1.2	1.3
One adult, youngest child 0-5	1.8	0.1	0.1	*0.1*	*0.1*	0.1	*0.1*	*0.1*	0.4	0.3	*0.2*	0.1	0.0	0.0	0.0	0.0
2+ adults, youngest child 0-5	31.5	2.2	2.9	2.5	2.4	2.2	1.9	2.2	5.3	3.6	2.5	1.2	0.3	0.4	1.0	0.7
One adult, youngest child 6-15	3.5	0.2	0.2	0.3	0.2	0.3	0.2	0.3	0.6	0.5	0.4	0.1	*0.1*	0.0	0.0	0.1
2+ adults, youngest child 6-15	35.2	2.4	3.0	2.8	2.4	2.4	2.3	2.1	5.7	4.4	3.0	1.6	0.6	0.5	0.9	1.0
One adult, youngest child 16-21	1.7	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0
2+ adults, youngest child 16-21	14.7	0.9	1.3	0.9	1.0	0.8	0.9	1.0	2.6	2.0	1.2	0.6	0.2	0.3	0.5	0.5
One adult, retired, no children	9.5	0.4	0.6	0.7	0.7	0.5	0.5	0.5	1.6	1.6	0.9	0.6	0.2	0.3	0.3	0.3
2+ adults, retired, no children	32.8	2.0	2.7	2.4	2.4	2.2	2.0	2.2	5.1	4.2	2.9	1.6	0.5	0.6	0.9	1.1
Race of Householder																
White	149.5	10.2	12.9	11.8	11.1	10.4	9.3	10.1	24.0	18.7	11.9	6.1	2.2	2.4	3.8	4.6
Black	16.6	0.8	1.2	1.1	1.0	0.9	1.0	1.2	2.8	2.5	1.7	0.9	0.2	0.2	0.6	0.4
Other	24.9	1.4	1.9	1.7	1.8	1.5	1.2	1.6	4.3	3.4	2.5	1.3	0.3	0.3	1.0	0.6
Hispanic Descent																
Yes	15.0	0.8	1.2	*0.9*	*0.9*	*1.0*	*0.7*	1.0	2.6	2.0	1.6	0.9	0.2	0.2	*0.6*	0.4
No	176.0	11.6	14.9	13.7	13.0	11.7	10.9	11.9	28.5	22.5	14.4	7.5	2.5	2.8	4.8	5.2
Family Income																
Less than $5,000	2.4	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.4	0.4	0.4	0.2	0.1	0.1	0.2	0.1
$5,000 to $9,999	5.6	*0.2*	0.2	0.1	0.2	*0.2*	0.2	0.3	0.8	1.2	0.9	0.6	0.2	0.2	*0.3*	0.1
$10,000 to $14,999	6.7	0.2	0.2	0.3	0.3	0.3	0.4	0.4	1.3	1.3	0.8	0.5	*0.1*	0.2	0.2	0.1
$15,000 to $19,999	9.6	0.3	0.4	*0.4*	0.5	0.5	0.5	0.6	1.8	1.7	1.1	0.7	0.3	0.3	*0.3*	0.3
$20,000 to $24,999	9.0	0.3	0.5	0.5	0.6	0.5	0.5	0.5	1.5	1.6	1.0	0.5	*0.2*	0.2	*0.4*	0.3
$25,000 to $34,999	23.1	1.0	1.4	1.5	1.6	1.5	1.3	1.6	3.9	3.5	2.4	1.2	0.4	0.4	0.6	0.9
$35,000 to $49,999	37.3	2.0	2.8	2.4	2.6	2.6	2.3	2.6	6.5	4.8	3.5	1.7	0.6	0.6	0.9	1.3
$50,000 to $74,999	36.9	2.7	3.5	3.1	2.9	2.8	2.3	2.7	6.2	4.2	2.7	1.2	0.3	0.5	0.8	0.9
$75,000 or More	48.9	5.1	5.9	5.3	4.2	3.7	3.3	3.2	7.1	4.5	2.4	1.2	0.5	0.4	0.9	1.2
Don't Know	11.5	0.8	1.0	0.9	0.8	0.7	0.8	0.7	1.6	1.4	0.8	0.5	0.2	*0.1*	0.7	0.4
Income Relative to Poverty Line																
Below 100 Percent	13.3	0.3	0.4	0.4	0.6	0.5	0.5	0.7	2.1	2.6	2.0	1.2	0.4	0.4	0.8	0.3
100 to 150 Percent	11.5	0.3	0.5	0.5	0.6	0.6	0.7	0.7	2.0	2.2	1.5	0.8	0.3	*0.2*	0.4	0.3
Above 150 Percent	154.6	11.1	14.1	12.8	11.9	10.9	9.6	10.7	25.4	18.4	11.8	5.8	1.9	2.2	3.5	4.5
Don't Know	11.5	0.8	1.0	0.9	0.8	0.7	0.8	0.7	1.6	1.4	0.8	0.5	0.2	0.1	0.7	0.4
Number of Drivers																
1	37.8	2.0	2.4	2.6	2.5	2.3	2.0	2.4	6.2	5.7	3.9	2.1	0.6	0.7	1.1	1.0

Table A4. U.S. Vehicles by Model Year, 2001 (Million Vehicles) (Continued)

2001 Household and Vehicle Characteristics	All Model Years	Model Year														
		2001 to 2002	2000	1999	1998	1997	1996	1995	1992 to 1994	1989 to 1991	1986 to 1988	1983 to 1985	1980 to 1982	1977 to 1979	1976 or earlier	Don't Know
2	109.6	7.7	9.9	9.1	8.2	7.6	7.1	7.4	17.5	13.1	8.5	4.3	1.4	1.6	2.7	3.3
3	32.0	2.0	2.9	2.2	2.3	2.1	1.8	2.3	5.5	4.1	2.7	1.5	0.5	0.5	1.0	0.9
4 or More	11.2	0.7	0.8	0.8	0.9	0.7	0.6	0.7	1.8	1.6	0.9	0.4	0.2	*0.1*	0.5	0.4
Age of Primary Driver																
16 to 17 Years	2.4	*0.1*	0.1	0.0	*0.1*	0.1	0.1	0.2	0.5	0.5	0.2	0.2	0.0	0.0	0.1	*0.1*
18 to 22 Years	8.6	0.4	0.6	0.5	0.6	0.5	0.6	0.7	1.7	1.4	0.6	0.4	0.1	0.1	0.3	0.2
23 to 29 Years	16.1	1.2	1.4	1.5	1.4	1.3	1.0	1.3	2.6	1.9	1.3	0.4	0.1	0.1	0.4	0.2
30 to 39 Years	33.5	2.5	3.1	2.9	2.7	2.4	2.1	2.3	5.6	3.8	2.4	1.2	0.4	0.4	0.9	0.7
40 to 49 Years	38.7	2.8	3.7	3.3	2.8	2.7	2.6	2.6	6.3	4.4	3.1	1.4	0.4	0.5	1.0	0.9
50 to 59 Years	31.6	2.2	2.9	2.5	2.2	2.2	1.8	2.1	4.9	4.1	2.8	1.4	0.5	0.5	0.8	1.0
60 to 69 Years	19.4	1.2	1.6	1.5	1.5	1.2	1.2	1.3	3.1	2.5	1.7	0.9	0.3	0.4	0.5	0.6
70 to 79 Years	13.3	0.7	1.0	0.9	1.0	0.9	0.7	0.8	2.3	2.0	1.2	0.7	0.2	0.3	0.4	0.3
80 Years and Over	3.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.6	0.7	0.5	0.3	0.1	0.1	0.1	0.1
Don't Know	23.4	1.2	1.5	1.4	1.4	1.2	1.3	1.3	3.5	3.2	2.3	1.5	0.6	0.6	0.9	1.4
Sex of Householder																
Male	80.3	5.2	6.7	6.1	5.5	5.3	5.0	5.2	13.1	10.6	6.9	3.8	1.4	1.5	1.3	2.9
Female	110.8	7.3	9.3	8.6	8.4	7.5	6.7	7.7	18.0	14.0	9.2	4.6	1.4	1.5	4.1	2.7
Vehicle Characteristics																
Type of Vehicle																
Passenger Car	112.4	6.4	8.5	7.9	7.7	7.6	6.8	8.0	19.4	16.5	9.7	4.9	1.5	1.3	3.0	3.3
Vans (Large and Minivans)	18.4	1.0	1.9	1.6	1.8	1.2	1.4	1.5	3.3	2.2	1.3	0.5	0.1	0.2	0.5	0.1
Sport Utility Vehicle	23.2	2.7	3.0	2.8	2.3	1.7	1.5	1.4	2.9	1.9	1.3	0.7	0.2	0.2	0.6	0.2
Pickup Truck	35.6	2.4	2.6	2.3	2.0	2.3	1.9	2.0	5.3	3.9	3.7	2.2	0.9	1.1	1.2	1.8
Recreational Vehicle	1.4	*0.1*	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	*0.2*	0.1	0.1
Fuel Economy (miles per gallon)																
10.9 or Less	6.1	0.1	0.1	*0.2*	0.1	0.1	0.1	0.2	0.6	0.4	0.7	0.5	0.3	0.8	0.2	1.7
11 to 12.9	7.6	*0.1*	0.2	0.2	0.2	0.3	0.3	0.3	0.9	1.1	1.2	0.7	0.3	0.5	0.2	1.1
13 to 15.9	28.4	1.8	2.0	2.2	1.6	1.5	1.5	1.6	4.6	3.8	2.6	1.5	0.6	0.9	0.8	1.5
16 to 18.9	40.2	2.8	3.7	3.0	2.8	2.8	2.2	2.5	6.5	4.9	3.6	1.9	0.6	0.6	1.4	0.9
19 to 21.9	43.0	3.1	4.0	3.5	3.3	2.8	3.0	2.9	7.7	5.9	3.2	1.6	0.4	0.1	1.3	0.1
22 to 24.9	34.7	2.6	3.5	3.1	3.1	2.7	2.5	2.8	5.6	4.2	2.1	1.0	0.3	0.1	1.1	*0.1*
25 to 29.9	23.3	1.4	2.2	1.9	2.1	2.1	1.3	1.8	3.9	3.2	2.0	0.8	0.3	0.0	0.3	0.0
30 or More	7.7	0.6	0.4	0.6	0.5	0.6	0.6	0.8	1.4	1.0	0.7	*0.3*	*0.1*	#N/A	*0.1*	0.0

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units

Table A4. U.S. Vehicles by Model Year, 2001 (Million Vehicles) (Continued)

2001 Household and Vehicle Characteristics	All Model Years	Model Year														
		2001 to 2002	2000	1999	1998	1997	1996	1995	1992 to 1994	1989 to 1991	1986 to 1988	1983 to 1985	1980 to 1982	1977 to 1979	1976 or earlier	Don't Know

were sampled.

#N/A = Value is missing or not applicable.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A5. U.S. Vehicle Fuel Economy by Model Year, 2001 (Miles per Gallon)

2001 Household and Vehicle Characteristics	All Model Years	Model Year														
		2001 to 2002	2000	1999	1998	1997	1996	1995	1992 to 1994	1989 to 1991	1986 to 1988	1983 to 1985	1980 to 1982	1977 to 1979	1976 or earlier	Don't Know
Household Characteristics																
Total	20.2	20.1	20.3	20.3	20.6	20.9	20.7	21.0	20.5	20.7	20.1	19.5	18.0	14.4	19.6	13.7
Census Region and Division																
Northeast	20.9	20.6	20.6	21.0	21.2	21.1	21.1	21.8	21.2	21.2	20.2	19.5	17.7	14.8	19.1	13.9
New England	21.0	20.4	21.4	20.8	21.2	20.9	21.1	22.5	21.0	21.2	20.1	20.8	16.7	15.2	20.2	15.5
Middle Atlantic	20.8	20.6	20.3	21.1	21.2	21.3	21.1	21.4	21.2	21.2	20.3	19.0	18.1	14.5	18.6	13.3
Midwest	20.1	20.4	20.2	19.8	20.5	20.8	20.7	20.8	20.4	21.0	20.3	18.4	17.7	14.3	19.9	13.7
East North Central	20.2	20.5	20.3	19.8	20.5	20.7	20.8	21.0	20.4	20.7	20.5	18.1	17.3	14.7	20.0	14.0
West North Central	20.1	20.1	19.9	19.8	20.3	21.1	20.5	20.5	20.3	21.6	19.8	18.7	18.3	13.9	19.6	13.5
South	20.2	19.8	20.4	20.3	20.4	20.8	20.6	20.8	20.6	20.3	19.9	18.6	18.4	15.1	19.2	14.5
South Atlantic	20.6	20.6	20.7	21.0	20.6	21.1	20.8	21.1	21.0	21.1	20.0	18.4	18.5	16.0	19.5	14.0
East South Central	19.6	19.4	20.7	19.7	19.7	19.9	20.4	19.4	19.9	19.3	20.4	19.0	19.0	15.1	20.2	14.7
West South Central	19.8	18.9	19.8	19.6	20.4	20.8	20.3	21.0	20.4	19.3	19.2	18.9	18.0	13.7	17.9	15.1
West	19.9	19.6	19.8	20.4	20.7	21.2	20.3	20.8	20.1	20.7	20.4	21.1	17.8	13.8	20.1	13.2
Mountain	18.9	19.5	19.0	19.1	20.5	20.0	19.6	20.6	19.7	20.1	20.0	21.7	18.7	13.2	19.4	***10.7***
Pacific	20.4	19.7	20.1	20.9	20.8	21.8	20.7	21.0	20.3	20.9	20.5	20.9	17.2	14.1	20.5	15.4
Urban Status																
Urban	20.5	20.4	20.6	20.6	20.8	21.3	21.0	21.2	20.8	20.9	20.5	20.2	18.5	14.2	19.7	13.4
Rural	19.5	19.1	19.5	19.5	20.0	19.9	19.8	20.3	19.8	20.3	19.4	18.0	16.9	14.8	19.2	14.5
Household Size																
1 Person	20.7	20.5	20.9	20.4	21.7	21.5	21.0	22.1	20.8	20.8	20.5	19.7	18.3	15.1	20.1	13.6
2 Persons	19.8	20.1	20.0	20.2	20.2	20.8	20.6	20.5	20.0	20.2	19.6	18.8	17.6	14.1	19.7	12.2
3 Persons	20.6	20.2	20.6	20.6	21.2	21.4	21.1	21.7	21.0	20.9	20.7	18.8	16.9	13.8	19.6	15.6
4 Persons	20.4	19.6	20.1	20.3	20.7	20.6	20.6	20.9	21.0	21.0	19.9	20.8	19.0	15.1	18.9	15.0
5 Persons	20.2	20.4	20.6	20.2	20.3	20.8	20.0	20.3	20.4	21.2	21.0	19.4	17.6	14.3	19.5	15.3
6 or More Persons	19.6	21.2	18.7	19.3	18.6	20.1	21.1	18.9	22.0	20.7	20.3	18.9	16.3	13.4	20.3	12.8
Household Composition (EIA)[1]																
Households With Children	20.3	19.9	20.4	20.1	20.4	20.8	20.5	20.9	20.8	21.0	20.3	20.4	18.4	14.3	19.2	14.8
Age of Oldest Child																
Under 7 Years	20.7	19.9	20.6	20.3	20.9	21.2	20.4	21.3	21.2	21.7	19.8	20.9	19.0	14.9	20.8	14.5
7 to 15 Years	20.1	19.7	20.0	19.9	20.1	20.6	20.6	20.6	20.7	20.7	20.3	20.4	18.4	13.2	19.4	14.6
16 to 17 Years	20.3	20.2	20.9	20.1	20.7	21.1	20.5	21.0	20.4	21.3	20.7	19.8	18.1	16.7	17.4	15.6
Households Without Children	20.2	20.2	20.2	20.5	20.8	21.1	20.8	21.1	20.3	20.4	20.0	18.7	17.5	14.5	19.9	13.0
One Adult	20.7	20.6	20.9	20.5	21.7	21.4	21.5	22.2	21.0	21.1	20.6	20.1	18.2	15.0	20.1	13.8
Age of Householder																
Under 35 Years	20.9	20.2	20.7	20.5	22.1	21.3	22.5	23.4	22.3	22.2	21.0	21.7	***17.9***	***14.8***	19.8	14.6
35 to 59 Years	20.7	20.2	20.7	20.2	21.5	21.8	20.4	22.5	20.8	20.9	20.3	19.9	18.4	15.2	21.3	13.6
60 Years or More	20.5	21.4	21.3	20.7	21.6	21.2	21.5	20.7	19.9	20.2	20.6	18.7	18.3	15.1	19.1	13.1
Two or More Adults	20.0	20.4	20.2	20.7	20.9	21.4	20.8	21.1	20.5	20.5	20.1	18.5	17.0	14.2	20.0	13.0

Table A5. U.S. Vehicle Fuel Economy by Model Year, 2001 (Miles per Gallon) (Continued)

2001 Household and Vehicle Characteristics	All Model Years	Model Year														
		2001 to 2002	2000	1999	1998	1997	1996	1995	1992 to 1994	1989 to 1991	1986 to 1988	1983 to 1985	1980 to 1982	1977 to 1979	1976 or earlier	Don't Know
Age of Householder																
Under 35 Years	21.6	21.7	20.7	21.5	22.1	23.2	21.3	23.4	22.0	22.1	21.2	19.2	16.9	14.3	21.6	13.2
35 to 59 Years	19.9	19.8	20.0	20.6	20.1	20.3	21.0	20.7	20.1	20.1	20.0	19.3	18.2	14.6	19.2	14.1
60 Years or More	19.3	19.7	19.9	20.0	20.6	20.6	20.1	19.3	19.3	19.4	19.1	16.9	15.8	13.8	19.1	*11.8*
Household Composition (NHTS)[2]																
One adult, no children	20.9	20.5	20.9	20.4	21.7	21.7	21.3	22.5	21.2	21.1	20.5	20.4	19.5	15.1	20.2	14.1
2+ adults, no children	20.4	20.4	20.0	20.8	20.6	21.4	21.0	21.4	20.5	20.7	19.8	19.3	17.7	14.6	20.6	13.6
One adult, youngest child 0-5	22.7	21.2	23.5	22.8	23.9	22.1	21.8	21.7	21.2	22.9	22.9	23.1	*10.4*	*12.2*	*22.4*	*14.2*
2+ adults, youngest child 0-5	20.4	19.8	20.2	20.0	20.2	20.9	20.5	21.0	21.0	21.7	20.0	20.0	18.3	14.5	20.0	14.1
One adult, youngest child 6-15	21.4	20.2	21.6	20.9	20.5	22.4	21.6	21.2	22.0	22.4	23.0	21.4	*19.5*	*15.0*	*22.6*	16.4
2+ adults, youngest child 6-15	20.0	19.8	20.3	20.0	20.3	20.4	20.2	20.6	20.4	20.1	19.9	20.5	18.6	13.5	18.7	15.0
One adult, youngest child 16-21	22.0	21.8	20.7	22.2	23.4	22.3	21.4	22.2	22.5	21.6	21.8	19.2	*18.8*	*15.4*	*18.8*	17.5
2+ adults, youngest child 16-21	20.7	20.3	21.0	20.8	21.2	21.5	20.9	21.5	20.8	21.1	20.8	19.8	18.9	16.5	18.3	15.0
One adult, retired, no children	19.7	20.9	21.0	20.1	20.9	21.0	19.9	20.5	19.5	20.0	20.7	18.4	*16.8*	15.1	20.0	12.8
2+ adults, retired, no children	19.1	19.4	19.9	19.8	20.4	20.1	20.6	19.5	19.4	19.4	19.4	16.9	16.1	13.7	18.7	*11.8*
Race of Householder																
White	20.0	19.9	20.1	20.1	20.5	20.7	20.6	20.7	20.4	20.4	20.0	19.0	17.6	14.2	19.3	13.4
Black	21.3	21.1	22.1	21.6	21.4	22.2	21.7	22.4	21.4	21.9	21.0	19.3	18.3	15.8	21.3	15.2
Other	20.7	19.9	21.3	21.8	21.5	21.7	21.4	21.6	20.8	22.0	20.5	21.1	19.6	17.0	20.5	16.0
Hispanic Descent																
Yes	20.6	20.3	20.9	20.0	20.2	22.2	21.2	22.0	21.2	21.2	20.0	21.3	20.6	15.3	20.1	15.3
No	20.2	20.0	20.3	20.3	20.7	20.8	20.6	20.9	20.5	20.7	20.2	19.2	17.8	14.4	19.5	13.6
Family Income																
Less than $5,000	20.9	*25.5*	21.2	19.3	22.5	24.2	26.7	22.8	21.6	22.5	21.9	20.4	*9.0*	13.5	19.4	14.7
$5,000 to $9,999	21.2	20.7	21.4	19.6	21.4	21.5	21.5	23.5	21.3	22.0	20.6	19.0	19.0	14.6	21.4	14.4
$10,000 to $14,999	20.7	21.4	20.5	20.6	20.3	22.9	21.4	21.9	21.0	21.0	20.9	16.2	20.3	16.0	21.8	*12.5*
$15,000 to $19,999	20.8	21.0	22.4	20.0	22.6	21.6	23.1	21.5	20.9	21.5	20.4	20.0	16.0	15.7	19.7	14.9
$20,000 to $24,999	20.7	19.6	22.3	20.9	21.7	21.1	20.7	22.3	19.9	21.5	19.9	21.7	20.3	12.8	20.7	14.6
$25,000 to $34,999	20.6	19.8	20.9	20.5	21.2	21.9	20.9	21.4	20.7	21.1	20.3	19.7	17.6	15.1	20.8	14.6
$35,000 to $49,999	20.2	20.3	20.7	21.0	20.8	20.8	20.4	20.4	20.5	20.3	19.8	19.4	17.0	14.0	18.2	15.2
$50,000 to $74,999	20.2	20.2	20.5	20.6	20.5	20.4	20.7	20.9	20.7	20.4	20.3	20.0	17.7	14.9	19.3	*11.1*
$75,000 or More	19.9	19.9	19.7	19.8	20.1	20.8	20.4	20.8	20.4	20.3	19.5	19.6	19.2	12.3	20.0	14.4
Don't Know	19.6	19.8	20.2	20.8	20.5	21.8	20.1	20.6	19.6	20.3	20.6	18.9	19.0	15.2	18.1	13.0
Income Relative to Poverty Line																
Below 100 Percent	20.7	21.5	21.5	19.7	22.0	21.8	23.0	21.9	21.4	21.7	20.9	17.5	18.2	15.0	20.6	15.0
100 to 150 Percent	20.7	19.0	21.3	21.2	21.0	21.8	21.6	21.4	20.9	22.0	20.6	21.3	17.4	15.6	21.1	15.5
Above 150 Percent	20.2	20.1	20.3	20.3	20.6	20.8	20.6	20.9	20.5	20.5	20.0	19.6	17.9	14.2	19.5	13.6
Don't Know	19.8	19.8	20.2	20.8	20.5	21.8	20.1	20.6	19.6	20.3	20.6	18.9	19.0	15.2	18.1	13.0
Number of Drivers																
1	20.3	21.0	21.0	20.3	21.5	21.5	21.0	21.9	20.7	21.1	20.8	20.3	16.7	15.1	21.5	14.3

Table A5. U.S. Vehicle Fuel Economy by Model Year, 2001 (Miles per Gallon) (Continued)

2001 Household and Vehicle Characteristics	All Model Years	Model Year														
		2001 to 2002	2000	1999	1998	1997	1996	1995	1992 to 1994	1989 to 1991	1986 to 1988	1983 to 1985	1980 to 1982	1977 to 1979	1976 or earlier	Don't Know
2	19.9	19.7	19.9	20.1	20.1	20.6	20.5	20.6	20.4	20.5	19.6	19.0	18.2	13.8	18.6	12.9
3	20.7	20.1	20.8	20.4	21.7	21.4	21.1	21.3	21.0	20.5	20.7	19.7	18.1	15.3	20.4	15.4
4 or More	21.8	20.0	21.7	20.9	20.1	22.5	20.3	19.3	22.7	21.0	20.5	19.2	20.8	16.2	20.9	13.7
Age of Primary Driver																
16 to 17 Years	20.9	20.5	22.2	21.9	22.8	22.2	23.1	23.4	22.4	22.1	24.5	20.7	17.4	*13.7*	19.0	17.3
18 to 22 Years	21.4	20.4	23.3	22.5	22.7	23.5	23.2	24.1	22.4	23.1	23.1	20.5	18.5	17.0	20.9	16.1
23 to 29 Years	20.6	20.9	21.3	21.5	22.0	22.8	22.2	23.1	22.6	22.5	20.9	23.2	18.5	14.9	20.7	12.2
30 to 39 Years	19.5	20.1	20.2	20.0	20.3	20.7	20.4	20.6	20.8	21.1	20.6	20.1	18.0	15.0	19.6	14.9
40 to 49 Years	19.4	20.0	19.9	20.2	20.3	20.9	20.3	20.6	20.0	20.4	20.1	19.8	19.2	14.9	19.2	14.5
50 to 59 Years	19.0	20.0	19.9	20.2	20.9	20.5	20.4	20.6	19.9	20.4	19.5	19.2	16.8	13.8	19.1	14.2
60 to 69 Years	18.6	19.6	19.9	19.9	20.9	20.3	20.3	19.5	19.9	19.2	19.5	18.1	18.1	14.6	19.4	*9.8*
70 to 79 Years	18.8	19.7	20.0	20.1	21.0	20.5	19.6	19.8	19.1	19.4	19.1	15.2	21.0	14.7	18.5	14.3
80 Years and Over	19.0	22.1	21.0	20.7	21.1	20.6	20.9	19.6	20.2	19.7	18.2	18.2	*16.5*	14.8	22.1	10.0
Don't Know	19.0	19.4	20.7	19.9	19.3	19.9	20.5	20.8	20.2	20.2	19.7	19.4	17.4	13.3	19.4	14.8
Sex of Householder																
Male	20.0	19.9	20.3	20.1	20.8	20.8	20.4	20.5	20.5	20.3	20.0	19.8	17.7	14.8	20.1	12.9
Female	20.4	20.2	20.3	20.4	20.5	21.1	20.9	21.3	20.6	21.1	20.3	19.2	18.2	14.1	19.4	14.6
Vehicle Characteristics																
Type of Vehicle																
Passenger Car	23.4	24.0	23.9	24.2	24.1	24.2	23.9	24.2	23.5	23.1	22.9	22.0	20.1	15.4	22.8	15.1
Vans (Large and Minivans)	19.1	19.5	19.9	19.8	19.9	19.4	19.2	19.0	18.7	18.4	18.0	17.2	19.6	16.6	19.4	17.0
Sport Utility Vehicle	17.0	17.6	17.3	16.9	17.2	17.3	17.2	16.5	16.7	16.7	16.9	17.5	14.8	14.4	16.7	14.3
Pickup Truck	17.2	16.9	17.3	17.1	17.1	17.5	17.4	17.9	17.3	16.9	17.8	17.7	18.0	15.4	17.3	14.9
Recreational Vehicle	5.0	5.9	6.6	6.0	8.5	5.4	5.1	5.2	5.3	4.8	4.6	5.0	4.6	4.4	5.0	5.2

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-

Table A5. U.S. Vehicle Fuel Economy by Model Year, 2001 (Miles per Gallon) (Continued)

2001 Household and Vehicle Characteristics	All Model Years	Model Year													
		2001 to 2002	2000	1999	1998	1997	1996	1995	1992 to 1994	1989 to 1991	1986 to 1988	1983 to 1985	1980 to 1982	1977 to 1979	1976 or earlier	Don't Know

826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A6. U.S. Average Vehicle Fuel Consumption by Model Year, 2001 (Gallons per Vehicle)

2001 Household and Vehicle Characteristics	All Model Years	Model Year														
		2001 to 2002	2000	1999	1998	1997	1996	1995	1992 to 1994	1989 to 1991	1986 to 1988	1983 to 1985	1980 to 1982	1977 to 1979	1976 or earlier	Don't Know
Household Characteristics																
Total	592	744	717	733	681	662	625	611	586	487	460	424	385	379	577	419
Census Region and Division																
Northeast	571	643	682	682	670	639	609	571	546	455	461	357	409	292	551	304
New England	580	668	695	695	727	654	575	613	550	429	483	402	273	*489*	526	290
Middle Atlantic	567	633	677	676	635	631	627	549	544	464	*450*	340	503	218	562	310
Midwest	590	746	700	728	690	636	646	620	583	488	426	443	372	372	558	391
East North Central	590	750	702	736	689	630	641	576	567	481	429	418	390	342	572	299
West North Central	592	732	693	709	695	648	658	711	622	502	419	480	345	411	508	*503*
South	615	790	762	722	699	694	641	592	623	517	465	396	410	394	609	398
South Atlantic	603	741	737	671	706	678	638	578	595	533	469	392	481	399	540	400
East South Central	624	924	815	820	654	831	646	638	620	508	457	343	309	338	702	351
West South Central	635	825	787	770	712	646	646	595	672	491	464	436	355	458	665	428
West	573	711	680	722	668	613	592	608	552	502	483	504	388	376	551	*505*
Mountain	598	714	652	*840*	635	637	604	643	554	456	485	*493*	451	381	587	*808*
Pacific	562	710	692	679	679	602	586	593	552	519	482	508	358	373	535	380
Urban Status																
Urban	570	698	676	679	655	620	600	564	560	481	440	430	400	375	552	439
Rural	660	872	853	850	783	767	715	708	661	541	510	439	378	374	639	420
Household Size																
1 Person	462	619	598	620	531	531	497	497	468	378	357	332	305	301	467	285
2 Persons	556	688	687	651	652	604	578	531	546	455	449	367	327	369	540	*490*
3 Persons	627	762	713	783	693	660	616	642	619	536	512	529	562	429	634	408
4 Persons	657	811	775	786	755	758	727	690	615	578	490	486	418	354	627	405
5 Persons	667	810	810	797	792	748	736	695	676	574	467	406	359	484	584	497
6 or More Persons	709	872	697	592	751	876	*934*	739	633	740	604	*533*	706	426	667	*528*
Household Composition (EIA)[1]																
Households With Children	665	809	781	802	774	738	715	688	653	576	503	502	455	439	600	442
Age of Oldest Child																
Under 7 Years	665	829	763	825	734	724	705	691	640	556	487	428	*615*	502	536	419
7 to 15 Years	670	799	781	788	785	771	736	727	670	584	488	540	427	*406*	594	415
16 to 17 Years	659	806	804	808	797	676	676	607	630	575	552	471	424	489	690	531
Households Without Children	540	682	667	655	624	589	560	537	535	441	427	388	348	340	553	428
One Adult	462	640	587	639	559	557	516	505	506	418	388	382	355	308	507	405
Age of Householder																
Under 35 Years	622	809	582	725	660	699	607	550	622	506	478	516	*510*	*320*	620	701
35 to 59 Years	522	663	706	755	638	537	610	585	537	461	401	337	278	345	492	227
60 Years or More	351	448	473	437	380	435	330	380	359	286	284	292	276	258	410	286
Two or More Adults	563	707	672	683	640	614	582	545	568	483	463	430	349	376	593	473

Table A6. U.S. Average Vehicle Fuel Consumption by Model Year, 2001 (Gallons per Vehicle) (Continued)

2001 Household and Vehicle Characteristics	All Model Years	Model Year														
		2001 to 2002	2000	1999	1998	1997	1996	1995	1992 to 1994	1989 to 1991	1986 to 1988	1983 to 1985	1980 to 1982	1977 to 1979	1976 or earlier	Don't Know
Age of Householder																
Under 35 Years	634	789	678	785	619	677	621	560	649	577	505	495	325	403	674	413
35 to 59 Years	593	731	749	690	724	673	601	587	600	475	473	410	424	336	558	371
60 Years or More	492	600	588	575	577	492	524	487	454	398	411	386	298	390	548	*636*
Household Composition (NHTS)[2]																
One adult, no children	530	681	691	729	615	579	552	558	540	446	382	360	340	323	533	274
2+ adults, no children	610	751	719	712	698	654	617	603	611	513	493	427	405	364	614	389
One adult, youngest child 0-5	611	845	644	*602*	620	687	659	532	667	596	456	*462*	*538*	*277*	*696*	*423*
2+ adults, youngest child 0-5	676	828	775	809	781	716	752	693	662	585	496	528	450	473	546	454
One adult, youngest child 6-15	629	717	682	687	716	744	608	699	577	644	533	495	*316*	*314*	*375*	395
2+ adults, youngest child 6-15	673	805	808	810	802	774	715	713	671	562	505	522	474	*421*	649	411
One adult, youngest child 16-21	588	637	771	856	642	861	619	527	478	513	446	332	*202*	*532*	*503*	1,273
2+ adults, youngest child 16-21	612	757	749	791	667	640	668	600	627	518	541	406	449	340	619	417
One adult, retired, no children	347	452	454	434	394	414	329	356	350	277	296	272	269	265	356	*304*
2+ adults, retired, no children	491	602	601	563	583	538	503	460	451	401	394	390	295	376	532	*570*
Race of Householder																
White	593	739	723	714	685	645	628	605	592	487	450	408	406	367	557	443
Black	566	716	639	698	610	626	575	551	539	543	527	438	*235*	412	616	353
Other	606	636	782	628	924	769	616	525	579	581	457	547	369	615	696	583
Hispanic Descent																
Yes	627	781	730	825	797	722	653	572	585	570	*476*	569	349	*371*	591	414
No	589	732	715	709	678	647	625	600	585	489	458	417	397	375	571	434
Family Income																
Less than $5,000	458	*552*	575	639	390	296	531	393	490	437	496	325	154	*158*	613	188
$5,000 to $9,999	464	546	459	916	*455*	588	431	571	506	446	393	461	337	323	588	315
$10,000 to $14,999	448	547	482	477	509	513	535	437	488	409	443	430	439	303	489	291
$15,000 to $19,999	510	567	650	527	552	520	511	484	552	478	469	392	410	538	545	603
$20,000 to $24,999	500	706	526	610	600	447	610	536	611	452	363	385	312	383	512	350
$25,000 to $34,999	543	658	679	654	624	590	525	623	559	483	451	389	356	391	591	376
$35,000 to $49,999	598	726	697	680	725	674	670	614	591	536	496	446	418	335	560	425
$50,000 to $74,999	653	*791*	716	783	712	689	659	667	635	538	510	465	408	396	605	665
$75,000 or More	648	761	778	758	744	726	675	602	607	504	441	425	475	386	*599*	334
Don't Know	531	648	686	654	597	554	565	498	485	444	390	558	313	362	565	465
Income Relative to Poverty Line																
Below 100 Percent	491	622	566	756	486	538	469	497	526	489	475	423	368	329	569	314
100 to 150 Percent	537	738	641	528	581	635	662	572	574	478	466	438	416	342	540	581
Above 150 Percent	607	744	724	727	704	665	636	612	596	503	461	423	401	387	579	428
Don't Know	539	648	686	654	597	554	565	498	485	444	390	558	313	362	565	465
Number of Drivers																
1	495	633	611	611	552	546	530	518	485	421	378	336	344	305	490	298

Table A6. U.S. Average Vehicle Fuel Consumption by Model Year, 2001 (Gallons per Vehicle) (Continued)

2001 Household and Vehicle Characteristics	All Model Years	Model Year														
		2001 to 2002	2000	1999	1998	1997	1996	1995	1992 to 1994	1989 to 1991	1986 to 1988	1983 to 1985	1980 to 1982	1977 to 1979	1976 or earlier	Don't Know
2	615	751	730	737	724	685	641	610	594	522	475	436	376	400	577	470
3	616	748	750	734	693	646	612	641	633	503	481	518	491	393	637	434
4 or More	629	929	742	764	806	734	871	902	618	451	470	426	369	455	568	562
Age of Primary Driver																
16 to 17 Years	592	742	736	390	446	468	479	542	574	463	586	436	336	*348*	653	*795*
18 to 22 Years	640	758	696	692	582	701	699	602	670	560	486	686	443	*427*	734	576
23 to 29 Years	619	850	721	713	655	693	648	611	641	556	548	*563*	472	*465*	588	419
30 to 39 Years	672	768	774	795	789	726	717	662	661	594	491	472	511	429	576	422
40 to 49 Years	646	792	789	785	768	684	667	665	626	547	460	438	398	415	626	387
50 to 59 Years	595	732	727	724	703	650	597	600	602	504	498	392	364	388	562	360
60 to 69 Years	515	651	613	567	601	529	535	518	514	412	435	383	263	363	537	*661*
70 to 79 Years	396	550	494	481	457	444	427	362	376	326	305	389	224	242	390	350
80 Years and Over	306	328	347	379	358	280	343	325	325	253	250	254	275	246	*439*	505
Don't Know	365	668	688	784	696	745	640	610	533	463	*452*	422	447	354	569	397
Sex of Householder																
Male	606	783	720	747	705	668	648	606	600	514	468	441	372	363	545	441
Female	582	702	713	695	674	643	611	593	574	482	453	426	415	386	582	424
Vehicle Characteristics																
Type of Vehicle																
Passenger Car	489	577	578	560	548	544	521	497	497	443	391	386	356	344	473	342
Vans (Large and Minivans)	690	820	753	833	808	704	719	758	657	590	556	388	417	366	662	359
Sport Utility Vehicle	802	835	862	881	896	867	815	769	841	674	550	*625*	383	551	717	*597*
Pickup Truck	708	1,001	921	972	863	842	791	757	714	577	563	453	410	347	664	429
Recreational Vehicle	1,143	1,181	*2,923*	835	*933*	*545*	*621*	943	975	766	704	1,221	*804*	603	1,537	*2,799*
Fuel Economy (miles per gallon)																
10.9 or Less	328	640	*1,792*	549	*777*	*325*	*421*	461	381	257	263	358	352	223	659	*312*
11 to 12.9	263	316	*234*	223	301	215	216	280	279	224	242	206	207	241	*291*	344
13 to 15.9	563	873	726	870	782	666	641	574	571	426	377	340	311	443	423	435
16 to 18.9	647	879	828	846	789	800	737	664	617	456	448	451	460	556	626	734
19 to 21.9	605	677	666	647	652	620	619	615	567	570	606	578	519	467	543	306
22 to 24.9	634	696	704	677	680	627	632	622	677	571	501	429	368	*477*	710	679
25 to 29.9	601	613	646	595	617	623	631	560	593	539	511	499	473	*357*	533	*1,515*
30 or More	519	501	562	762	492	584	457	542	474	478	431	*507*	*475*	#N/A	438	*231*

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units

Table A6. U.S. Average Vehicle Fuel Consumption by Model Year, 2001 (Gallons per Vehicle) (Continued)

2001 Household and Vehicle Characteristics	All Model Years	Model Year														
		2001 to 2002	2000	1999	1998	1997	1996	1995	1992 to 1994	1989 to 1991	1986 to 1988	1983 to 1985	1980 to 1982	1977 to 1979	1976 or earlier	Don't Know

were sampled.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A7. U.S. Vehicle-Miles Traveled by Family Income and Poverty Status, 2001 (Billion Miles)

2001 Household and Vehicle Characteristics	Total	2001 Family Income (dollars)										Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 to 74,999	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know
Household Characteristics															
Total	2,287	23	55	62	102	93	257	450	484	639	123	139	130	1,895	123
Census Region and Division															
Northeast	378	3	7	8	14	10	37	70	82	122	26	17	19	315	26
New England	122	*1*	3	*2*	3	*2*	14	22	29	37	10	5	7	101	10
Middle Atlantic	256	*2*	*5*	6	10	8	23	48	53	85	17	12	12	214	17
Midwest	560	3	14	16	23	22	69	115	128	140	29	31	30	470	29
East North Central	385	2	8	11	18	13	45	77	87	102	22	21	20	321	22
West North Central	175	1	6	5	6	9	25	38	42	37	6	10	11	148	6
South	872	12	23	27	46	41	98	181	172	230	42	62	52	716	42
South Atlantic	482	*6*	10	15	22	22	48	95	102	140	23	28	27	403	23
East South Central	143	2	7	5	10	6	19	32	26	29	7	14	9	113	7
West South Central	247	4	*6*	*7*	14	14	31	54	44	61	12	19	16	200	12
West	478	5	11	12	19	*19*	52	84	102	147	27	29	*28*	394	27
Mountain	138	*1*	3	*2*	6	*5*	18	29	35	32	7	8	*8*	115	7
Pacific	340	4	8	9	13	*14*	34	56	67	115	20	21	20	278	20
Urban Status															
Urban	1,677	17	39	43	69	66	176	314	350	507	96	99	86	1,396	96
Rural	611	6	16	20	33	27	81	136	134	131	27	40	44	499	27
Household Size															
1 Person	254	6	15	18	20	18	45	54	35	23	21	20	18	194	21
2 Persons	722	6	14	18	31	31	85	146	142	199	50	20	38	615	50
3 Persons	492	*4*	13	12	21	22	52	87	118	137	24	30	21	417	24
4 Persons	495	3	5	7	17	14	43	98	116	173	18	32	20	425	18
5 Persons	214	*3*	*5*	*5*	6	*4*	21	41	45	76	7	*19*	19	169	7
6 or More Persons	110	*1*	*2*	2	7	4	10	*23*	27	30	*3*	17	*14*	75	*3*
Household Composition (EIA)[1]															
Households With Children	1,078	9	*17*	22	44	32	105	205	257	345	40	80	69	890	40
Age of Oldest Child															
Under 7 Years	275	2	6	5	12	*12*	31	50	65	86	7	18	15	234	7
7 to 15 Years	560	*7*	*8*	*12*	22	14	51	114	130	178	23	43	35	458	23
16 to 17 Years	244	1	*4*	5	10	6	23	41	62	82	9	18	19	197	9
Households Without Children	1,209	14	37	40	58	60	152	245	227	293	84	59	61	1,005	84
One Adult	254	6	15	18	20	18	45	54	35	23	21	20	18	194	21
Age of Householder															
Under 35 Years	48	*1*	2	3	3	3	11	12	6	3	2	3	3	39	2
35 to 59 Years	124	2	5	5	6	8	20	31	24	16	8	7	5	104	8

Table A7. U.S. Vehicle-Miles Traveled by Family Income and Poverty Status, 2001 (Billion Miles) (Continued)

2001 Household and Vehicle Characteristics	Total	2001 Family Income (dollars)										Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 to 74,999	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know
60 Years or More	82	2	8	10	10	7	14	11	6	3	11	10	10	51	11
Two or More Adults	955	8	23	22	38	43	106	191	192	271	62	39	43	811	62
Age of Householder															
Under 35 Years	184	4	12	5	10	5	21	35	40	45	*7*	18	14	145	*7*
35 to 59 Years	484	2	4	8	11	21	40	89	103	176	29	10	16	429	29
60 Years or More	287	2	7	9	16	17	45	66	49	49	27	10	13	237	27
Household Composition (NHTS)[2]															
One adult, no children	182	4	7	10	10	12	34	44	30	19	12	11	10	149	12
2+ adults, no children	545	5	14	9	16	21	45	101	115	188	31	21	24	469	31
One adult, youngest child 0-5	25	1	2	2	*5*	*3*	*4*	*3*	3	*1*	0	7	3	13	0
2+ adults, youngest child 0-5	434	*2*	*6*	7	17	15	46	90	104	133	12	32	30	359	12
One adult, youngest child 6-15	47	*2*	1	*4*	*6*	*2*	10	11	6	*4*	1	7	9	30	1
2+ adults, youngest child 6-15	475	*4*	*7*	7	12	9	38	87	117	172	21	30	20	404	21
One adult, youngest child 16-21	22	0	0	*1*	*3*	1	5	5	3	1	*1*	*1*	*3*	16	*1*
2+ adults, youngest child 16-21	186	0	*2*	*3*	6	4	12	32	51	67	9	7	*8*	164	9
One adult, retired, no children	65	2	7	8	9	5	11	8	4	3	8	9	8	40	8
2+ adults, retired, no children	307	3	8	11	18	19	52	70	51	49	26	14	15	252	26
Race of Householder															
White	1,774	12	32	41	71	63	192	354	385	536	89	79	84	1,522	89
Black	200	5	9	9	15	12	26	36	42	35	11	22	20	147	11
Other	313	5	*14*	12	16	17	39	61	57	67	23	*38*	26	226	23
Hispanic Descent															
Yes	194	4	*9*	*9*	13	12	29	38	*32*	*35*	12	*29*	20	*132*	12
No	2,093	19	45	53	89	81	228	412	452	604	111	110	110	1,763	111
Number of Drivers															
1	379	11	23	28	33	28	68	76	52	32	28	41	35	275	28
2	1,343	7	19	27	50	50	141	271	298	409	71	60	62	1,150	71
3	407	*4*	*11*	6	15	11	38	74	97	133	18	28	22	339	18
4 or More	154	*1*	*1*	*2*	*4*	*3*	10	28	37	64	*6*	*9*	11	129	*6*
Age of Primary Driver															
16 to 17 Years	28	0	0	0	*1*	0	3	4	8	10	1	1	2	24	1
18 to 22 Years	123	3	7	4	10	6	16	20	22	28	*7*	15	16	86	*7*
23 to 29 Years	228	*3*	7	8	14	*13*	37	55	47	37	6	21	21	180	6
30 to 39 Years	456	4	4	9	14	17	42	100	110	142	14	21	23	398	14
40 to 49 Years	502	*3*	8	10	14	16	44	91	118	173	25	24	21	433	25
50 to 59 Years	375	3	6	8	13	13	38	65	78	131	20	16	14	325	20
60 to 69 Years	194	2	6	8	11	9	28	43	35	36	16	11	12	156	16
70 to 79 Years	102	2	5	7	10	7	18	19	11	9	13	9	7	72	13
80 Years and Over	24	0	2	3	2	2	4	3	2	1	4	3	2	15	4

Table A7. U.S. Vehicle-Miles Traveled by Family Income and Poverty Status, 2001 (Billion Miles) (Continued)

2001 Household and Vehicle Characteristics	Total	2001 Family Income (dollars)										Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 to 74,999	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know
Don't Know	256	3	*9*	4	12	9	28	50	52	71	19	18	12	207	19
Sex of Householder															
Male	970	7	22	19	39	35	103	206	213	285	41	48	44	837	41
Female	1,317	16	33	44	63	58	154	244	271	353	82	91	86	1,057	82
Vehicle Characteristics															
Model Year															
2001 to 2002	184	*1*	2	*2*	3	4	13	30	43	77	10	4	4	166	10
2000	233	1	2	2	6	6	20	41	52	90	14	5	7	207	14
1999	213	1	*3*	3	4	7	20	34	50	79	13	*6*	5	189	13
1998	196	1	2	*3*	6	7	21	40	43	63	10	6	8	172	10
1997	175	*1*	3	3	5	5	19	36	39	55	9	6	8	151	9
1996	151	*1*	2	4	6	*6*	14	31	31	46	9	6	10	126	9
1995	161	2	4	4	6	*6*	21	33	38	40	7	9	9	136	7
1992 to 1994	373	4	8	13	21	19	45	79	81	89	15	25	22	311	15
1989 to 1991	252	4	11	11	17	15	35	53	46	46	13	26	24	189	13
1986 to 1988	149	5	7	7	11	7	22	34	28	21	6	20	14	108	6
1983 to 1985	71	*1*	*5*	4	5	*5*	9	15	11	10	5	10	*7*	48	5
1980 to 1982	20	0	1	1	*2*	1	2	4	2	4	*1*	2	2	14	*1*
1977 to 1979	16	0	1	*1*	*2*	1	*2*	3	3	2	1	2	*1*	12	1
1976 or Earlier	61	*2*	4	*3*	*4*	4	7	10	10	11	7	9	*5*	39	7
Don't Know	33	0	1	0	3	2	5	8	6	6	2	1	3	26	2
Type of Vehicle															
Passenger Car	1,286	16	38	41	69	54	157	249	251	339	72	94	81	1,039	72
Vans (Large and Minivans)	243	2	*4*	5	8	9	23	47	58	74	12	13	13	205	12
Sport Utility Vehicle	317	1	5	5	7	7	24	53	71	125	19	11	11	276	19
Pickup Truck	433	3	8	10	17	22	53	99	102	99	20	21	25	367	20
Recreational Vehicle	8	0	0	0	0	0	1	2	*2*	2	*1*	0	0	*7*	*1*
Fuel Economy (miles per gallon)															
10.9 or Less	15	0	0	*1*	1	1	2	3	*3*	3	*1*	1	1	12	*1*
11 to 12.9	24	0	0	1	2	*2*	3	5	4	4	2	2	2	18	2
13 to 15.9	240	1	*4*	6	9	9	22	48	53	75	13	12	11	205	13
16 to 18.9	464	4	10	11	15	16	50	92	104	136	26	23	24	391	26
19 to 21.9	534	5	13	13	21	21	60	103	112	155	30	31	27	445	30
22 to 24.9	513	5	14	14	25	21	56	97	104	151	28	36	27	423	28
25 to 29.9	366	5	10	12	23	16	47	76	73	86	17	26	28	296	17
30 or More	131	2	3	5	6	7	17	26	31	28	6	9	*10*	105	6

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy

Table A7. U.S. Vehicle-Miles Traveled by Family Income and Poverty Status, 2001 (Billion Miles) (Continued)

2001 Household and Vehicle Characteristics	Total	2001 Family Income (dollars)										Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 to 74,999	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know

Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A8. U.S. Vehicle Fuel Consumption by Family Income and Poverty Status, 2001 (Billion Gallons)

2001 Household and Vehicle Characteristics	Total	2001 Family Income (dollars)										Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 or 74,999	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know
Household Characteristics															
Total	113.1	1.1	2.6	3.0	4.9	4.5	12.5	22.3	24.0	31.9	6.2	6.7	6.2	93.9	6.2
Census Region and Division															
Northeast	18.1	0.1	0.3	0.4	0.6	0.5	1.7	3.3	3.9	6.0	1.2	0.8	0.9	15.2	1.2
New England	5.8	0.0	0.1	*0.1*	0.2	*0.1*	0.6	1.0	1.4	1.8	0.5	0.2	0.3	4.8	0.5
Middle Atlantic	12.3	*0.1*	*0.2*	0.3	0.5	0.4	1.1	2.3	2.5	4.1	0.8	0.6	0.6	10.3	0.8
Midwest	27.7	0.2	0.7	0.8	1.2	1.1	3.4	5.7	6.4	6.9	1.5	1.5	1.5	23.3	1.5
East North Central	19.0	0.1	0.4	0.5	0.9	0.6	2.2	3.8	4.3	5.1	1.1	1.1	1.0	15.8	1.1
West North Central	8.7	0.0	0.3	0.2	0.3	0.5	1.2	1.9	2.1	1.9	0.3	0.4	0.5	7.4	0.3
South	43.2	0.5	1.1	1.3	2.2	2.0	4.9	9.0	8.5	11.6	2.1	3.0	2.5	35.6	2.1
South Atlantic	23.4	*0.3*	0.5	0.7	1.0	1.0	2.3	4.6	4.9	7.0	1.2	1.4	1.2	19.7	1.2
East South Central	7.3	0.1	0.3	0.3	0.5	0.3	1.0	1.7	1.3	1.5	0.3	0.7	0.5	5.8	0.3
West South Central	12.5	0.2	*0.3*	0.4	0.7	0.7	1.6	2.7	2.3	3.2	0.6	0.9	0.8	10.2	0.6
West	24.0	*0.2*	0.5	0.6	0.9	*0.9*	2.5	4.2	5.2	7.5	1.4	1.4	*1.4*	19.9	1.4
Mountain	7.3	*0.1*	0.2	*0.1*	0.3	0.3	0.9	1.5	2.0	1.6	0.4	0.4	*0.4*	6.1	0.4
Pacific	16.7	0.2	*0.4*	0.4	0.6	*0.7*	1.6	2.7	3.2	5.9	1.0	1.0	1.0	13.8	1.0
Urban Status															
Urban	81.7	0.8	1.8	2.0	3.3	3.1	8.4	15.3	17.0	25.1	4.7	4.7	4.0	68.3	4.7
Rural	31.3	0.3	0.8	1.0	1.6	1.4	4.1	7.0	6.9	6.8	1.5	2.0	2.2	25.6	1.5
Household Size															
1 Person	12.3	0.3	0.7	0.9	1.0	0.8	2.2	2.6	1.7	1.1	1.1	1.0	0.9	9.4	1.1
2 Persons	36.4	0.3	0.7	0.8	1.6	1.6	4.3	7.4	7.2	10.0	2.6	1.0	1.8	31.1	2.6
3 Persons	23.9	*0.2*	0.6	0.6	1.0	1.1	2.5	4.3	5.7	6.7	1.2	1.4	1.0	20.3	1.2
4 Persons	24.3	0.2	0.2	0.3	0.8	0.7	2.0	4.8	5.7	8.7	0.9	1.5	0.9	21.0	0.9
5 Persons	10.6	*0.1*	*0.2*	*0.2*	0.3	*0.2*	1.0	2.1	2.2	3.8	0.3	*0.9*	0.9	8.4	0.3
6 or More Persons	5.5	0.0	*0.1*	0.1	0.3	0.2	0.5	*1.1*	1.4	1.5	*0.2*	0.9	*0.7*	3.7	*0.2*
Household Composition (EIA)[1]															
Households With Children	53.1	0.4	*0.8*	1.1	2.0	1.6	5.0	10.1	12.7	17.3	2.0	3.8	3.3	44.1	2.0
Age of Oldest Child															
Under 7 Years	13.3	0.1	0.2	0.2	0.6	0.6	1.4	2.4	3.2	4.2	0.4	0.8	0.7	11.4	0.4
7 to 15 Years	27.8	0.3	*0.4*	*0.6*	1.0	0.7	2.5	5.7	6.5	9.1	1.1	2.0	1.6	23.0	1.1
16 to 17 Years	12.0	0.0	*0.2*	0.3	0.5	0.3	1.1	2.0	3.0	4.0	0.5	0.9	0.9	9.6	0.5
Households Without Children	60.0	0.7	1.8	2.0	2.9	2.9	7.5	12.2	11.3	14.6	4.2	2.9	3.0	49.9	4.2
One Adult	12.3	0.3	0.7	0.9	1.0	0.8	2.2	2.6	1.7	1.1	1.1	1.0	0.9	9.4	1.1
Age of Householder															
Under 35 Years	2.3	*0.1*	0.1	0.1	0.1	0.1	0.5	0.6	0.3	0.2	0.1	0.1	0.1	1.9	0.1
35 to 59 Years	6.0	0.1	0.2	0.2	0.3	0.4	1.0	1.5	1.1	0.8	0.4	0.4	0.2	5.1	0.4

Table A8. U.S. Vehicle Fuel Consumption by Family Income and Poverty Status, 2001 (Billion Gallons) (Continued)

2001 Household and Vehicle Characteristics	Total	2001 Family Income (dollars)										Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 or 74,999	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know
60 Years or More	4.0	0.1	0.4	0.5	0.5	0.3	0.7	0.5	0.3	0.2	0.6	0.5	0.5	2.5	0.6
Two or More Adults	47.7	0.4	1.1	1.1	1.9	2.1	5.3	9.6	9.6	13.5	3.2	1.9	2.1	40.5	3.2
Age of Householder															
Under 35 Years	8.5	0.2	0.5	0.2	0.5	0.2	0.9	1.6	1.8	2.1	*0.3*	0.8	0.6	6.7	*0.3*
35 to 59 Years	24.3	0.1	0.2	0.4	0.6	1.0	2.0	4.5	5.1	8.9	1.4	0.5	0.8	21.5	1.4
60 Years or More	14.9	0.1	0.4	0.5	0.9	0.9	2.4	3.4	2.6	2.4	1.4	0.6	0.7	12.3	1.4
Household Composition (NHTS)[2]															
One adult, no children	8.7	0.2	0.3	0.4	0.5	0.6	1.6	2.1	1.4	1.0	0.6	0.5	0.4	7.2	0.6
2+ adults, no children	26.7	0.2	0.7	0.4	0.8	1.0	2.2	5.0	5.6	9.4	1.6	1.0	1.1	23.1	1.6
One adult, youngest child 0-5	1.1	0.1	0.1	0.1	*0.2*	*0.1*	*0.2*	0.1	0.1	*0.1*	0.0	0.3	0.2	0.6	0.0
2+ adults, youngest child 0-5	21.3	*0.1*	*0.3*	0.4	0.8	0.7	2.2	4.4	5.2	6.6	0.6	1.5	1.4	17.7	0.6
One adult, youngest child 6-15	2.2	*0.1*	0.1	*0.2*	*0.3*	*0.1*	0.5	0.5	0.3	*0.2*	0.1	0.3	0.4	1.4	0.1
2+ adults, youngest child 6-15	23.7	*0.2*	*0.3*	0.4	0.6	0.5	1.8	4.4	5.7	8.8	1.1	1.4	1.0	20.3	1.1
One adult, youngest child 16-21	1.0	0.0	0.0	*0.1*	*0.1*	0.1	0.2	0.2	*0.1*	0.1	*0.1*	*0.1*	*0.2*	0.7	*0.1*
2+ adults, youngest child 16-21	9.0	0.0	*0.1*	*0.1*	0.3	0.2	0.6	1.5	2.5	3.3	0.4	0.3	*0.4*	7.9	0.4
One adult, retired, no children	3.3	0.1	0.4	0.4	0.4	0.3	0.6	0.4	0.2	0.1	0.4	0.5	0.4	2.0	0.4
2+ adults, retired, no children	16.0	0.1	0.4	0.6	1.0	1.0	2.7	3.6	2.8	2.5	1.4	0.8	0.8	13.1	1.4
Race of Householder															
White	88.6	0.6	1.6	2.0	3.5	3.1	9.4	17.7	19.3	26.9	4.5	3.8	4.1	76.1	4.5
Black	9.4	0.2	0.4	0.4	0.7	0.6	1.2	1.6	2.0	1.7	0.5	1.0	0.9	6.9	0.5
Other	15.1	0.3	*0.6*	0.6	0.8	0.8	1.9	3.0	2.8	3.3	1.2	*1.8*	1.2	10.9	1.2
Hispanic Descent															
Yes	9.3	0.2	*0.4*	*0.4*	0.6	0.6	1.4	1.9	*1.5*	*1.7*	0.6	*1.4*	0.9	*6.4*	0.6
No	103.7	0.9	2.2	2.6	4.3	3.9	11.1	20.4	22.4	30.2	5.6	5.3	5.3	87.6	5.6
Number of Drivers															
1	18.3	0.5	1.1	1.3	1.6	1.4	3.3	3.7	2.5	1.6	1.4	2.0	*1.7*	13.3	1.4
2	67.5	0.3	0.9	1.4	2.4	2.4	7.0	13.6	15.0	20.7	3.6	2.9	3.0	58.0	3.6
3	19.7	*0.2*	*0.5*	0.3	0.7	0.5	1.8	3.6	4.7	6.6	0.9	1.3	1.0	16.5	0.9
4 or More	7.4	0.0	*0.1*	*0.1*	*0.2*	*0.2*	0.5	1.3	1.8	3.1	*0.3*	*0.4*	0.6	6.2	*0.3*
Age of Primary Driver															
16 to 17 Years	1.3	0.0	0.0	0.0	*0.1*	0.0	0.1	0.2	0.4	0.5	0.0	0.9	0.6	10.5	0.0
18 to 22 Years	5.5	0.1	0.3	0.2	0.4	0.3	0.7	0.9	1.0	1.3	*0.3*	0.0	0.1	1.1	*0.3*
23 to 29 Years	10.4	*0.1*	0.3	0.3	0.6	0.6	1.7	2.5	2.2	1.7	0.3	0.6	0.7	3.9	0.3
30 to 39 Years	22.5	0.2	0.2	0.5	0.7	0.8	2.1	4.9	5.5	7.0	0.7	0.9	0.9	8.3	0.7
40 to 49 Years	25.0	*0.1*	0.4	0.5	0.7	0.8	2.2	4.6	5.9	8.7	1.2	1.0	1.1	19.6	1.2
50 to 59 Years	18.8	0.1	0.3	0.4	0.6	0.7	1.9	3.3	3.9	6.7	1.0	1.1	1.0	21.6	1.0
60 to 69 Years	10.0	0.1	0.3	0.4	0.6	0.5	1.4	2.2	1.9	1.8	0.8	0.8	0.7	16.3	0.8
70 to 79 Years	5.3	0.1	0.3	0.4	0.5	0.4	0.9	1.0	0.6	0.4	0.6	0.5	0.6	8.1	0.6
80 Years and Over	1.2	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.5	0.4	3.7	0.2

Table A8. U.S. Vehicle Fuel Consumption by Family Income and Poverty Status, 2001 (Billion Gallons) (Continued)

2001 Household and Vehicle Characteristics	Total	2001 Family Income (dollars)										Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 or 74,999	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know
Don't Know	13.0	0.1	*0.4*	0.2	0.6	0.5	1.4	2.6	2.6	3.7	1.0	0.2	0.1	0.7	1.0
Sex of Householder															
Male	48.4	0.3	1.1	0.9	2.0	1.7	5.1	10.4	10.6	14.2	2.0	2.3	2.2	41.8	2.0
Female	64.7	0.7	1.5	2.1	2.9	2.8	7.4	11.9	13.4	17.7	4.2	4.3	4.0	52.1	4.2
Vehicle Characteristics															
Model Year															
2001 to 2002	9.2	0.0	0.1	*0.1*	0.1	0.2	0.6	1.5	2.2	3.9	0.5	*0.2*	0.2	8.3	0.5
2000	11.5	0.0	0.1	0.1	0.3	0.3	1.0	2.0	2.5	4.6	0.7	0.2	0.3	10.2	0.7
1999	10.5	*0.1*	*0.1*	*0.1*	0.2	0.3	1.0	1.6	2.4	4.0	0.6	*0.3*	0.3	9.3	0.6
1998	9.5	0.0	0.1	0.2	0.3	0.3	1.0	1.9	2.1	3.1	0.5	0.3	0.4	8.4	0.5
1997	8.3	0.0	0.1	0.1	0.2	0.2	0.9	1.7	1.9	2.7	0.4	0.3	0.4	7.3	0.4
1996	7.3	0.0	0.1	0.2	0.3	*0.3*	0.7	1.5	1.5	2.2	0.4	0.3	0.5	6.1	0.4
1995	7.7	0.1	0.2	0.2	0.3	*0.3*	1.0	1.6	1.8	1.9	0.4	0.4	0.4	6.5	0.4
1992 to 1994	18.2	0.2	0.4	0.6	1.0	0.9	2.2	3.8	3.9	4.3	0.8	1.2	1.1	15.2	0.8
1989 to 1991	12.2	0.2	0.5	0.5	0.8	0.7	1.7	2.6	2.3	2.3	0.6	1.2	1.1	9.2	0.6
1986 to 1988	7.4	0.2	0.3	0.4	0.5	0.4	1.1	1.7	1.4	1.1	0.3	1.0	0.7	5.4	0.3
1983 to 1985	3.6	*0.1*	*0.3*	0.2	0.3	*0.2*	0.5	0.8	0.5	0.5	*0.3*	0.6	*0.3*	2.4	*0.3*
1980 to 1982	1.1	0.0	*0.1*	0.0	*0.1*	0.1	0.1	0.3	0.1	0.2	0.1	0.1	0.1	0.8	0.1
1977 to 1979	1.1	0.0	0.1	0.1	*0.2*	0.1	*0.2*	0.2	0.2	0.2	0.1	0.1	*0.1*	0.8	0.1
1976 or Earlier	3.1	*0.1*	0.2	*0.1*	*0.2*	*0.2*	0.3	0.5	0.5	0.5	0.4	0.5	*0.2*	2.0	0.4
Don't Know	2.4	0.0	0.0	0.0	0.2	0.1	0.3	0.5	*0.6*	0.4	0.2	0.1	0.2	1.9	0.2
Type of Vehicle															
Passenger Car	55.0	0.7	1.7	1.8	3.0	2.3	6.7	10.6	10.6	14.6	3.2	4.1	3.4	44.4	3.2
Vans (Large and Minivans)	12.7	0.1	*0.2*	0.3	0.4	0.5	1.2	2.5	3.0	3.8	0.6	0.7	0.7	10.7	0.6
Sport Utility Vehicle	18.6	0.1	0.3	0.3	0.4	0.4	1.4	3.1	4.2	7.4	1.1	0.6	0.6	16.2	1.1
Pickup Truck	25.1	0.2	0.5	0.6	1.0	1.2	3.1	5.7	5.9	5.8	1.2	1.2	1.5	21.3	1.2
Recreational Vehicle	1.6	0.0	0.0	*0.1*	0.1	*0.1*	0.2	0.4	*0.3*	0.4	*0.1*	*0.1*	0.1	*1.3*	*0.1*
Fuel Economy (miles per gallon)															
10.9 or Less	2.3	0.0	0.0	0.1	*0.1*	0.1	0.3	0.5	0.4	*0.5*	0.2	0.1	0.1	1.9	0.2
11 to 12.9	2.0	0.0	0.0	0.1	0.2	0.1	*0.3*	0.4	0.3	0.4	0.1	0.1	0.2	1.5	0.1
13 to 15.9	16.3	0.1	0.3	*0.4*	0.6	0.6	1.5	3.3	3.6	5.1	0.9	0.8	0.7	13.9	0.9
16 to 18.9	26.6	0.2	0.6	0.6	0.9	0.9	2.9	5.3	6.0	7.8	1.5	1.3	1.4	22.4	1.5
19 to 21.9	26.2	0.2	0.7	0.7	1.0	1.0	2.9	5.0	5.5	7.6	1.5	1.5	1.3	21.8	1.5
22 to 24.9	22.1	0.2	0.6	0.6	1.1	0.9	2.4	4.2	4.4	6.5	1.2	1.6	1.2	18.2	1.2
25 to 29.9	13.6	0.2	0.4	0.4	0.9	0.6	1.7	2.8	2.7	3.2	0.6	1.0	1.0	11.0	0.6
30 or More	4.0	0.1	0.1	0.1	0.2	0.2	0.5	0.8	0.9	0.9	0.2	0.3	*0.3*	3.2	0.2

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy

Table A8. U.S. Vehicle Fuel Consumption by Family Income and Poverty Status, 2001 (Billion Gallons) (Continued)

2001 Household and Vehicle Characteristics	Total	2001 Family Income (dollars)										Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 or 74,999	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know

Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A9. U.S. Average Vehicle-Miles Traveled by Family Income and Poverty Status, 2001 (Thousand Miles per Household)

2001 Household Characteristics	Total	2001 Family Income (dollars)										Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 or 74,999	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know
Household Characteristics															
Total	23.1	13.3	13.5	13.2	16.3	16.4	19.3	23.9	28.1	31.0	19.0	16.0	18.2	24.7	19.0
Census Region and Division															
Northeast	21.4	12.8	13.5	10.8	13.2	12.1	16.9	22.5	25.1	27.7	18.9	15.2	16.7	22.5	18.9
New England	22.8	*9.6*	15.9	10.1	13.2	10.7	18.8	24.7	25.8	29.8	19.4	15.4	21.9	23.8	19.4
Middle Atlantic	20.8	14.5	*12.5*	11.1	13.2	12.6	15.9	21.7	24.7	26.8	18.6	15.2	14.7	22.0	18.6
Midwest	23.7	11.0	15.4	13.9	16.1	15.6	20.1	24.4	29.7	32.5	18.3	17.7	17.8	25.3	18.3
East North Central	23.6	11.2	15.1	14.6	17.3	14.1	19.0	24.1	28.2	33.2	18.8	18.5	17.9	25.0	18.8
West North Central	24.1	10.7	15.8	12.6	13.3	18.1	22.4	25.1	33.2	30.9	16.7	16.2	17.6	26.2	16.7
South	24.1	13.9	12.8	14.0	18.3	18.6	20.9	24.9	29.3	33.4	19.1	15.9	19.4	26.1	19.1
South Atlantic	23.6	14.6	12.4	12.8	17.0	18.1	18.9	24.1	28.2	32.7	19.2	15.2	17.4	25.5	19.2
East South Central	25.1	13.7	16.5	15.9	19.5	16.2	26.3	26.3	33.6	35.0	17.6	18.1	20.1	27.7	17.6
West South Central	24.5	13.1	10.7	15.4	19.9	20.9	21.6	25.7	29.6	34.3	19.8	15.4	23.3	26.5	19.8
West	22.3	13.9	13.1	12.7	15.1	*16.1*	17.7	22.2	27.2	29.2	19.9	15.4	17.9	23.7	19.9
Mountain	22.7	*16.4*	14.0	*10.6*	15.5	*16.7*	19.4	22.4	29.7	28.7	18.9	17.8	*20.0*	23.7	18.9
Pacific	22.1	*13.2*	12.8	13.4	15.0	15.9	17.0	22.1	26.0	29.3	20.2	14.6	17.1	23.7	20.2
Urban Status															
Urban	21.6	12.8	13.1	12.2	14.6	15.2	17.3	21.7	26.1	29.2	18.1	15.2	16.3	23.1	18.1
Rural	28.6	15.0	14.6	16.3	21.6	20.1	25.7	30.8	35.2	40.7	23.0	18.6	23.7	31.0	23.0
Household Size															
1 Person	11.3	9.4	7.2	8.9	8.8	9.5	11.9	13.8	15.1	15.8	9.9	7.8	8.9	12.5	9.9
2 Persons	21.6	13.3	15.2	14.7	16.7	16.5	18.4	21.7	24.6	27.2	19.2	14.6	16.8	22.6	19.2
3 Persons	28.6	*17.8*	26.8	18.1	22.2	23.2	25.8	27.8	31.9	32.6	30.7	21.1	22.2	29.7	30.7
4 Persons	30.9	16.8	14.9	18.2	25.7	24.2	26.0	31.4	33.8	34.7	28.0	20.4	25.8	32.6	28.0
5 Persons	31.8	19.2	*26.0*	17.0	23.4	20.3	26.9	30.9	34.6	38.7	30.1	21.3	27.2	34.5	30.1
6 or More Persons	35.0	*7.7*	*35.3*	17.7	24.9	20.6	26.1	38.9	41.3	42.8	*50.2*	22.4	*31.4*	40.6	*50.2*
Household Composition (EIA)[1]															
Households With Children	29.0	14.2	20.1	16.4	22.9	20.9	24.8	28.8	32.6	34.1	28.5	19.9	24.5	30.8	28.5
Age of Oldest Child															
Under 7 Years	27.0	9.5	21.5	14.6	22.0	22.5	23.2	27.7	30.4	31.2	21.8	19.2	19.9	28.7	21.8
7 to 15 Years	28.3	*16.7*	16.9	16.0	23.9	18.8	23.9	27.8	32.0	33.2	29.4	19.3	24.5	29.9	29.4
16 to 17 Years	34.1	11.2	29.6	19.6	22.0	23.9	30.0	34.2	37.2	40.2	34.4	22.0	30.3	36.4	34.4
Households Without Children	19.6	12.7	11.7	12.0	13.4	14.7	16.8	20.8	24.3	28.0	16.4	12.7	14.1	21.1	16.4
One Adult	11.3	9.4	7.2	8.9	8.8	9.5	11.9	13.8	15.1	15.8	9.9	7.8	8.9	12.5	9.9
Age of Householder															
Under 35 Years	14.5	16.3	12.8	13.2	11.5	12.6	15.0	15.7	16.9	14.3	12.3	13.9	13.2	14.8	12.3

Table A9. U.S. Average Vehicle-Miles Traveled by Family Income and Poverty Status, 2001 (Thousand Miles per Household) (Continued)

2001 Household Characteristics	Total	2001 Family Income (dollars)										Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 or 74,999	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know
35 to 59 Years	13.8	9.5	8.1	11.0	11.2	10.8	13.4	15.2	16.3	17.3	13.5	8.5	11.0	14.6	13.5
60 Years or More	8.1	7.4	6.1	7.4	7.3	7.6	8.9	9.7	10.7	12.1	8.0	6.4	7.4	8.8	8.0
Two or More Adults	24.3	17.1	19.3	16.6	18.3	18.9	20.3	24.4	27.4	29.9	21.3	19.1	18.7	25.3	21.3
Age of Householder															
Under 35 Years	28.1	23.4	36.3	23.4	27.5	18.1	23.9	27.2	32.1	30.2	25.0	30.9	25.5	28.2	25.0
35 to 59 Years	27.9	14.5	14.7	16.7	19.6	24.1	24.4	28.2	28.3	32.1	28.7	15.7	18.3	29.0	28.7
60 Years or More	18.6	11.6	12.1	14.1	14.6	15.0	16.7	19.8	23.0	23.8	16.2	13.1	14.9	19.5	16.2
Household Composition (NHTS)[2]															
One adult, no children	13.3	10.7	8.4	11.3	10.4	11.0	13.1	14.6	15.9	15.9	13.0	9.1	11.3	13.9	13.0
2+ adults, no children	27.2	21.1	30.3	20.8	21.2	23.9	23.0	26.9	27.6	30.3	26.1	26.7	21.5	27.7	26.1
One adult, youngest child 0-5	16.2	10.3	12.5	11.6	16.2	22.4	18.7	18.8	21.2	***19.8***	***10.7***	13.0	13.7	20.4	***10.7***
2+ adults, youngest child 0-5	28.7	13.0	27.6	17.4	23.2	19.9	24.5	29.3	32.6	31.8	26.7	21.4	24.6	30.1	26.7
One adult, youngest child 6-15	17.9	***18.3***	11.3	13.8	***21.7***	12.6	20.4	19.9	17.7	17.4	14.4	14.7	23.1	17.7	14.4
2+ adults, youngest child 6-15	31.6	***15.6***	23.5	18.5	26.4	***24.4***	27.5	30.3	33.3	35.7	32.2	22.6	29.5	32.7	32.2
One adult, youngest child 16-21	23.3	***7.5***	***42.3***	13.9	34.4	14.5	27.3	24.4	23.3	25.1	***20.5***	***17.0***	26.3	23.7	***20.5***
2+ adults, youngest child 16-21	37.2	***13.0***	17.4	22.1	26.8	29.3	26.5	34.1	44.0	41.6	38.0	21.6	26.4	39.0	38.0
One adult, retired, no children	7.8	7.5	6.2	7.3	7.3	6.8	9.1	9.4	9.9	13.8	7.0	6.5	7.3	8.6	7.0
2+ adults, retired, no children	18.5	12.9	11.4	13.2	14.5	15.3	17.6	20.0	22.3	23.9	16.4	13.3	13.4	19.6	16.4
Race of Householder															
White	23.4	14.1	12.1	13.1	16.1	15.6	19.2	23.7	28.1	31.2	18.1	16.1	17.9	24.9	18.1
Black	20.7	11.3	14.3	12.3	16.8	17.6	17.9	23.2	28.6	29.3	18.2	14.0	18.6	22.9	18.2
Other	23.3	13.9	17.7	14.6	16.6	18.6	20.8	25.5	27.9	30.1	24.4	17.4	19.2	25.2	24.4
Hispanic Descent															
Yes	23.4	***14.4***	18.3	14.8	16.2	18.4	22.1	25.0	30.2	33.9	24.6	17.1	19.9	26.1	24.6
No	23.1	13.1	12.8	13.0	16.3	16.1	19.0	23.8	28.0	30.8	18.5	15.8	18.0	24.6	18.5
Number of Drivers															
1	12.0	10.6	8.4	9.6	9.9	10.3	12.5	14.0	15.9	15.7	10.1	0.4	***0.6***	0.2	10.1
2	25.5	15.9	19.8	18.2	21.9	20.0	22.0	25.0	28.0	29.3	22.8	1.3	1.4	0.3	22.8
3	36.5	***21.0***	36.8	23.6	29.5	35.2	33.8	36.3	38.3	38.9	37.0	3.4	3.5	1.1	37.0
4 or More	49.2	***30.0***	***36.6***	***20.6***	***46.9***	40.8	34.8	54.2	48.1	53.5	58.5	5.3	15.8	1.8	58.5

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

Table A9. U.S. Average Vehicle-Miles Traveled by Family Income and Poverty Status, 2001 (Thousand Miles per Household) (Continued)

2001 Household Characteristics	Total	2001 Family Income (dollars)										Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 or 74,999	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A10. U.S. Average Vehicle Fuel Consumption by Family Income and Poverty Status, 2001 (Gallons per Household)

2001 Household Characteristics	Total	2001 Family Income (dollars)										Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 to 75,000	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know
Total	1,143	620	647	644	788	794	940	1,183	1,393	1,549	957	942	1,363	1,546	957
Census Region and Division															
Northeast	1,027	547	625	515	621	592	784	1,081	1,202	1,348	903	624	750	1,087	903
New England	1,086	*455*	751	474	589	515	858	1,169	1,241	1,448	923	705	888	1,144	923
Middle Atlantic	1,001	596	*574*	529	632	618	748	1,046	1,181	1,309	893	590	698	1,063	893
Midwest	1,176	561	736	668	807	759	983	1,219	1,471	1,610	935	781	842	1,259	935
East North Central	1,164	586	746	704	866	685	920	1,192	1,387	1,642	955	822	890	1,232	955
West North Central	1,205	507	722	598	666	890	1,118	1,277	1,676	1,530	873	703	751	1,319	873
South	1,193	652	617	690	875	892	1,030	1,239	1,446	1,683	971	730	927	1,294	971
South Atlantic	1,146	648	587	628	791	830	919	1,166	1,358	1,631	955	728	788	1,235	955
East South Central	1,273	628	782	784	957	841	1,333	1,394	1,691	1,779	860	803	1,011	1,420	860
West South Central	1,244	671	543	777	971	1,037	1,072	1,286	1,530	1,761	1,071	686	1,147	1,348	1,071
West	1,119	640	630	616	731	791	860	1,111	1,386	1,488	1,016	654	844	1,200	1,016
Mountain	1,194	*892*	700	*571*	777	*804*	965	1,177	1,644	1,474	1,038	812	*915*	1,258	1,038
Pacific	1,090	*568*	604	631	711	786	812	1,078	1,266	1,492	1,008	602	821	1,176	1,008
Urban Status															
Urban	1,054	589	622	577	693	725	830	1,062	1,273	1,443	895	655	761	1,129	895
Rural	1,469	735	714	839	1,082	1,018	1,295	1,577	1,814	2,116	1,235	873	1,137	1,594	1,235
Household Size															
1 Person	550	465	356	422	430	452	568	672	719	792	483	381	422	604	483
2 Persons	1,091	634	747	706	852	816	919	1,099	1,252	1,371	986	716	823	1,137	986
3 Persons	1,391	*776*	1,246	928	1,014	1,120	1,231	1,366	1,547	1,605	1,492	1,011	1,023	1,439	1,492
4 Persons	1,519	757	711	878	1,163	1,159	1,245	1,527	1,662	1,744	1,408	880	1,082	1,616	1,408
5 Persons	1,567	894	*1,188*	800	1,135	945	1,316	1,536	1,709	1,925	1,509	890	1,322	1,710	1,509
6 or More Persons	1,762	*355*	*1,632*	1,005	1,241	1,037	1,271	1,946	2,097	2,139	*2,787*	890	*1,666*	2,023	*2,787*
Household Composition (EIA)[1]															
Households With Children	1,429	639	917	782	1,058	1,019	1,182	1,419	1,612	1,710	1,441	546	641	676	683
Age of Oldest Child															
Under 7 Years	1,307	453	925	675	995	1,114	1,090	1,329	1,502	1,542	1,044	555	616	680	571
7 to 15 Years	1,403	*734*	793	765	1,087	898	1,153	1,381	1,595	1,689	1,449	541	618	683	698
16 to 17 Years	1,676	538	1,392	956	1,077	1,179	1,419	1,684	1,797	1,995	1,902	553	704	656	747
Households Without Children	972	609	574	588	667	710	826	1,039	1,208	1,392	826	438	452	556	489
One Adult	550	465	356	422	430	452	568	672	719	792	483	405	425	523	449
Age of Householder															
Under 35 Years	679	712	541	568	510	578	721	756	797	686	607	553	521	644	504
35 to 59 Years	667	471	406	527	550	516	633	750	767	875	655	363	437	553	483
60 Years or More	401	391	306	356	364	368	436	473	537	606	395	299	317	371	360
Two or More Adults	1,212	801	944	842	921	921	1,015	1,224	1,370	1,487	1,080	533	515	578	550

Table A10. U.S. Average Vehicle Fuel Consumption by Family Income and Poverty Status, 2001 (Gallons per Household) (Continued)

2001 Household Characteristics	Total	2001 Family Income (dollars)										Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 to 75,000	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know
Age of Householder															
Under 35 Years	1,297	1,025	1,662	1,022	1,256	795	1,059	1,270	1,478	1,418	1,242	688	612	631	605
35 to 59 Years	1,400	701	761	845	949	1,158	1,233	1,424	1,411	1,615	1,415	474	490	598	592
60 Years or More	966	618	632	777	798	771	868	1,018	1,234	1,194	852	436	442	504	453
Household Composition (NHTS)[2]															
One adult, no children	634	508	406	518	496	513	616	712	749	798	624	438	518	665	624
2+ adults, no children	1,334	927	1,428	976	1,016	1,124	1,109	1,332	1,345	1,509	1,296	1,229	1,046	1,356	1,296
One adult, youngest child 0-5	733	457	551	493	676	1,115	806	878	1,047	*982*	*495*	523	608	976	*495*
2+ adults, youngest child 0-5	1,410	630	1,200	857	1,085	967	1,166	1,419	1,636	1,584	1,315	904	1,176	1,490	1,315
One adult, youngest child 6-15	827	*731*	606	612	*900*	530	977	947	871	810	699	669	989	840	699
2+ adults, youngest child 6-15	1,580	*711*	1,090	903	1,281	1,208	1,329	1,532	1,629	1,825	1,634	973	1,372	1,644	1,634
One adult, youngest child 16-21	1,082	*352*	*1,552*	683	1,704	652	1,155	1,163	1,137	1,159	*939*	*954*	1,207	1,079	*939*
2+ adults, youngest child 16-21	1,801	*474*	839	1,055	1,238	1,498	1,329	1,647	2,116	2,011	1,895	954	1,365	1,869	1,895
One adult, retired, no children	395	396	313	360	371	346	463	464	517	691	354	327	360	434	354
2+ adults, retired, no children	964	674	596	723	780	778	909	1,036	1,201	1,204	865	722	683	1,013	865
Race of Householder															
White	1,170	663	589	644	797	773	945	1,185	1,407	1,568	920	706	851	1,245	920
Black	968	513	686	580	750	808	845	1,070	1,327	1,440	826	667	779	1,075	826
Other	1,121	655	814	700	783	874	982	1,243	1,350	1,455	1,238	750	951	1,216	1,238
Hispanic Descent															
Yes	1,127	*678*	826	715	761	838	1,044	1,221	1,456	1,667	1,259	729	994	1,258	1,259
No	1,145	610	621	634	792	788	928	1,179	1,389	1,542	931	706	835	1,225	931
Number of Drivers															
1	590	486	402	449	484	491	599	682	753	776	498	445	*495*	625	498
2	1,281	753	961	932	1,067	977	1,082	1,260	1,417	1,484	1,163	1,004	1,063	1,320	1,163
3	1,775	936	1,736	1,157	1,390	1,670	1,622	1,759	1,836	1,921	1,833	1,179	1,519	1,826	1,833
4 or More	2,086	*1,447*	*1,684*	*974*	*2,099*	2,146	1,649	2,554	2,342	2,560	2,993	1,141	2,373	2,411	2,993

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as

Table A10. U.S. Average Vehicle Fuel Consumption by Family Income and Poverty Status, 2001 (Gallons per Household) (Continued)

2001 Household Characteristics	Total	2001 Family Income (dollars)									Income Relative to Poverty Line			
		Less than 5,000	5,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 to 24,999	25,000 to 34,999	35,000 to 49,999	50,000 to 75,000	75,000 or More	Don't Know	Below 100 %	100 to 150 %	Above 150 %	Don't Know

published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A11. U.S. Vehicles by NHTS Household Composition[2], 2001 (Million Vehicles)

2001 Household and Vehicle Characteristics	No Children		Youngest Child 0-5		Youngest Child 6-15		Youngest Child 16-21		No Children (Retired)	
	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults
Household Characteristics										
Total	16.4	43.8	1.8	31.5	3.5	35.2	1.7	14.7	9.5	32.8
Census Region and Division										
Northeast	2.5	7.6	*0.3*	5.1	0.7	6.1	0.2	2.2	1.5	5.4
New England	0.7	2.6	0.0	1.5	*0.3*	1.8	*0.1*	*0.8*	0.5	1.7
Middle Atlantic	1.9	4.9	*0.3*	3.7	0.4	4.4	0.1	1.4	1.1	3.7
Midwest	3.8	10.0	0.4	7.9	0.8	8.6	0.6	4.2	2.5	8.3
East North Central	2.7	6.8	0.3	5.4	0.5	6.0	0.5	2.8	1.7	5.9
West North Central	1.1	3.3	0.1	2.5	0.3	2.6	0.1	1.4	0.8	2.4
South	6.5	16.7	0.8	10.7	1.3	12.2	0.6	5.1	3.5	12.8
South Atlantic	3.6	9.5	0.6	5.6	0.7	6.8	0.4	2.7	2.0	7.2
East South Central	1.1	3.0	*0.1*	1.8	0.2	1.7	*0.1*	0.9	0.7	2.2
West South Central	1.8	4.3	*0.2*	3.3	0.4	3.7	0.2	1.5	0.9	3.4
West	3.6	9.5	0.3	7.7	0.7	8.2	0.3	3.2	1.9	6.4
Mountain	1.1	2.8	0.1	2.1	0.2	2.4	0.1	1.0	0.6	2.0
Pacific	2.5	6.7	0.2	5.6	0.5	5.9	0.3	2.2	1.3	4.4
Urban Status										
Urban	13.5	33.2	1.5	24.4	2.8	25.8	1.3	10.4	7.3	23.3
Rural	2.9	10.7	0.3	7.1	0.7	9.3	0.5	4.3	2.2	9.6
Household Size										
1 Person	16.4	*0.4*	0.0	0.0	0.0	0.0	*0.1*	0.0	9.5	0.2
2 Persons	0.0	35.8	*0.5*	*0.1*	1.4	*0.1*	1.2	0.3	#N/A	26.1
3 Persons	#N/A	6.3	0.6	7.5	1.4	8.4	0.4	8.2	#N/A	5.4
4 Persons	#N/A	1.1	0.4	12.2	*0.5*	16.6	0.0	5.2	#N/A	1.0
5 Persons	#N/A	*0.2*	0.2	7.1	*0.1*	7.4	0.0	*0.8*	#N/A	*0.1*
6 or More Persons	#N/A	*0.1*	*0.1*	4.7	0.0	2.7	#N/A	*0.2*	#N/A	0.0
Race of Householder										
White	12.8	35.1	0.8	22.5	2.5	26.8	1.4	11.9	8.1	27.6
Black	1.8	3.3	0.7	2.4	0.6	3.1	0.2	0.9	0.8	2.7
Other	1.8	5.4	*0.3*	6.6	0.5	5.4	*0.1*	1.8	*0.6*	2.5
Hispanic Descent										
Yes	0.8	2.8	*0.3*	4.8	0.3	3.5	*0.1*	1.1	*0.2*	*1.2*
No	15.6	41.1	1.6	26.7	3.2	31.7	1.7	13.7	9.2	31.6
Family Income										
Less than $5,000	0.5	0.5	0.1	0.2	*0.1*	*0.4*	0.0	0.0	0.3	0.4
$5,000 to $9,999	0.9	0.9	0.2	*0.4*	0.1	*0.5*	0.0	*0.2*	1.2	1.1
$10,000 to $14,999	0.9	0.8	0.2	0.7	0.3	0.7	0.2	*0.2*	1.3	1.3

Table A11. U.S. Vehicles by NHTS Household Composition[2], 2001 (Million Vehicles) (Continued)

2001 Household and Vehicle Characteristics	No Children		Youngest Child 0-5		Youngest Child 6-15		Youngest Child 16-21		No Children (Retired)	
	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults
$15,000 to $19,999	1.1	1.4	*0.3*	1.3	0.4	1.0	0.2	0.5	1.4	2.2
$20,000 to $24,999	1.3	1.7	*0.2*	1.2	*0.2*	0.7	0.1	0.4	0.8	2.2
$25,000 to $34,999	3.0	3.9	*0.3*	3.6	0.7	3.0	0.3	1.1	1.5	5.7
$35,000 to $49,999	3.6	8.2	*0.2*	6.6	0.8	6.8	0.4	2.5	1.0	7.2
$50,000 to $74,999	2.4	9.1	0.2	7.1	0.4	8.4	0.2	3.7	0.4	5.0
$75,000 or More	1.6	14.8	*0.1*	9.5	*0.3*	12.1	0.1	5.4	0.2	4.6
Don't Know	1.2	2.6	0.1	0.9	0.1	1.5	0.1	0.6	1.3	3.1
Income Relative to Poverty Line										
Below 100 Percent	1.3	1.5	0.6	2.6	0.6	2.5	*0.1*	0.6	1.5	1.9
100 to 150 Percent	0.9	2.0	0.3	2.2	0.5	1.5	0.2	0.7	1.3	1.9
Above 150 Percent	13.0	37.7	*0.9*	25.8	2.3	29.6	1.2	12.8	5.4	25.9
Don't Know	1.2	2.6	0.1	0.9	0.1	1.5	0.1	0.6	1.3	3.1
Number of Drivers										
1	16.3	1.7	1.5	*1.3*	2.4	0.8	0.3	0.2	9.4	3.9
2	0.0	35.3	0.2	24.2	0.9	21.2	1.2	1.8	#N/A	24.9
3	#N/A	5.5	*0.1*	4.3	0.2	10.0	*0.2*	8.1	#N/A	3.6
4 or More	#N/A	1.2	0.0	1.7	0.0	3.1	*0.1*	4.6	#N/A	0.4
Age of Primary Driver										
16 to 17 Years	#N/A	#N/A	0.0	0.1	0.1	0.9	0.2	1.1	#N/A	#N/A
18 to 22 Years	0.4	2.0	0.2	1.0	0.3	1.6	0.4	2.6	0.0	0.2
23 to 29 Years	1.7	5.9	0.5	5.8	0.1	1.1	#N/A	0.4	0.0	0.5
30 to 39 Years	3.3	5.1	0.6	14.0	1.0	8.0	0.1	0.6	0.1	0.9
40 to 49 Years	4.1	7.3	0.3	5.0	1.4	14.0	0.6	4.2	0.2	1.7
50 to 59 Years	4.2	13.0	*0.1*	1.2	0.4	3.8	0.3	3.1	0.8	4.9
60 to 69 Years	1.8	4.1	0.0	0.3	*0.1*	0.6	0.0	0.4	2.3	9.7
70 to 79 Years	0.7	0.7	#N/A	*0.1*	0.0	0.3	0.0	*0.1*	3.8	7.6
80 Years and Over	0.2	0.1	#N/A	0.0	0.0	0.0	#N/A	#N/A	1.8	1.8
Don't Know	0.2	5.6	0.1	3.9	0.2	4.8	0.2	2.2	0.5	5.7
Sex of Householder										
Male	8.6	19.9	0.2	11.7	1.0	13.8	0.5	6.2	3.5	14.8
Female	7.8	23.9	1.6	19.7	2.5	21.4	1.2	8.5	6.0	18.0
Vehicle Characteristics										
Model Year										
2001 to 2002	1.0	3.4	0.1	2.2	0.2	2.4	0.1	0.9	0.4	2.0
2000	1.1	4.0	0.1	2.9	0.2	3.0	0.1	1.3	0.6	2.7
1999	1.2	3.7	*0.1*	2.5	0.3	2.8	0.1	0.9	0.7	2.4
1998	1.1	3.3	*0.1*	2.4	0.2	2.4	0.2	1.0	0.7	2.4
1997	1.2	2.9	0.1	2.2	0.3	2.4	0.1	0.8	0.5	2.2
1996	0.9	2.7	*0.1*	1.9	0.2	2.3	0.1	0.9	0.5	2.0
1995	1.1	3.2	*0.1*	2.2	0.3	2.1	0.1	1.0	0.5	2.2

Table A11. U.S. Vehicles by NHTS Household Composition[2], 2001 (Million Vehicles) (Continued)

2001 Household and Vehicle Characteristics	No Children		Youngest Child 0-5		Youngest Child 6-15		Youngest Child 16-21		No Children (Retired)	
	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults
1992 to 1994	2.6	6.8	0.4	5.3	0.6	5.7	0.3	2.6	1.6	5.1
1989 to 1991	2.4	5.3	0.3	3.6	0.5	4.4	0.3	2.0	1.6	4.2
1986 to 1988	1.5	3.2	*0.2*	2.5	0.4	3.0	0.2	1.2	0.9	2.9
1983 to 1985	0.9	1.7	0.1	1.2	0.1	1.6	0.1	0.6	0.6	1.6
1980 to 1982	0.2	0.6	0.0	0.3	*0.1*	0.6	0.0	0.2	0.2	0.5
1977 to 1979	0.3	0.5	0.0	0.4	0.0	0.5	0.0	0.3	0.3	0.6
1976 or Earlier	0.4	1.2	0.0	1.0	0.0	0.9	0.0	0.5	0.3	0.9
Don't Know	0.5	1.3	0.0	0.7	0.1	1.0	0.0	0.5	0.3	1.1
Type of Vehicle										
Passenger Car	11.1	26.1	1.4	16.2	2.3	17.3	1.3	8.7	7.6	20.5
Vans (Large and Minivans)	0.7	2.5	0.1	4.7	0.3	5.3	0.1	1.2	0.4	2.9
Sport Utility Vehicle	1.8	5.7	*0.2*	4.9	0.5	5.4	0.2	1.8	0.4	2.4
Pickup Truck	2.8	9.2	0.1	5.6	0.4	6.9	0.2	3.0	0.9	6.4
Recreational Vehicle	*0.1*	0.3	0.0	0.1	0.0	0.2	0.0	0.0	*0.1*	0.6
Fuel Economy (miles per gallon)										
10.9 or Less	0.5	1.3	0.0	0.6	*0.1*	1.1	0.0	0.3	0.4	1.9
11 to 12.9	0.6	1.6	0.0	0.9	*0.1*	1.2	0.0	0.6	0.6	2.0
13 to 15.9	2.1	6.1	0.2	4.6	0.4	5.8	0.1	2.0	1.6	5.4
16 to 18.9	3.2	8.9	0.3	6.7	0.6	7.6	0.4	3.3	2.1	7.1
19 to 21.9	3.3	9.0	*0.5*	7.4	0.7	8.1	0.3	2.9	2.4	8.4
22 to 24.9	3.3	8.8	0.4	5.5	0.7	6.1	0.3	3.1	1.5	5.0
25 to 29.9	2.5	6.1	*0.4*	4.2	0.6	3.9	0.4	1.9	0.7	2.4
30 or More	0.9	2.1	*0.1*	1.5	0.2	1.4	0.1	0.6	0.2	0.7

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

#N/A = Value is missing or not applicable.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details

Table A11. U.S. Vehicles by NHTS Household Composition[2], 2001 (Million Vehicles) (Continued)

2001 Household and Vehicle Characteristics	No Children		Youngest Child 0-5		Youngest Child 6-15		Youngest Child 16-21		No Children (Retired)	
	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults

on augmentations to NHTS public-use data.

Table A12. U.S. Average Vehicle-Miles Traveled by NHTS Household Composition[2], 2001 (Thousand Miles per Household)

2001 Household Characteristics	No Children		Youngest Child 0-5		Youngest Child 6-15		Youngest Child 16-21		No Children (Retired)	
	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults
Total	13.3	27.2	16.2	28.7	17.9	31.6	23.3	37.2	7.8	18.5
Census Region and Division										
Northeast	12.6	24.4	*13.0*	26.6	15.6	29.1	23.4	38.8	7.8	16.3
New England	12.9	25.3	*8.9*	30.0	18.3	30.1	20.4	41.8	7.6	18.2
Middle Atlantic	12.5	23.9	*13.8*	25.3	13.8	28.7	25.5	37.4	7.9	15.5
Midwest	13.5	27.5	15.4	29.5	16.0	33.1	22.5	42.3	8.0	18.6
East North Central	13.2	27.9	15.7	29.5	14.8	32.9	22.9	40.5	8.6	18.4
West North Central	14.3	26.8	14.8	29.5	17.6	33.5	20.8	45.8	6.7	19.2
South	13.8	29.4	17.6	30.4	21.9	33.4	27.4	35.0	7.8	19.0
South Atlantic	12.9	28.4	19.3	30.5	23.0	33.8	24.7	36.6	8.1	18.0
East South Central	14.6	30.9	15.0	31.9	16.9	32.0	*23.9*	36.8	8.1	23.1
West South Central	15.4	30.5	*13.9*	29.5	22.2	33.2	35.9	31.6	7.0	18.7
West	12.4	25.5	*17.0*	27.1	16.1	29.6	18.8	33.3	7.7	19.3
Mountain	12.3	26.2	*12.3*	29.9	17.5	31.1	25.0	36.0	7.6	17.4
Pacific	12.5	25.3	*19.0*	26.1	15.6	29.1	17.4	32.2	7.7	20.2
Urban Status										
Urban	12.7	25.9	16.0	26.8	16.5	29.9	20.6	35.0	7.2	17.1
Rural	16.1	32.1	17.0	36.1	24.2	37.3	33.9	43.2	10.4	22.3
Household Size										
1 Person	13.2	18.3	*14.3*	18.0	*8.7*	*16.1*	*27.1*	*45.2*	7.8	13.2
2 Persons	29.7	25.7	17.4	*44.6*	14.9	*17.9*	22.6	32.5	#N/A	17.1
3 Persons	#N/A	36.1	13.9	25.9	17.9	28.7	28.4	36.0	#N/A	24.6
4 Persons	#N/A	47.0	18.7	28.1	24.0	31.7	19.3	38.0	#N/A	30.9
5 Persons	#N/A	*22.5*	17.7	29.5	38.1	34.4	*5.2*	41.7	#N/A	*42.6*
6 or More Persons	#N/A	*71.9*	*11.6*	34.8	*15.4*	35.0	#N/A	*69.3*	#N/A	*64.1*
Race of Householder										
White	13.5	27.9	19.4	29.5	18.1	32.6	25.4	39.2	7.9	18.5
Black	11.4	23.4	14.3	29.9	18.3	29.6	16.5	30.1	7.0	18.3
Other	13.1	25.7	13.6	25.9	16.1	28.7	18.5	29.7	7.6	18.8
Hispanic Descent										
Yes	11.3	26.0	*13.5*	25.8	16.1	28.9	*10.6*	27.2	8.6	16.4
No	13.4	27.3	16.7	29.3	18.0	32.0	24.0	38.2	7.8	18.6
Family Income										
Less than $5,000	10.7	21.1	10.3	13.0	*18.3*	*15.6*	*7.5*	*13.0*	7.5	12.9
$5,000 to $9,999	8.4	30.3	12.5	27.6	11.3	23.5	42.3	17.4	6.2	11.4
$10,000 to $14,999	11.3	20.8	11.6	17.4	13.8	18.5	13.9	22.1	7.3	13.2
$15,000 to $19,999	10.4	21.2	16.2	23.2	*21.7*	26.4	34.4	26.8	7.3	14.5

Table A12. U.S. Average Vehicle-Miles Traveled by Household Composition (NHTS)2, 2001 (Thousand Miles per Household) (Continued)

2001 Household Characteristics	No Children		Youngest Child 0-5		Youngest Child 6-15		Youngest Child 16-21		No Children (Retired)	
	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults	One adult	2+ adults
$20,000 to $24,999	11.0	23.9	22.4	19.9	12.6	*24.4*	14.5	29.3	6.8	15.3
$25,000 to $34,999.....	13.1	23.0	18.7	24.5	20.4	27.5	27.3	26.5	9.1	17.6
$35,000 to $49,999.....	14.6	26.9	18.8	29.3	19.9	30.3	24.4	34.1	9.4	20.0
$50,000 to $74,999	15.9	27.6	21.2	32.6	17.7	33.3	23.3	44.0	9.9	22.3
$75,000 or More	15.9	30.3	*19.8*	31.8	17.4	35.7	25.1	41.6	13.8	23.9
Don't Know.....	13.0	26.1	*10.7*	26.7	14.4	32.2	*20.5*	38.0	7.0	16.4
Income Relative to Poverty Line										
Below 100 Percent.....	13.0	26.1	10.7	26.7	14.4	32.2	*20.5*	38.0	7.0	16.4
100 to 150 Percent	9.1	26.7	13.0	21.4	14.7	22.6	17.0	21.6	6.5	13.3
Above 150 Percent	11.3	21.5	13.7	24.6	23.1	29.5	26.3	26.4	7.3	13.4
Don't Know.....	13.9	27.7	*20.4*	30.1	17.7	32.7	*23.7*	39.0	8.6	19.6
Number of Drivers										
1.....	13.3	14.5	14.5	17.3	14.2	13.8	17.1	*18.0*	7.8	10.6
2.....	29.7	26.5	27.6	27.4	31.4	29.6	24.5	24.6	#N/A	19.0
3.....	#N/A	39.4	*23.8*	38.0	28.7	36.1	36.6	38.4	#N/A	28.4
4 or More	#N/A	47.2	*33.7*	59.9	71.9	49.9	*10.0*	45.8	#N/A	52.7

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

#N/A = Value is missing or not applicable.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A13. U.S. Average Vehicle-Miles Traveled by Vehicle Fuel Economy Category, 2001 (Thousand Miles per Vehicle)

2001 Household and Vehicle Characteristics	All Fuel Economy Categories	Fuel Economy (miles per gallon)							
		10.9 or less	11 to 12.9	13 to 15.9	16 to 18.9	19 to 21.9	22 to 24.9	25 to 25.9	30 or More
Household Characteristics									
Total	12.0	2.4	3.1	8.5	11.5	12.4	14.8	15.7	17.0
Census Region and Division									
Northeast	11.9	2.7	2.8	7.7	11.0	11.8	14.4	15.1	17.0
New England	12.3	1.8	*3.2*	7.9	11.6	12.1	14.5	15.0	17.2
Middle Atlantic	11.7	3.0	2.7	7.6	10.7	11.8	14.4	15.2	16.9
Midwest	11.9	1.7	2.9	8.8	11.2	12.1	15.6	15.4	16.7
East North Central	11.9	1.7	2.7	8.6	11.3	12.0	15.4	15.7	16.2
West North Central	11.9	1.6	3.5	9.1	11.0	12.5	16.1	14.9	17.6
South	12.4	2.3	2.9	8.9	12.3	12.7	15.1	16.6	17.8
South Atlantic	12.4	2.5	3.0	8.4	11.5	12.9	14.5	16.8	17.9
East South Central	12.3	2.3	2.6	9.1	12.9	12.2	17.0	15.0	17.2
West South Central	12.5	1.9	3.0	9.4	13.5	12.6	15.3	16.8	18.0
West	11.4	3.0	3.7	8.0	11.0	12.7	13.7	15.2	16.3
Mountain	11.3	*4.3*	4.4	8.8	11.0	12.6	13.6	15.2	*16.4*
Pacific	11.4	2.4	3.4	7.6	11.0	12.8	13.7	15.1	16.3
Urban Status									
Urban	11.7	2.4	3.0	8.1	10.8	12.0	14.4	15.2	16.8
Rural	12.8	2.4	3.3	9.5	13.5	13.7	16.3	18.0	18.2
Household Size									
1 Person	9.6	1.7	2.2	5.7	8.8	10.0	13.1	12.8	14.1
2 Persons	11.0	2.9	3.0	7.7	10.7	11.7	13.9	15.3	15.7
3 Persons	12.9	2.4	3.3	9.1	12.3	12.3	15.9	17.1	16.5
4 Persons	13.4	1.6	4.0	9.8	12.9	14.0	15.4	16.6	20.5
5 Persons	13.5	2.1	3.2	9.9	13.0	14.0	16.1	17.2	17.9
6 or More Persons	13.9	1.9	3.8	10.8	13.8	15.3	17.8	15.0	18.2
Household Composition (EIA)[1]									
Households With Children	13.5	1.9	3.8	10.0	13.4	13.7	15.9	16.9	18.7
Age of Oldest Child									
Under 7 Years	13.7	1.5	4.6	10.3	13.3	13.6	16.3	16.3	17.7
7 to 15 Years	13.5	2.0	3.5	10.1	13.2	13.8	16.0	17.5	19.9
16 to 17 Years	13.4	1.9	3.8	9.5	13.7	13.8	15.3	16.5	17.2
Households Without Children	10.9	2.6	2.8	7.3	10.2	11.4	14.1	14.8	15.6
One Adult	9.6	1.7	2.2	5.7	8.8	10.0	13.1	12.8	14.1
Age of Householder									
Under 35 Years	13.2	*2.9*	3.3	11.0	14.3	13.5	14.7	13.0	13.9
35 to 59 Years	10.9	1.9	2.8	7.4	10.4	11.2	14.0	13.9	14.2
60 Years or More	7.1	1.4	1.6	3.4	5.8	8.4	11.3	10.8	14.4

Table A13. U.S. Average Vehicle-Miles Traveled by Vehicle Fuel Economy Category, 2001 (Thousand Miles per Vehicle) (Continued)

2001 Household and Vehicle Characteristics	All Fuel Economy Categories	Fuel Economy (miles per gallon)							
		10.9 or less	11 to 12.9	13 to 15.9	16 to 18.9	19 to 21.9	22 to 24.9	25 to 25.9	30 or More
Two or More Adults	11.3	2.8	2.9	7.8	10.6	11.8	14.4	15.5	16.1
Age of Householder									
Under 35 Years	13.7	1.8	3.8	9.5	14.4	12.6	15.9	15.0	16.4
35 to 59 Years	11.8	2.5	3.2	8.9	11.5	12.5	14.1	16.2	15.5
60 Years or More	9.5	*3.3*	2.6	5.9	8.2	11.0	13.7	14.8	17.2
Household Composition (NHTS)[2]									
One adult, no children	11.1	2.0	2.8	7.3	10.6	10.9	14.3	13.6	14.3
Two or more adults, no children	12.4	2.7	3.4	9.4	12.2	12.4	14.6	15.8	16.0
One adult, youngest child 0-5	13.3	*4.0*	*4.4*	7.5	14.2	10.5	13.7	17.4	20.8
2+ adults, youngest child 0-5	13.8	1.5	4.2	10.5	13.1	14.1	17.0	16.6	16.7
One adult, youngest child 6-15	13.3	1.2	2.5	8.2	12.3	12.8	13.9	20.6	16.3
2+ adults, youngest child 6-15	13.5	2.2	3.4	10.2	14.0	13.9	15.5	16.7	21.5
One adult, youngest child 16-21	12.5	*2.1*	5.0	*7.8*	12.3	10.6	14.7	14.6	16.8
2+ adults, youngest child 16-21	12.7	1.4	3.4	8.3	11.9	13.4	15.2	16.8	16.0
One adult, retired, no children	6.8	1.4	1.6	3.6	6.0	8.4	10.5	10.3	13.2
2+ adults, retired, no children	9.4	*3.0*	2.6	5.9	8.4	11.0	13.6	14.2	16.3
Race of Householder									
White	11.9	2.5	3.1	8.7	11.6	12.3	14.9	15.5	16.8
Black	12.1	1.8	2.6	6.3	9.8	12.3	14.5	17.8	18.6
Other	12.5	1.9	3.7	8.3	12.4	13.2	14.4	15.5	17.1
Hispanic Descent									
Yes	12.9	1.5	3.8	8.4	13.1	13.6	14.9	16.1	16.9
No	11.9	2.4	3.1	8.5	11.4	12.3	14.8	15.7	17.1
Family Income									
Less than $5,000	9.4	1.4	*2.6*	3.9	9.2	10.3	11.7	14.2	12.2
$5,000 to $9,999	9.9	1.3	2.0	4.6	8.4	11.4	14.5	14.6	14.1
$10,000 to $14,999	9.4	*2.7*	3.1	5.7	7.9	9.9	12.1	12.9	17.1
$15,000 to $19,999	10.6	2.3	4.1	5.5	8.3	10.6	15.1	17.5	14.7
$20,000 to $24,999	10.3	1.8	*3.0*	7.1	9.6	10.5	13.2	14.5	17.5
$25,000 to $34,999	11.1	2.1	3.2	7.0	10.6	11.0	14.5	15.4	18.6
$35,000 to $49,999	12.1	2.3	3.1	8.7	11.6	12.5	15.0	16.0	17.4
$50,000 to $74,999	13.1	*2.7*	3.3	9.8	13.0	13.6	15.6	16.1	17.7
$75,000 or More	13.1	2.9	3.1	10.2	13.0	13.4	15.2	16.1	16.4
Don't Know	10.7	2.4	2.8	7.4	9.9	11.4	13.6	15.1	17.6
Income Relative to Poverty Line									
Below 100 Percent	10.4	2.0	2.9	5.5	8.7	11.1	14.9	14.6	14.2
100 to 150 Percent	11.3	1.8	3.7	6.6	10.3	11.8	13.5	15.9	19.7
Above 150 Percent	12.3	2.5	3.1	8.9	12.0	12.6	15.0	15.9	17.1
Don't Know	10.7	2.4	2.8	7.4	9.9	11.4	13.6	15.1	17.6

Table A13. U.S. Average Vehicle-Miles Traveled by Vehicle Fuel Economy Category, 2001 (Thousand Miles per Vehicle) (Continued)

2001 Household and Vehicle Characteristics	All Fuel Economy Categories	Fuel Economy (miles per gallon)							
		10.9 or less	11 to 12.9	13 to 15.9	16 to 18.9	19 to 21.9	22 to 24.9	25 to 25.9	30 or More
Number of Drivers									
1	10.0	1.8	2.3	5.6	9.1	10.5	13.3	14.2	15.1
2	12.3	2.8	3.4	9.3	12.0	12.7	15.1	16.0	16.9
3	12.7	1.8	3.4	8.8	11.8	13.3	15.2	16.3	17.9
4 or More	13.8	1.0	3.1	9.1	13.8	14.0	15.9	16.6	20.7
Age of Primary Driver									
16 to 17 Years	11.6	1.1	3.3	6.1	10.1	10.8	13.4	14.8	19.3
18 to 22 Years	14.2	1.3	2.4	8.3	13.7	11.7	15.7	17.2	18.9
23 to 29 Years	14.1	1.8	4.0	9.9	14.2	13.2	15.6	15.7	17.5
30 to 39 Years	13.6	1.8	4.7	11.0	13.7	13.9	15.4	16.0	16.0
40 to 49 Years	13.0	2.4	3.4	10.3	12.8	13.4	14.8	15.9	18.6
50 to 59 Years	11.9	2.3	2.8	8.6	11.8	12.3	15.1	15.7	14.6
60 to 69 Years	10.0	*3.3*	2.3	6.8	9.0	11.2	14.2	14.9	15.6
70 to 79 Years	7.6	2.0	2.3	4.3	6.5	9.6	12.1	11.0	13.2
80 Years and Over	6.0	2.1	1.5	2.7	4.9	7.8	9.6	14.3	*6.8*
Don't Know	10.9	2.4	3.5	7.0	10.3	12.6	14.8	16.4	19.3
Sex of Householder									
Male	12.1	2.4	3.2	8.8	11.7	12.8	15.2	15.6	17.7
Female	11.9	2.4	3.1	8.2	11.4	12.2	14.5	15.8	16.6
Vehicle Characteristics									
Model Year									
2001 to 2002	14.8	4.1	3.9	13.0	15.2	13.8	16.1	16.5	17.1
2000	14.5	*11.9*	*2.9*	10.8	14.3	13.6	16.4	17.3	18.3
1999	14.6	3.5	2.7	12.8	14.9	13.2	15.7	15.9	24.2
1998	14.1	*4.2*	3.7	11.5	13.9	13.4	15.8	16.6	15.8
1997	13.7	*2.0*	2.6	9.9	13.9	12.7	14.6	16.8	18.8
1996	13.0	*2.5*	2.6	9.5	12.8	12.6	14.8	16.9	15.0
1995	12.6	2.9	3.4	8.5	11.5	12.4	14.5	15.1	17.8
1992 to 1994	12.0	2.4	3.4	8.4	10.8	11.6	15.7	15.9	15.9
1989 to 1991	10.3	1.8	2.7	6.2	8.0	11.6	13.2	14.5	15.8
1986 to 1988	9.3	1.8	2.9	5.5	7.8	12.2	11.6	13.9	14.3
1983 to 1985	8.4	2.5	2.5	5.0	7.8	11.8	10.0	13.4	*17.8*
1980 to 1982	7.1	2.1	2.5	4.5	7.9	10.6	8.6	12.5	*15.7*
1977 to 1979	5.4	1.5	2.9	6.4	9.5	9.2	*11.0*	*9.7*	#N/A
1976 or Earlier	11.2	3.5	*3.5*	6.3	10.9	11.1	16.6	14.3	14.3
Don't Know	5.9	*2.2*	4.1	6.3	12.7	6.2	15.8	*39.7*	*7.3*
Type of Vehicle									
Passenger Car	11.4	1.2	1.8	2.8	5.3	10.2	14.6	15.5	17.1
Van (Large and Minivans)	13.2	1.2	2.6	8.1	10.5	16.7	23.1	13.4	#N/A
Sport Utility Vehicle	13.7	1.7	4.4	11.8	15.6	18.6	15.9	17.2	14.8

Table A13. U.S. Average Vehicle-Miles Traveled by Vehicle Fuel Economy Category, 2001 (Thousand Miles per Vehicle) (Continued)

2001 Household and Vehicle Characteristics	All Fuel Economy Categories	Fuel Economy (miles per gallon)							
		10.9 or less	11 to 12.9	13 to 15.9	16 to 18.9	19 to 21.9	22 to 24.9	25 to 25.9	30 or More
Pickup Truck	12.1	1.3	3.8	10.5	15.9	14.7	14.0	22.1	*11.7*
Recreational Vehicle.....	5.9	5.9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

#N/A = Value is missing or not applicable.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A14. U.S. Vehicle Fuel Consumption by Vehicle Type, 2001 (Billion Gallons)

2001 Household and Vehicle Characteristics	All Vehicle Types	Type of Vehicle				
		Passenger Car	Van (Large and Minivan)	Sport Utility Vehicle	Pickup Truck	Recreational Vehicle
Household Characteristics						
Total	113.1	55.0	12.7	18.6	25.1	1.6
Census Region and Division						
Northeast	18.1	9.9	2.4	3.2	2.4	0.2
New England	5.8	3.1	0.7	1.0	1.0	0.0
Middle Atlantic	12.3	6.8	1.7	2.2	1.4	*0.1*
Midwest	27.7	13.6	3.7	4.1	6.2	0.2
East North Central	19.0	9.4	2.6	2.8	4.0	0.1
West North Central	8.7	4.1	1.1	1.2	2.2	0.1
South	43.2	20.6	4.1	6.9	11.1	0.5
South Atlantic	23.4	12.1	2.5	3.8	4.8	0.3
East South Central	7.3	3.2	0.6	1.0	2.4	0.1
West South Central	12.5	5.3	1.0	2.1	4.0	0.1
West	24.0	10.9	2.5	4.5	5.4	*0.7*
Mountain	7.3	2.9	*0.8*	1.3	1.9	*0.4*
Pacific	16.7	8.1	1.8	3.1	3.5	0.3
Urban Status						
Urban	81.7	42.7	9.4	13.9	14.8	*1.0*
Rural	31.3	12.4	3.3	4.8	10.3	0.5
Household Size						
1 Person	12.3	7.5	0.7	1.6	2.5	0.1
2 Persons	36.4	18.6	2.7	5.4	8.8	*1.0*
3 Persons	23.9	12.0	2.1	4.4	5.2	*0.3*
4 Persons	24.3	10.6	3.7	4.4	5.5	*0.1*
5 Persons	10.6	4.3	2.2	1.8	2.1	0.1
6 or More Persons	5.5	2.0	1.4	1.0	1.0	0.0
Household Composition (EIA)[1]						
Households With Children	53.1	22.8	8.4	10.3	11.3	0.3
Age of Oldest Child						
Under 7 Years	13.3	5.9	1.8	2.6	2.9	0.0
7 to 15 Years	27.8	11.5	4.8	5.5	5.8	0.2
16 to 17 Years	12.0	5.4	1.8	2.1	2.6	0.0
Households Without Children	60.0	32.2	4.3	8.3	13.9	1.3
One Adult	12.3	7.5	0.7	1.6	2.5	0.1
Age of Householder						
Under 35 Years	2.3	1.3	0.0	0.4	0.5	0.0
35 to 59 Years	6.0	3.2	0.4	0.9	1.4	*0.1*
60 Years or More	4.0	3.0	0.2	0.3	0.5	0.0
Two or More Adults	47.7	24.7	3.7	6.7	11.4	*1.2*

Table A14. U.S. Vehicle Fuel Consumption by Vehicle Type, 2001 (Billion Gallons) (Continued)

2001 Household and Vehicle Characteristics	All Vehicle Types	Type of Vehicle				
		Passenger Car	Van (Large and Minivan)	Sport Utility Vehicle	Pickup Truck	Recreational Vehicle
Age of Householder						
Under 35 Years	8.5	5.0	0.3	1.4	1.7	0.0
35 to 59 Years	24.3	11.5	1.9	3.9	6.6	0.3
60 Years or More	14.9	8.1	1.5	1.4	3.1	*0.8*
Household Composition (NHTS)[2]						
One adult, no children	8.7	4.9	0.4	1.3	2.0	*0.1*
Two or more adults, no children	26.7	13.4	1.8	4.5	6.7	0.4
One adult, youngest child 0-5	1.1	0.7	0.1	0.2	0.1	0.0
2+ adults, youngest child 0-5	21.3	8.8	3.7	4.2	4.5	0.1
One adult, youngest child 6-15	2.2	1.2	0.2	0.3	0.4	0.0
2+ adults, youngest child 6-15	23.7	9.6	3.9	4.9	5.2	*0.2*
One adult, youngest child 16-21	1.0	0.7	0.0	*0.1*	0.2	0.0
2+ adults, youngest child 16-21	9.0	4.6	0.9	1.3	2.2	0.0
One adult, retired, no children	3.3	2.3	0.2	0.2	0.5	0.0
2+ adults, retired, no children	16.0	8.6	1.5	1.6	3.5	*0.8*
Race of Householder						
White	88.6	41.4	10.0	14.8	21.0	*1.4*
Black	9.4	6.3	0.7	1.2	1.1	0.0
Other	15.1	7.3	2.1	2.6	3.0	0.1
Hispanic Descent						
Yes	9.3	4.3	1.4	1.7	1.9	0.0
No	103.7	50.7	11.3	16.9	23.2	1.5
Family Income						
Less than $5,000	1.1	0.7	0.1	0.1	0.2	0.0
$5,000 to $9,999	2.6	1.7	*0.2*	0.3	0.5	0.0
$10,000 to $14,999	3.0	1.8	0.3	0.3	0.6	*0.1*
$15,000 to $19,999	4.9	3.0	0.4	0.4	1.0	0.1
$20,000 to $24,999	4.5	2.3	0.5	0.4	1.2	*0.1*
$25,000 to $34,999	12.5	6.7	1.2	1.4	3.1	0.2
$35,000 to $49,999	22.3	10.6	2.5	3.1	5.7	0.4
$50,000 to $74,999	24.0	10.6	3.0	4.2	5.9	*0.3*
$75,000 or More	31.9	14.6	3.8	7.4	5.8	0.4
Don't Know	6.2	3.2	0.6	1.1	1.2	*0.1*
Income Relative to Poverty Line						
Below 100 Percent	6.7	4.1	0.7	0.6	1.2	*0.1*
100 to 150 Percent	6.2	3.4	0.7	0.6	1.5	0.1
Above 150 Percent	93.9	44.4	10.7	16.2	21.3	*1.3*
Don't Know	6.2	3.2	0.6	1.1	1.2	*0.1*
Number of Drivers						
1	18.3	11.1	1.4	2.3	3.2	0.2

Table A14. U.S. Vehicle Fuel Consumption by Vehicle Type, 2001 (Billion Gallons) (Continued)

2001 Household and Vehicle Characteristics	All Vehicle Types	Type of Vehicle				
		Passenger Car	Van (Large and Minivan)	Sport Utility Vehicle	Pickup Truck	Recreational Vehicle
2	67.5	30.4	8.0	11.9	15.8	*1.3*
3	19.7	9.6	2.4	3.3	4.4	*0.1*
4 or More	7.4	3.8	0.9	1.1	1.7	0.0
Age of Primary Driver						
16 to 17 Years	1.3	0.8	0.0	*0.2*	0.3	#N/A
18 to 22 Years	5.5	3.6	0.1	0.6	1.1	#N/A
23 to 29 Years	10.4	5.9	0.5	1.8	2.2	0.0
30 to 39 Years	22.5	9.4	3.1	4.8	5.1	*0.1*
40 to 49 Years	25.0	10.6	3.5	4.9	5.9	0.2
50 to 59 Years	18.8	9.0	2.0	3.1	4.5	0.3
60 to 69 Years	10.0	5.2	1.0	1.0	2.4	*0.4*
70 to 79 Years	5.3	3.3	0.5	0.4	0.9	*0.2*
80 Years and Over	1.2	1.0	0.1	0.0	0.1	0.0
Don't Know	13.0	6.3	1.9	1.9	2.6	0.3
Sex of Householder						
Male	48.4	22.8	5.3	7.9	11.6	*0.8*
Female	64.7	32.2	7.4	10.8	13.5	0.8
Vehicle Characteristics						
Model Year						
2001 to 2002	9.2	3.7	0.8	2.3	2.4	*0.1*
2000	11.5	4.9	1.4	2.6	2.4	*0.2*
1999	10.5	4.4	1.3	2.4	2.2	0.1
1998	9.5	4.2	1.4	2.1	1.7	0.0
1997	8.3	4.1	0.8	1.4	1.9	0.0
1996	7.3	3.5	1.0	1.2	1.5	0.0
1995	7.7	4.0	1.1	1.1	1.5	0.1
1992 to 1994	18.2	9.7	2.2	2.4	3.8	0.2
1989 to 1991	12.2	7.3	1.3	1.3	2.2	0.1
1986 to 1988	7.4	3.8	*0.7*	0.7	2.1	0.1
1983 to 1985	3.6	1.9	0.2	*0.4*	1.0	0.1
1980 to 1982	1.1	0.5	0.0	0.1	0.4	0.1
1977 to 1979	1.1	0.4	0.1	0.1	0.4	*0.1*
1976 or Earlier	3.1	1.4	0.3	0.4	0.8	0.1
Don't Know	2.4	1.1	*0.1*	*0.1*	0.8	*0.3*
Fuel Economy (miles per gallon)						
10.9 or Less	2.3	0.2	0.0	0.1	0.3	1.6
11 to 12.9	2.0	0.4	0.2	0.5	0.9	#N/A
13 to 15.9	16.3	1.5	1.2	5.7	7.9	#N/A
16 to 18.9	26.6	4.0	3.0	9.3	10.3	#N/A
19 to 21.9	26.2	13.7	7.5	1.9	3.1	#N/A
22 to 24.9	22.1	18.7	0.8	0.9	1.8	#N/A

Table A14. U.S. Vehicle Fuel Consumption by Vehicle Type, 2001 (Billion Gallons) (Continued)

2001 Household and Vehicle Characteristics	All Vehicle Types	Type of Vehicle				
		Passenger Car	Van (Large and Minivan)	Sport Utility Vehicle	Pickup Truck	Recreational Vehicle
25 to 29.9	13.6	12.6	0.0	0.2	0.8	#N/A
30 or More	4.0	4.0	#N/A	0.0	0.0	#N/A

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

#N/A = Value is missing or not applicable.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A15. U.S. Average Vehicle-Miles Traveled by Vehicle Type, 2001 (Thousand Miles per Vehicle)

2001 Household and Vehicle Characteristics	All Vehicle Types	Type of Vehicle				
		Passenger Car	Van (Large and Minivan)	Sport Utility Vehicle	Pickup Truck	Recreational Vehicle
Household Characteristics						
Total	12.0	11.4	13.2	13.7	12.1	5.9
Census Region and Division						
Northeast	11.9	11.3	13.8	13.8	11.8	*7.8*
New England	12.3	11.7	13.6	14.4	12.7	*3.0*
Middle Atlantic	11.7	11.1	13.9	13.6	11.2	*9.7*
Midwest	11.9	11.4	13.4	13.6	11.8	3.3
East North Central	11.9	11.3	13.4	13.9	11.9	3.2
West North Central	11.9	11.7	13.4	12.8	11.6	3.5
South	12.4	11.9	13.2	13.8	12.9	6.1
South Atlantic	12.4	12.0	13.2	14.2	12.3	7.1
East South Central	12.3	11.6	13.6	13.1	12.9	5.8
West South Central	12.5	11.8	13.1	13.6	13.6	4.7
West	11.4	10.9	12.6	13.3	11.4	*7.1*
Mountain	11.3	10.5	*14.8*	12.3	11.1	*13.2*
Pacific	11.4	11.0	11.8	13.7	11.5	4.6
Urban Status						
Urban	11.7	11.1	12.9	13.4	12.1	5.9
Rural	12.8	12.6	14.4	14.5	12.2	6.0
Household Size						
1 Person	9.6	8.9	10.0	12.7	11.2	*4.8*
2 Persons	11.0	10.7	11.5	12.8	11.3	6.5
3 Persons	12.9	12.8	13.2	13.8	12.6	7.8
4 Persons	13.4	13.0	14.5	14.2	13.1	3.3
5 Persons	13.5	13.1	14.0	14.1	13.5	3.7
6 or More Persons	13.9	12.9	14.9	17.1	13.2	*3.3*
Household Composition (EIA)[1]						
Households With Children	13.5	13.1	14.5	14.5	13.4	4.2
Age of Oldest Child						
Under 7 Years	13.7	12.9	16.4	14.2	14.2	*5.6*
7 to 15 Years	13.5	13.3	13.9	14.5	13.0	4.0
16 to 17 Years	13.4	12.8	14.2	14.9	13.4	*5.4*
Households Without Children	10.9	10.5	11.3	12.8	11.3	6.4
One Adult	9.6	8.9	10.0	12.7	11.2	*4.8*
Age of Householder						
Under 35 Years	13.2	12.5	14.3	14.6	15.1	*10.0*
35 to 59 Years	10.9	10.3	10.9	12.9	11.4	*6.8*
60 Years or More	7.1	6.8	8.3	10.1	8.4	2.7
Two or More Adults	11.3	11.0	11.6	12.8	11.3	6.6

Table A15. U.S. Average Vehicle-Miles Traveled by Vehicle Type, 2001 (Thousand Miles per Vehicle) (Continued)

2001 Household and Vehicle Characteristics	All Vehicle Types	Type of Vehicle				
		Passenger Car	Van (Large and Minivan)	Sport Utility Vehicle	Pickup Truck	Recreational Vehicle
Age of Householder						
Under 35 Years	13.7	13.6	15.6	13.8	14.0	*5.2*
35 to 59 Years	11.8	11.5	12.3	13.1	12.0	6.0
60 Years or More	9.5	9.3	10.4	11.0	9.3	*7.1*
Household Composition (NHTS)[2]						
One adult, no children	11.1	10.5	11.2	13.0	12.2	*7.1*
Two or more adults, no children	12.4	12.2	13.2	13.4	12.6	6.1
One adult, youngest child 0-5	13.3	12.5	12.1	*18.7*	15.7	19.5
2+ adults, youngest child 0-5	13.8	13.2	15.3	14.2	14.0	2.7
One adult, youngest child 6-15	13.3	13.2	13.5	12.8	14.9	*1.6*
2+ adults, youngest child 6-15	13.5	13.3	14.0	15.2	12.7	5.2
One adult, youngest child 16-21	12.5	11.9	12.5	14.7	15.4	*4.7*
2+ adults, youngest child 16-21	12.7	12.5	13.6	13.0	12.8	*3.5*
One adult, retired, no children	6.8	6.5	8.0	10.1	8.0	2.8
2+ adults, retired, no children	9.4	9.2	9.9	11.0	9.3	*7.1*
Race of Householder						
White	11.9	11.3	13.2	13.6	12.0	5.9
Black	12.1	11.9	12.0	13.1	12.4	*8.7*
Other	12.5	11.9	14.0	14.0	12.9	*5.7*
Hispanic Descent						
Yes	12.9	12.1	14.7	13.9	13.8	*5.9*
No	11.9	11.4	13.1	13.6	12.0	5.9
Family Income						
Less than $5,000	9.4	9.3	9.6	9.5	9.7	*2.4*
$5,000 to $9,999	9.9	9.4	9.9	15.2	10.2	*0.3*
$10,000 to $14,999	9.4	9.0	10.3	11.8	9.4	*13.4*
$15,000 to $19,999	10.6	10.9	9.4	11.3	9.7	4.9
$20,000 to $24,999	10.3	9.6	10.9	*10.9*	12.5	3.5
$25,000 to $34,999	11.1	11.1	11.0	12.4	11.1	4.1
$35,000 to $49,999	12.1	11.8	13.5	13.0	12.1	5.1
$50,000 to $74,999	13.1	12.5	14.9	14.2	13.3	*9.6*
$75,000 or More	13.1	12.3	14.8	14.4	13.2	6.5
Don't Know	10.7	10.0	11.8	14.0	10.7	6.3
Income Relative to Poverty Line						
Below 100 Percent	10.4	10.3	10.5	11.8	10.4	*7.8*
100 to 150 Percent	11.3	11.0	10.9	12.9	11.8	5.7
Above 150 Percent	12.3	11.7	13.8	13.7	12.4	5.9
Don't Know	10.7	10.0	11.8	14.0	10.7	6.3
Number of Drivers						
1	10.0	9.5	10.7	13.0	11.1	*4.9*

Table A15. U.S. Average Vehicle-Miles Traveled by Vehicle Type, 2001 (Thousand Miles per Vehicle) (Continued)

2001 Household and Vehicle Characteristics	All Vehicle Types	Type of Vehicle				
		Passenger Car	Van (Large and Minivan)	Sport Utility Vehicle	Pickup Truck	Recreational Vehicle
2	12.3	11.8	13.4	13.7	12.3	6.5
3	12.7	12.5	13.8	13.7	12.2	4.1
4 or More	13.8	13.6	15.2	14.9	13.4	*2.0*
Age of Primary Driver						
16 to 17 Years	11.6	11.7	9.6	10.3	12.4	#N/A
18 to 22 Years	14.2	14.1	*15.3*	15.3	14.3	#N/A
23 to 29 Years	14.1	13.5	14.1	15.4	15.6	*5.9*
30 to 39 Years	13.6	13.0	14.3	14.5	14.3	*4.6*
40 to 49 Years	13.0	12.5	13.8	14.5	12.6	7.7
50 to 59 Years	11.9	11.5	12.7	13.3	11.9	6.4
60 to 69 Years	10.0	9.6	11.3	11.4	10.0	*9.1*
70 to 79 Years	7.6	7.5	8.8	9.6	7.3	4.7
80 Years and Over	6.0	5.9	7.3	5.8	6.6	*4.0*
Don't Know	10.9	10.6	14.1	11.5	10.5	4.2
Sex of Householder						
Male	12.1	11.6	13.2	13.6	12.2	*5.9*
Female	11.9	11.3	13.3	13.7	12.1	6.0
Vehicle Characteristics						
Model Year						
2001 to 2002	14.8	13.8	16.0	14.7	16.9	6.9
2000	14.5	13.8	15.0	15.0	15.9	*19.2*
1999	14.6	13.6	16.5	14.9	16.6	5.0
1998	14.1	13.2	16.1	15.4	14.8	*7.9*
1997	13.7	13.2	13.6	15.0	14.7	*2.9*
1996	13.0	12.4	13.8	14.0	13.8	*3.2*
1995	12.6	12.0	14.4	12.7	13.6	4.9
1992 to 1994	12.0	11.7	12.3	14.0	12.3	5.1
1989 to 1991	10.3	10.2	10.9	11.3	9.7	*3.7*
1986 to 1988	9.3	8.9	10.0	9.3	10.1	3.3
1983 to 1985	8.4	8.5	6.7	*10.9*	8.0	6.1
1980 to 1982	7.1	7.2	*8.2*	5.7	7.4	*3.7*
1977 to 1979	5.4	5.3	6.1	7.9	5.3	2.7
1976 or Earlier	11.2	10.8	12.8	11.9	11.4	7.6
Don't Know	5.9	5.2	6.1	*8.5*	6.4	*14.5*
Fuel Economy (miles per gallon)						
10.9 or Less	2.4	1.2	1.2	1.7	1.3	5.9
11 to 12.9	3.1	1.8	2.6	4.4	3.8	#N/A
13 to 15.9	8.5	2.8	8.1	11.8	10.5	#N/A
16 to 18.9	11.5	5.3	10.5	15.6	15.9	#N/A
19 to 21.9	12.4	10.2	16.7	18.6	14.7	#N/A
22 to 24.9	14.8	14.6	23.1	15.9	14.0	#N/A

Table A15. U.S. Average Vehicle-Miles Traveled by Vehicle Type, 2001 (Thousand Miles per Vehicle) (Continued)

2001 Household and Vehicle Characteristics	All Vehicle Types	Type of Vehicle				
		Passenger Car	Van (Large and Minivan)	Sport Utility Vehicle	Pickup Truck	Recreational Vehicle
25 to 29.9	15.7	15.5	13.4	17.2	22.1	#N/A
30 or More	17.0	17.1	#N/A	14.8	*11.7*	#N/A

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

#N/A = Value is missing or not applicable.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A16. U.S. Number of Vehicles by Vehicle Type, 2001 (Million Vehicles)

2001 Household and Vehicle Characteristics	All Vehicle Types	Type of Vehicle				
		Passenger Car	Van (Large and Minivan)	Sport Utility Vehicle	Pickup Truck	Recreational Vehicle
Household Characteristics						
Total	191.0	112.4	18.4	23.2	35.6	1.4
Census Region and Division						
Northeast	31.7	20.7	3.3	4.0	3.5	0.1
New England	10.0	6.3	1.0	1.2	1.4	0.0
Middle Atlantic	21.8	14.4	2.3	2.8	2.2	0.1
Midwest	47.1	27.5	5.3	5.1	9.0	0.3
East North Central	32.4	19.3	3.7	3.5	5.7	0.2
West North Central	14.7	8.2	1.5	1.6	3.3	0.1
South	70.2	40.5	5.9	8.5	14.9	0.4
South Atlantic	38.9	23.8	3.6	4.6	6.7	0.2
East South Central	11.7	6.2	0.9	1.3	3.2	0.1
West South Central	19.7	10.5	1.5	2.6	5.1	0.1
West	41.9	23.7	3.8	5.7	8.2	0.5
Mountain	12.2	6.3	1.0	1.8	2.9	*0.1*
Pacific	29.7	17.4	2.8	3.8	5.3	0.4
Urban Status						
Urban	143.5	89.7	14.0	17.7	21.2	0.9
Rural	47.6	22.7	4.4	5.6	14.4	0.5
Household Size						
1 Person	26.6	19.2	1.2	2.2	3.8	0.1
2 Persons	65.5	39.9	4.4	7.2	13.2	0.8
3 Persons	38.1	22.3	3.0	5.5	7.3	*0.2*
4 Persons	37.0	19.5	4.9	5.3	7.2	0.1
5 Persons	15.9	7.9	3.1	2.1	2.8	0.1
6 or More Persons	7.9	3.7	1.8	1.0	1.3	0.0
Household Composition (EIA)[1]						
Households With Children	79.8	41.8	11.2	12.0	14.5	0.3
Age of Oldest Child						
Under 7 Years	20.0	11.1	2.2	3.2	3.5	0.0
7 to 15 Years	41.5	20.6	6.7	6.4	7.6	0.2
16 to 17 Years	18.2	10.0	2.4	2.4	3.4	0.0
Households Without Children	111.2	70.6	7.2	11.2	21.1	1.1
One Adult	26.6	19.2	1.2	2.2	3.8	0.1
Age of Householder						
Under 35 Years	3.7	2.5	0.1	0.5	0.6	0.0
35 to 59 Years	11.5	7.3	0.6	1.3	2.2	0.0
60 Years or More	11.4	9.4	0.5	0.4	1.0	*0.1*
Two or More Adults	84.7	51.4	6.0	9.0	17.3	1.0

Table A16. U.S. Number of Vehicles by Vehicle Type, 2001 (Million Vehicles) (Continued)

2001 Household and Vehicle Characteristics	All Vehicle Types	Type of Vehicle				
		Passenger Car	Van (Large and Minivan)	Sport Utility Vehicle	Pickup Truck	Recreational Vehicle
Age of Householder						
Under 35 Years	13.4	9.1	0.4	1.8	2.1	0.0
35 to 59 Years	41.0	23.2	2.8	5.1	9.5	0.3
60 Years or More	30.3	19.1	2.8	2.1	5.7	0.6
Household Composition (NHTS)[2]						
One adult, no children	16.4	11.1	0.7	1.8	2.8	*0.1*
Two or more adults, no children	43.8	26.1	2.5	5.7	9.2	0.3
One adult, youngest child 0-5	1.8	1.4	0.1	*0.2*	0.1	0.0
2+ adults, youngest child 0-5	31.5	16.2	4.7	4.9	5.6	0.1
One adult, youngest child 6-15	3.5	2.3	0.3	0.5	0.4	0.0
2+ adults, youngest child 6-15	35.2	17.3	5.3	5.4	6.9	0.2
One adult, youngest child 16-21	1.7	1.3	0.1	0.2	0.2	0.0
2+ adults, youngest child 16-21	14.7	8.7	1.2	1.8	3.0	0.0
One adult, retired, no children	9.5	7.6	0.4	0.4	0.9	*0.1*
2+ adults, retired, no children	32.8	20.5	2.9	2.4	6.4	0.6
Race of Householder						
White	149.5	85.3	14.5	18.5	29.9	1.3
Black	16.6	12.4	1.1	1.6	1.6	0.0
Other	24.9	14.7	2.8	3.2	4.1	*0.1*
Hispanic Descent						
Yes	15.0	8.6	1.8	2.1	2.5	0.0
No	176.0	103.8	16.6	21.1	33.2	1.4
Family Income						
Less than $5,000	2.4	1.7	0.2	0.2	0.3	0.0
$5,000 to $9,999	5.6	4.1	0.4	0.3	0.8	0.0
$10,000 to $14,999	6.7	4.6	0.5	0.4	1.1	0.0
$15,000 to $19,999	9.6	6.3	0.9	0.6	1.7	0.1
$20,000 to $24,999	9.0	5.6	0.9	0.7	1.7	*0.1*
$25,000 to $34,999	23.1	14.1	2.1	1.9	4.8	0.2
$35,000 to $49,999	37.3	21.2	3.5	4.1	8.2	0.4
$50,000 to $74,999	36.9	20.1	3.9	5.0	7.7	0.2
$75,000 or More	48.9	27.4	5.0	8.7	7.5	0.3
Don't Know	11.5	7.2	1.0	1.4	1.8	0.1
Income Relative to Poverty Line						
Below 100 Percent	13.3	9.1	1.3	0.9	2.0	0.0
100 to 150 Percent	11.5	7.3	1.2	0.9	2.1	0.1
Above 150 Percent	154.6	88.8	14.9	20.1	29.6	1.2
Don't Know	11.5	7.2	1.0	1.4	1.8	0.1
Number of Drivers						
1	37.8	27.0	2.4	3.2	5.1	0.2

Table A16. U.S. Number of Vehicles by Vehicle Type, 2001 (Million Vehicles) (Continued)

2001 Household and Vehicle Characteristics	All Vehicle Types	Type of Vehicle				
		Passenger Car	Van (Large and Minivan)	Sport Utility Vehicle	Pickup Truck	Recreational Vehicle
2	109.6	60.3	11.5	14.7	22.0	1.1
3	32.0	18.2	3.4	4.1	6.3	0.1
4 or More	11.2	6.6	1.1	1.3	2.2	0.0
Age of Primary Driver						
16 to 17 Years	2.4	1.7	0.1	*0.3*	0.4	#N/A
18 to 22 Years	8.6	6.4	0.1	0.7	1.4	#N/A
23 to 29 Years	16.1	10.8	0.7	2.1	2.5	0.0
30 to 39 Years	33.5	17.4	4.2	5.6	6.1	0.1
40 to 49 Years	38.7	19.9	4.9	5.7	8.0	0.2
50 to 59 Years	31.6	18.1	3.0	3.9	6.5	0.2
60 to 69 Years	19.4	11.9	1.7	1.5	4.1	*0.2*
70 to 79 Years	13.3	9.4	1.0	0.6	2.1	0.2
80 Years and Over	3.9	3.3	0.2	0.1	0.3	*0.1*
Don't Know	23.4	13.6	2.5	2.7	4.2	0.4
Sex of Householder						
Male	80.3	45.6	7.7	9.8	16.5	0.7
Female	110.8	66.8	10.7	13.4	19.2	0.7
Vehicle Characteristics						
Model Year						
2001 to 2002	12.5	6.4	1.0	2.7	2.4	*0.1*
2000	16.0	8.5	1.9	3.0	2.6	0.1
1999	14.6	7.9	1.6	2.8	2.3	0.1
1998	13.9	7.7	1.8	2.3	2.0	0.0
1997	12.8	7.6	1.2	1.7	2.3	0.1
1996	11.6	6.8	1.4	1.5	1.9	0.1
1995	12.8	8.0	1.5	1.4	2.0	0.1
1992 to 1994	31.1	19.4	3.3	2.9	5.3	0.2
1989 to 1991	24.5	16.5	2.2	1.9	3.9	0.1
1986 to 1988	16.1	9.7	1.3	1.3	3.7	0.2
1983 to 1985	8.4	4.9	0.5	0.7	2.2	0.1
1980 to 1982	2.8	1.5	0.1	0.2	0.9	0.1
1977 to 1979	3.0	1.3	0.2	0.2	1.1	*0.2*
1976 or Earlier	5.4	3.0	0.5	0.6	1.2	0.1
Don't Know	5.6	3.3	0.1	0.2	1.8	0.1
Fuel Economy (miles per gallon)						
10.9 or Less	6.1	1.5	0.3	0.7	2.2	1.4
11 to 12.9	7.6	2.5	0.9	1.3	2.9	#N/A
13 to 15.9	28.4	7.9	2.2	7.2	11.2	#N/A
16 to 18.9	40.2	13.6	5.1	10.4	11.2	#N/A
19 to 21.9	43.0	27.7	9.0	2.1	4.2	#N/A
22 to 24.9	34.7	29.6	0.8	1.3	3.0	#N/A

Table A16. U.S. Number of Vehicles by Vehicle Type, 2001 (Million Vehicles) (Continued)

2001 Household and Vehicle Characteristics	All Vehicle Types	Type of Vehicle				
		Passenger Car	Van (Large and Minivan)	Sport Utility Vehicle	Pickup Truck	Recreational Vehicle
25 to 29.9	23.3	22.0	*0.1*	0.3	0.9	#N/A
30 or More	7.7	7.7	#N/A	0.0	0.0	#N/A

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

#N/A = Value is missing or not applicable.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A17. U.S. Number of Households by Vehicle Fuel Expenditures, 2001 (Million Households)

2001 Household and Vehicle Characteristics	All Expenditure Categories	Motor Fuel Expenditures (dollars per household)					Percent of Income for Motor Fuel				
		$500 or Less	$501 to $1,000	$1001 to $1,500	$1,501 to $2,000	$2,001 or More	Less than 2	2 to 3.9	4 to 5.9	6 to 7.9	8 or More
Household Characteristics											
Total	98.9	19.2	22.4	18.1	14.3	24.8	38.4	29.8	13.5	6.5	10.8
Census Region and Division											
Northeast	17.7	3.9	4.2	3.4	2.5	3.6	8.5	5.0	2.0	0.9	1.3
New England	5.4	1.0	1.2	1.1	0.8	1.3	2.3	1.7	0.6	0.3	0.4
Middle Atlantic	12.3	2.9	3.0	2.4	1.7	2.3	6.1	3.3	1.3	0.6	0.9
Midwest	23.6	4.2	5.2	4.1	3.4	6.6	8.4	7.4	3.5	1.6	2.6
East North Central	16.3	2.9	3.6	2.9	2.3	4.5	5.9	5.4	2.3	1.1	1.7
West North Central	7.3	1.3	1.6	1.2	1.1	2.0	2.5	2.1	1.2	0.6	0.9
South	36.2	7.2	8.1	6.6	5.2	9.1	13.0	11.1	5.0	2.7	4.5
South Atlantic	20.4	4.3	4.7	3.7	2.8	4.8	8.2	6.2	2.7	1.3	2.0
East South Central	5.7	1.0	1.1	1.1	0.8	1.6	1.6	1.7	0.9	0.5	1.0
West South Central	10.1	1.9	2.2	1.7	1.6	2.7	3.3	3.1	1.4	0.8	1.5
West	21.4	3.9	4.9	4.0	3.2	5.5	8.5	6.3	3.0	1.3	2.4
Mountain	6.1	1.1	1.4	1.1	0.9	1.7	2.3	1.9	0.9	0.4	0.7
Pacific	15.4	2.8	3.5	2.9	2.3	3.8	6.2	4.5	2.1	0.9	1.7
Urban Status											
Urban	77.6	16.7	18.7	14.6	10.8	16.7	33.6	23.5	9.4	4.1	7.0
Rural	21.3	2.6	3.6	3.5	3.5	8.1	4.8	6.4	4.0	2.4	3.8
Household Size											
1 Person	22.4	10.6	7.0	2.6	1.2	1.1	12.7	5.1	2.0	1.0	1.7
2 Persons	33.4	5.4	8.3	7.3	5.3	7.0	13.8	10.4	4.3	1.9	3.1
3 Persons	17.2	1.6	3.2	3.5	2.9	5.9	5.2	5.7	2.6	1.3	2.4
4 Persons	16.0	1.0	2.4	3.0	3.0	6.5	4.5	5.4	2.7	1.4	1.9
5 Persons	6.7	0.4	1.0	1.2	1.2	2.9	1.6	2.4	1.2	0.6	1.0
6 or More Persons	3.2	***0.3***	0.4	0.4	0.6	1.4	***0.6***	0.9	***0.6***	0.4	0.6
Household Composition (EIA)[1]											
Households With Children	37.1	3.3	6.5	7.3	6.5	13.5	10.7	12.5	6.2	3.0	4.7
Age of Oldest Child											
Under 7 Years	10.2	1.0	2.2	2.1	1.8	3.1	3.3	3.3	1.5	0.8	1.2
7 to 15 Years	19.8	1.8	3.4	3.9	3.6	7.1	5.8	6.8	3.4	1.5	2.3
16 to 17 Years	7.1	0.5	0.9	1.2	1.1	3.4	1.7	2.3	1.3	0.7	1.1
Households Without Children	61.7	15.9	15.9	10.8	7.7	11.3					
One Adult	22.3	10.6	6.9	2.6	1.3	1.1	12.7	5.1	2.0	1.0	1.7
Age of Householder											
Under 35 Years	3.3	1.1	1.2	0.6	0.3	0.2	1.6	0.9	0.4	0.2	0.3
35 to 59 Years	9.0	3.2	3.1	1.4	0.7	0.7	5.0	2.1	0.9	0.4	0.7
60 Years or More	10.0	6.3	2.6	0.6	0.3	0.2	6.2	2.0	0.8	0.4	0.7

Table A17. U.S. Number of Households by Vehicle Fuel Expenditures, 2001 (Million Households) (Continued)

2001 Household and Vehicle Characteristics	All Expenditure Categories	Motor Fuel Expenditures (dollars per household)					Percent of Income for Motor Fuel				
		$500 or Less	$501 to $1,000	$1001 to $1,500	$1,501 to $2,000	$2,001 or More	Less than 2	2 to 3.9	4 to 5.9	6 to 7.9	8 or More
Two or More Adults	39.2	5.3	8.9	8.3	6.5	10.3	14.9	12.3	5.2	2.5	4.4
Age of Householder											
Under 35 Years	6.5	0.6	1.3	1.5	1.2	1.9	2.0	2.1	0.9	0.5	1.1
35 to 59 Years	17.3	1.4	3.0	3.7	3.3	6.0	5.9	5.9	2.6	1.1	1.8
60 Years or More	15.4	3.3	4.6	3.1	2.0	2.4	7.0	4.3	1.8	0.9	1.6
Household Composition (NHTS)[2]											
One adult, no children	13.7	5.0	4.9	2.0	1.0	0.8	7.5	3.3	1.3	0.6	1.0
Two or more adults, no children	20.1	1.6	3.7	4.6	3.8	6.3	7.3	6.8	2.6	1.2	2.1
One adult, youngest child 0-5	1.5	0.5	*0.5*	0.3	*0.1*	*0.1*	0.4	0.4	*0.3*	0.1	0.3
2+ adults, youngest child 0-5	15.1	1.2	2.7	3.1	3.0	5.2	4.5	5.2	2.4	1.2	1.8
One adult, youngest child 6-15	2.6	0.7	0.9	0.4	0.3	0.3	1.0	0.7	0.4	0.2	0.4
2+ adults, youngest child 6-15	15.0	0.8	2.0	2.9	2.7	6.5	4.1	5.3	2.5	1.2	1.9
One adult, youngest child 16-21	0.9	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.1	0.1
2+ adults, youngest child 16-21	5.1	0.2	0.5	0.8	0.7	2.8	1.1	1.6	1.0	0.6	0.7
One adult, retired, no children	8.3	5.4	2.0	0.5	0.2	0.2	5.0	1.7	0.6	0.4	0.6
2+ adults, retired, no children	16.6	3.7	4.8	3.3	2.2	2.5	7.2	4.6	2.1	0.9	1.9
Race of Householder											
White	75.8	14.1	16.4	14.3	11.0	19.8	29.7	23.9	10.3	4.7	7.2
Black	9.7	2.6	2.6	1.7	1.1	1.7	3.8	2.4	1.4	0.7	1.4
Other	13.4	2.5	3.3	2.2	2.1	3.3	4.8	3.6	1.8	1.1	2.1
Hispanic Descent											
Yes	8.3	1.6	1.9	1.3	*1.4*	2.0	2.6	2.1	1.3	0.8	1.5
No	90.6	17.6	20.4	16.8	12.9	22.8	35.8	27.7	12.2	5.7	9.3
Family Income											
Less than $5,000	1.7	0.7	*0.5*	0.2	*0.2*	0.1	0.1	0.0	0.0	0.1	1.5
$5,000 to $9,999	4.1	2.0	1.0	0.4	0.3	*0.3*	0.5	0.7	0.6	0.4	1.8
$10,000 to $14,999	4.7	2.0	1.3	0.7	0.3	0.3	0.9	1.1	0.7	0.6	1.4
$15,000 to $19,999	6.3	2.3	1.7	0.9	0.5	0.8	1.6	1.4	1.1	0.6	1.5
$20,000 to $24,999	5.6	2.0	1.6	0.9	0.5	0.7	1.8	1.5	0.9	0.6	0.9
$25,000 to $34,999	13.3	3.1	3.8	2.5	1.7	2.2	3.8	4.1	2.5	1.4	1.5
$35,000 to $49,999	18.9	2.7	4.6	3.9	2.8	4.8	5.8	6.6	3.5	1.5	1.5
$50,000 to $74,999	17.2	1.4	3.3	3.6	3.1	5.8	6.3	6.9	2.5	0.9	0.6
$75,000 or More	20.6	1.0	2.9	4.1	4.1	8.5	11.0	7.5	1.5	0.3	0.2
Don't Know	6.5	1.9	1.5	1.0	0.7	1.3	6.5	#N/A	#N/A	#N/A	#N/A
Income Relative to Poverty Line											
Below 100 Percent	7.9	3.2	2.2	1.0	0.7	0.7	0.9	1.2	1.1	1.0	4.5
100 to 150 Percent	6.7	2.3	1.8	1.0	0.6	1.0	1.4	1.6	1.4	0.8	1.9
Above 150 Percent	77.8	11.8	16.8	15.1	12.2	21.8	29.6	27.0	10.9	4.6	4.4
Don't Know	6.5	1.9	1.5	1.0	0.7	1.3	6.5	#N/A	#N/A	#N/A	#N/A

Table A17. U.S. Number of Households by Vehicle Fuel Expenditures, 2001 (Million Households) (Continued)

2001 Household and Vehicle Characteristics	All Expenditure Categories	Motor Fuel Expenditures (dollars per household)					Percent of Income for Motor Fuel				
		$500 or Less	$501 to $1,000	$1001 to $1,500	$1,501 to $2,000	$2,001 or More	Less than 2	2 to 3.9	4 to 5.9	6 to 7.9	8 or More
Number of Drivers											
1.....	31.7	14.2	10.1	3.8	1.9	1.7	16.9	7.3	3.1	1.5	2.9
2.....	52.6	4.6	10.9	12.4	9.7	14.9	18.6	17.8	7.4	3.4	5.3
3.....	11.1	0.3	1.2	1.6	2.3	5.8	2.3	3.6	2.2	1.0	1.9
4 or More	3.2	*0.4*	0.2	0.2	0.3	2.2	0.4	1.0	0.8	0.4	0.6

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

#N/A = Value is missing or not applicable.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A18. U.S. Vehicles by EIA Household Composition[1], 2001 (Million Vehicles)

2001 Household and Vehicle Characteristics	Households With Children				Households Without Children						
	Total	Age of Oldest Child			Total	One Adult--Age of Householder			Two or More Adults--Age of Householder		
		Under 7 Years	7 to 15 Years	16 or 17 Years		Under 35 Years	35 to 59 Years	60 Years or Over	Under 35 Years	35 to 59 Years	60 Years or Over
Household Characteristics											
Total	79.8	20.0	41.5	18.2	111.2	3.7	11.5	11.4	13.4	41.0	30.3
Census Region and Division											
Northeast	13.4	3.4	7.0	*2.9*	18.4	0.6	1.8	1.9	2.0	6.9	5.2
New England	4.1	0.9	2.0	*1.2*	5.8	0.2	0.4	0.5	0.8	2.1	1.8
Middle Atlantic	9.2	2.5	5.0	1.8	12.5	0.4	1.3	1.3	1.2	4.8	3.5
Midwest	20.1	5.0	9.9	5.2	27.0	0.8	2.7	2.9	3.2	9.8	7.7
East North Central	13.9	3.4	6.8	3.7	18.6	0.6	1.9	2.0	2.0	6.9	5.2
West North Central	6.2	1.6	3.1	1.5	8.5	0.2	0.8	0.9	1.2	2.8	2.5
South	27.7	7.0	14.3	6.4	42.5	1.5	4.4	4.4	4.7	16.1	11.4
South Atlantic	15.1	3.7	8.1	3.3	23.7	0.8	2.4	2.5	2.6	8.8	6.6
East South Central	4.2	1.2	2.1	0.9	7.4	0.2	*0.8*	0.8	0.8	3.1	1.7
West South Central	8.4	2.2	4.0	2.2	11.3	0.4	1.2	1.2	1.3	4.1	3.1
West	18.6	4.6	10.3	3.7	23.3	0.8	2.6	2.2	3.5	8.2	5.9
Mountain	5.3	1.2	2.8	1.2	7.0	*0.2*	0.8	0.7	1.0	2.3	2.0
Pacific	13.3	3.4	7.5	2.4	16.4	0.6	1.8	1.6	2.5	5.9	4.0
Urban Status											
Urban	60.1	15.9	31.1	13.1	83.3	3.2	9.2	8.9	11.3	28.9	21.8
Rural	19.7	4.1	10.5	5.1	27.9	0.5	2.2	2.5	2.1	12.1	8.5
Household Size											
1 Person	#N/A	#N/A	#N/A	#N/A	26.6	3.7	11.5	11.4	#N/A	#N/A	#N/A
2 Persons	2.5	*0.6*	1.4	0.5	63.0	#N/A	#N/A	#N/A	8.9	28.5	25.5
3 Persons	21.6	8.4	9.1	4.2	16.5	#N/A	#N/A	#N/A	3.4	9.1	4.0
4 Persons	32.6	8.1	17.6	7.0	4.4	#N/A	#N/A	#N/A	0.7	3.0	0.6
5 Persons	15.3	2.4	8.9	4.0	0.6	#N/A	#N/A	#N/A	*0.3*	*0.3*	0.0
6 or More Persons	7.7	0.5	4.6	2.6	*0.2*	#N/A	#N/A	#N/A	*0.1*	0.0	0.0
Race of Householder											
White	59.1	14.7	30.4	14.0	90.4	2.6	8.9	9.7	10.1	32.9	26.2
Black	7.2	1.6	3.8	1.8	9.4	0.4	1.4	0.9	1.0	3.5	2.1
Other	13.5	3.7	7.3	2.4	11.5	0.6	1.2	0.8	2.3	4.6	2.0
Hispanic Descent											
Yes	9.3	2.6	5.0	*1.7*	5.7	0.3	*0.6*	*0.2*	1.4	2.1	*0.9*
No	70.4	17.4	36.5	16.6	105.6	3.3	10.9	11.2	12.0	38.9	29.3
Family Income											
Less than $5,000	0.9	0.2	0.6	0.1	1.6	0.1	0.3	0.3	0.4	0.2	0.3

Table A18. U.S. Vehicles by EIA Household Composition[1], 2001 (Million Vehicles) (Continued)

2001 Household and Vehicle Characteristics	Households With Children				Households Without Children						
	Total	Age of Oldest Child			Total	One Adult--Age of Householder			Two or More Adults--Age of Householder		
		Under 7 Years	7 to 15 Years	16 or 17 Years		Under 35 Years	35 to 59 Years	60 Years or Over	Under 35 Years	35 to 59 Years	60 Years or Over
$5,000 to $9,999	*1.2*	0.3	*0.7*	*0.2*	4.3	0.2	0.7	1.3	0.7	0.6	0.9
$10,000 to $14,999	2.1	0.5	*1.1*	0.5	4.5	0.3	0.6	1.5	0.4	0.8	1.0
$15,000 to $19,999	3.3	0.9	1.6	0.8	6.4	0.3	0.6	1.6	0.8	1.1	2.0
$20,000 to $24,999	2.6	0.8	1.3	0.5	6.3	0.3	0.9	1.0	0.5	1.8	1.9
$25,000 to $34,999	8.2	2.4	4.1	1.7	14.9	0.8	1.9	1.9	1.6	3.6	5.1
$35,000 to $49,999	15.6	3.8	8.9	3.0	21.7	0.9	2.6	1.3	2.6	7.3	7.0
$50,000 to $74,999	18.1	4.5	9.0	4.6	18.8	0.4	1.9	0.6	2.6	8.8	4.5
$75,000 or More	24.8	6.0	12.7	6.1	24.2	0.3	1.3	0.4	3.4	14.4	4.4
Don't Know	2.9	0.6	1.6	0.7	8.6	0.2	0.8	1.5	*0.6*	2.4	3.1
Income Relative to Poverty Line											
Below 100 Percent	5.6	1.2	3.2	1.2	5.8	0.3	1.0	1.6	1.0	0.8	1.1
100 to 150 Percent	4.8	1.2	2.3	1.3	6.0	0.3	0.6	1.5	0.9	1.5	1.3
Above 150 Percent	66.5	17.1	34.4	15.0	90.9	2.9	9.1	6.8	11.0	36.4	24.8
Don't Know	2.9	0.6	1.6	0.7	8.6	0.2	0.8	1.5	*0.6*	2.4	3.1
Number of Drivers											
1	6.2	1.8	3.9	0.5	31.6	3.6	11.4	11.3	0.5	1.5	3.3
2	47.7	15.5	28.3	3.9	61.9	#N/A	#N/A	#N/A	9.0	29.1	23.7
3	18.3	2.0	7.3	9.0	13.7	#N/A	#N/A	#N/A	3.0	7.8	2.8
4 or More	7.5	0.7	2.0	4.8	3.7	#N/A	#N/A	#N/A	*0.8*	2.5	0.4
Age of Primary Driver											
16 to 17 Years	2.4	#N/A	#N/A	2.4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
18 to 22 Years	3.7	0.8	1.7	1.1	5.0	0.4	#N/A	#N/A	2.3	2.0	0.2
23 to 29 Years	7.8	4.8	2.6	0.4	8.3	1.7	#N/A	#N/A	5.0	1.4	0.3
30 to 39 Years	24.0	8.6	13.2	2.2	9.5	1.5	1.8	#N/A	2.9	2.7	0.5
40 to 49 Years	23.0	2.3	14.2	6.5	15.7	#N/A	4.3	#N/A	0.7	9.9	0.8
50 to 59 Years	7.0	0.7	3.7	2.5	24.6	#N/A	5.0	#N/A	0.9	17.0	1.7
60 to 69 Years	1.2	0.3	0.7	0.2	18.2	#N/A	#N/A	4.2	*0.2*	1.9	11.9
70 to 79 Years	0.5	*0.1*	0.3	*0.1*	12.8	#N/A	#N/A	4.6	0.1	0.4	7.7
80 Years and Over	*0.1*	0.0	0.0	#N/A	3.9	#N/A	#N/A	2.0	0.0	0.1	1.8
Don't Know	10.1	2.3	5.1	2.7	13.3	0.0	0.3	0.7	1.3	5.7	5.3
Sex of Householder											
Male	29.7	7.5	15.3	7.0	50.5	2.1	6.4	3.8	6.6	17.3	14.3
Female	50.1	12.5	26.3	11.3	60.7	1.5	5.1	7.6	6.8	23.7	16.0
Vehicle Characteristics											
Model Year											
2001 to 2002	5.2	1.5	2.6	1.2	7.3	0.3	0.7	0.5	1.0	2.8	1.9
2000	6.9	1.9	3.6	1.4	9.1	0.3	0.8	0.7	1.2	3.7	2.4
1999	6.2	1.7	3.2	1.2	8.5	0.3	0.8	0.8	1.1	3.1	2.4

Table A18. U.S. Vehicles by EIA Household Composition[1], 2001 (Million Vehicles) (Continued)

2001 Household and Vehicle Characteristics	Households With Children				Households Without Children						
	Total	Age of Oldest Child			Total	One Adult--Age of Householder			Two or More Adults--Age of Householder		
		Under 7 Years	7 to 15 Years	16 or 17 Years		Under 35 Years	35 to 59 Years	60 Years or Over	Under 35 Years	35 to 59 Years	60 Years or Over
1998	5.7	1.6	2.8	1.3	8.2	*0.3*	0.7	0.8	1.1	2.9	2.4
1997	5.5	1.5	2.8	1.2	7.3	0.3	0.7	0.6	0.9	2.6	2.0
1996	5.0	1.2	2.7	1.2	6.6	0.1	0.7	0.6	0.8	2.5	1.8
1995	5.2	1.5	2.5	1.2	7.6	0.3	0.7	0.7	1.1	2.8	2.0
1992 to 1994	13.2	3.5	6.7	3.1	17.8	0.6	1.7	1.9	2.2	6.6	4.9
1989 to 1991	10.0	2.1	5.4	2.5	14.6	0.4	1.6	2.0	1.8	5.1	3.7
1986 to 1988	6.8	1.5	3.7	1.6	9.2	0.2	1.1	1.1	0.8	3.3	2.6
1983 to 1985	3.3	0.6	1.9	0.8	5.1	0.1	0.7	0.7	0.4	1.7	1.4
1980 to 1982	1.2	0.2	0.7	0.3	1.6	*0.1*	*0.2*	0.2	0.1	0.6	0.5
1977 to 1979	1.0	0.2	0.6	0.2	1.9	#N/A	0.3	0.3	0.1	0.8	0.5
1976 or Earlier	2.4	0.6	1.2	0.5	3.0	0.1	0.3	0.4	0.5	0.9	0.9
Don't Know	2.1	0.5	1.2	0.5	3.5	*0.1*	0.4	0.3	0.3	1.5	0.9
Type of Vehicle											
Passenger Car	41.8	11.1	20.6	10.0	70.6	2.5	7.3	9.4	9.1	23.2	19.1
Vans (Large and Minivans)	11.2	2.2	6.7	2.4	7.2	0.1	0.6	0.5	0.4	2.8	2.8
Sport Utility Vehicle	12.0	3.2	6.4	2.4	11.2	0.5	1.3	0.4	1.8	5.1	2.1
Pickup Truck	14.5	3.5	7.6	3.4	21.1	0.6	2.2	1.0	2.1	9.5	5.7
Recreational Vehicle	0.3	0.0	0.2	0.0	1.1	0.0	0.0	*0.1*	0.0	0.3	0.6
Fuel Economy (miles per gallon)											
10.9 or Less	1.8	0.3	1.2	0.3	4.3	0.1	0.4	*0.4*	0.3	1.5	1.6
11 to 12.9	2.6	0.6	1.4	0.6	5.1	0.1	0.5	0.6	0.3	1.8	1.7
13 to 15.9	12.1	2.7	6.6	2.8	16.3	0.3	1.5	1.9	1.3	6.3	4.9
16 to 18.9	17.0	4.2	8.9	3.8	23.2	0.7	2.3	2.5	2.4	8.7	6.7
19 to 21.9	18.3	4.5	9.7	4.1	24.7	0.5	2.4	2.9	2.2	8.7	7.9
22 to 24.9	14.2	3.7	7.1	3.4	20.5	0.8	2.2	1.9	3.1	7.8	4.7
25 to 29.9	10.1	3.1	4.7	2.4	13.1	0.8	1.6	1.0	2.8	4.8	2.2
30 or More	3.6	0.9	1.8	0.8	4.1	0.3	0.5	0.2	1.0	1.5	0.6

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

#N/A = Value is missing or not applicable.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum

Table A18. U.S. Vehicles by EIA Household Composition[1], 2001 (Million Vehicles) (Continued)

2001 Household and Vehicle Characteristics	Households With Children				Households Without Children						
	Total	Age of Oldest Child			Total	One Adult--Age of Householder			Two or More Adults--Age of Householder		
		Under 7 Years	7 to 15 Years	16 or 17 Years		Under 35 Years	35 to 59 Years	60 Years or Over	Under 35 Years	35 to 59 Years	60 Years or Over

Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A19. U.S. Average Vehicle-Miles Traveled by EIA Household Composition[1], 2001 (Thousand Miles per Household)

2001 Household Characteristics	Households With Children				Households Without Children						
	Total	Age of Oldest Child			Total	One Adult--Age of Householder			Two or More Adults--Age of Householder		
		Under 7 Years	7 to 15 Years	16 or 17 Years		Under 35 Years	35 to 59 Years	60 Years or Over	Under 35 Years	35 to 59 Years	60 Years or Over
Household Characteristics											
Total	29.0	27.0	28.3	34.1	19.6	14.5	13.8	8.1	28.1	27.9	18.6
Census Region and Division											
Northeast	26.8	23.9	26.6	32.0	18.1	15.1	14.0	7.2	24.0	26.2	16.4
New England	28.8	26.5	27.7	34.1	19.3	15.8	13.2	7.5	26.8	26.3	18.7
Middle Atlantic	26.0	23.0	26.2	30.8	17.5	14.7	14.2	7.0	22.2	26.2	15.3
Midwest	30.3	25.9	29.9	36.9	19.8	14.5	14.1	8.3	30.1	28.4	18.7
East North Central	30.3	26.7	29.8	36.3	19.5	13.0	14.3	9.0	28.8	28.3	18.1
West North Central	30.1	24.1	30.2	38.3	20.6	18.9	13.6	6.8	32.0	28.7	20.0
South	30.5	29.6	29.6	34.0	20.5	15.3	14.0	8.5	30.2	29.7	18.9
South Atlantic	30.6	29.1	30.8	32.5	19.8	13.8	13.1	8.6	31.2	29.0	17.8
East South Central	30.8	31.7	28.4	36.1	22.2	18.7	14.8	8.5	32.9	30.8	21.3
West South Central	30.0	29.5	27.8	35.6	20.9	16.5	15.5	8.5	26.7	30.2	20.2
West	27.4	26.5	26.2	32.6	18.9	12.6	12.9	7.8	26.0	25.6	19.9
Mountain	29.4	31.3	26.7	34.9	18.6	13.9	12.7	7.3	27.5	26.3	17.9
Pacific	26.6	24.7	26.0	31.6	19.0	12.2	13.0	8.1	25.4	25.4	20.8
Urban Status											
Urban	27.1	25.0	26.8	31.3	18.3	14.1	13.1	7.6	26.9	26.3	17.4
Rural	36.0	35.7	33.4	42.7	24.2	17.4	17.1	10.5	35.1	32.5	22.1
Household Size											
1 Person	#N/A	#N/A	#N/A	#N/A	11.3	14.5	13.8	8.1	#N/A	#N/A	#N/A
2 Persons	16.6	17.3	14.9	21.4	21.9	#N/A	#N/A	#N/A	25.4	25.3	17.5
3 Persons	26.5	25.6	25.8	30.9	32.3	#N/A	#N/A	#N/A	37.0	34.0	25.3
4 Persons	30.2	27.8	29.5	36.1	38.4	#N/A	#N/A	#N/A	33.1	41.9	31.3
5 Persons	31.6	32.9	30.0	34.9	38.8	#N/A	#N/A	#N/A	*20.9*	56.5	*89.5*
6 or More Persons	34.7	39.2	32.9	37.5	*59.3*	#N/A	#N/A	#N/A	*69.3*	49.2	*30.6*
Race of Householder											
White	30.4	28.3	29.2	36.5	19.8	14.8	14.1	8.0	29.6	28.5	18.7
Black	25.6	24.0	25.5	27.3	17.2	13.2	11.9	7.4	24.7	23.5	18.0
Other	26.0	23.7	26.3	29.2	20.3	13.8	13.5	10.2	24.3	27.6	17.7
Hispanic Descent											
Yes	25.8	23.6	26.0	29.1	19.8	12.9	11.4	8.5	25.0	27.2	14.8
No	29.5	27.5	28.6	34.8	19.6	14.6	13.9	8.1	28.6	28.0	18.7
Family Income											

Table A19.U.S. Average Vehicle-Miles Traveled by Household Composition1 (EIA), 2001 (Thousand Miles per Household) (Continued)

2001 Household Characteristics	Households With Children				Households Without Children						
	Total	Age of Oldest Child			Total	One Adult--Age of Householder			Two or More Adults--Age of Householder		
		Under 7 Years	7 to 15 Years	16 or 17 Years		Under 35 Years	35 to 59 Years	60 Years or Over	Under 35 Years	35 to 59 Years	60 Years or Over
Less than $5,000	14.2	9.5	*16.7*	11.2	12.7	16.3	9.5	7.4	23.4	14.5	11.6
$5,000 to $9,999	20.1	21.5	16.9	29.6	11.7	12.8	8.1	6.1	36.3	14.7	12.1
$10,000 to $14,999	16.4	14.6	16.0	19.6	12.0	13.2	11.0	7.4	23.4	16.7	14.1
$15,000 to $19,999	22.9	22.0	23.9	22.0	13.4	11.5	11.2	7.3	27.5	19.6	14.6
$20,000 to $24,999	20.9	22.5	18.8	23.9	14.7	12.6	10.8	7.6	18.1	24.1	15.0
$25,000 to $34,999	24.8	23.2	23.9	30.0	16.8	15.0	13.4	8.9	23.9	24.4	16.7
$35,000 to $49,999	28.8	27.7	27.8	34.2	20.8	15.7	15.2	9.7	27.2	28.2	19.8
$50,000 to $74,999	32.6	30.4	32.0	37.2	24.3	16.9	16.3	10.7	32.1	28.3	23.0
$75,000 or More	34.1	31.2	33.2	40.2	28.0	14.3	17.3	12.1	30.2	32.1	23.8
Don't Know	28.5	21.8	29.4	34.4	16.4	12.3	13.5	8.0	25.0	28.7	16.2
Income Relative to Poverty Line											
Below 100 Percent	19.9	19.2	19.3	22.0	12.7	13.9	8.5	6.4	30.9	15.7	13.1
100 to 150 Percent	24.5	19.9	24.5	30.3	14.1	13.2	11.0	7.4	25.5	18.3	14.9
Above 150 Percent	30.8	28.7	29.9	36.4	21.1	14.8	14.6	8.8	28.2	29.0	19.5
Don't Know	28.5	21.8	29.4	34.4	16.4	12.3	13.5	8.0	25.0	28.7	16.2
Number of Drivers											
1	15.0	15.9	14.1	18.3	11.4	14.4	13.7	8.1	17.8	12.5	10.0
2	28.2	27.2	29.4	24.3	23.4	#N/A	#N/A	#N/A	26.2	26.2	19.3
3	36.3	40.1	35.7	35.9	36.9	#N/A	#N/A	#N/A	39.6	39.2	28.0
4 or More	50.8	55.6	52.6	49.5	45.9	#N/A	#N/A	#N/A	36.3	48.6	54.1

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

#N/A = Value is missing or not applicable.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

Table A20. U.S. Number of Vehicles, Vehicle-Kilometers, Motor Fuel Consumption and Expenditures, 2001

2001 Household and Vehicle Characteristics	Number of Vehicles (million)	Average per Vehicle			Liters per 100 Kilometers
		Vehicle-Kilometers Traveled (hundreds)	Consumption (liters)	Expenditures (dollars)	
Household Characteristics					
Total	191.0	192.7	2,240	787	11.6
Census Region and Division					
Northeast	31.7	191.7	2,162	766	11.3
New England	10.0	197.8	2,218	810	11.2
Middle Atlantic	21.8	188.9	2,137	746	11.3
Midwest	47.1	191.0	2,226	793	11.7
East North Central	32.4	190.8	2,216	792	11.6
West North Central	14.7	191.5	2,250	793	11.8
South	70.2	199.8	2,329	776	11.7
South Atlantic	38.9	199.5	2,281	756	11.4
East South Central	11.7	197.5	2,358	795	11.9
West South Central	19.7	201.7	2,407	804	11.9
West	41.9	183.5	2,166	814	11.8
Mountain	12.2	182.0	2,247	829	12.3
Pacific	29.7	184.0	2,133	808	11.6
Urban Status					
Urban	143.5	188.1	2,157	760	11.5
Rural	47.6	206.5	2,492	867	12.1
Household Size					
1 Person	26.6	154.1	1,757	616	11.4
2 Persons	65.5	177.5	2,105	737	11.9
3 Persons	38.1	207.5	2,371	834	11.4
4 Persons	37.0	215.2	2,488	876	11.6
5 Persons	15.9	216.5	2,509	882	11.6
6 or More Persons	7.9	223.6	2,646	938	11.8
Household Composition (EIA)[1]					
Households With Children	79.8	217.5	2,518	886	11.6
Age of Oldest Child					
Under 7 Years	20.0	221.0	2,520	885	11.4
7 to 15 Years	41.5	216.9	2,532	892	11.7
16 to 17 Years	18.2	215.0	2,483	871	11.5
Households Without Children	111.2	174.9	2,041	716	11.7
One Adult	26.6	154.1	1,757	616	11.4
Age of Householder					
Under 35 Years	3.7	212.4	2,343	821	11.0
35 to 59 Years	11.5	174.6	1,993	700	11.4
60 Years or More	11.4	114.8	1,332	467	11.6
Two or More Adults	84.7	181.4	2,130	747	11.7

Table A20. U.S. Number of Vehicles, Vehicle-Kilometers, Motor Fuel Consumption and Expenditures, 2001 (Continued)

2001 Household and Vehicle Characteristics	Number of Vehicles (million)	Average per Vehicle			Liters per 100 Kilometers
		Vehicle-Kilometers Traveled (hundreds)	Consumption (liters)	Expenditures (dollars)	
Age of Householder					
Under 35 Years	13.4	220.6	2,394	844	10.9
35 to 59 Years	41.0	190.0	2,238	783	11.8
60 Years or More	30.3	152.4	1,867	655	12.2
Household Composition (NHTS)[2]					
One adult, no children	16.4	178.3	2,006	703	11.3
2+ adults, no children	43.8	200.0	2,308	809	11.5
One adult, youngest child 0-5	1.8	214.3	2,282	790	10.6
2+ adults, youngest child 0-5	31.5	221.6	2,559	901	11.5
One adult, youngest child 6-15	3.5	214.3	2,336	822	10.9
2+ adults, youngest child 6-15	35.2	217.4	2,554	898	11.7
One adult, youngest child 16-21	1.7	201.6	2,200	775	10.9
2+ adults, youngest child 16-21	14.7	203.9	2,324	818	11.4
One adult, retired, no children	9.5	110.1	1,305	458	11.9
2+ adults, retired, no children	32.8	150.7	1,848	648	12.3
Race of Householder					
White	149.5	191.0	2,244	788	11.7
Black	16.6	194.1	2,136	735	11.0
Other	24.9	201.9	2,287	814	11.3
Hispanic Descent					
Yes	15.0	208.0	2,354	836	11.3
No	176.0	191.4	2,231	783	11.7
Family Income					
Less than $5,000	2.4	150.7	1,657	578	11.0
$5,000 to $9,999	5.6	158.6	1,787	627	11.3
$10,000 to $14,999	6.7	150.5	1,724	605	11.5
$15,000 to $19,999	9.6	169.9	1,931	674	11.4
$20,000 to $24,999	9.0	166.2	1,899	661	11.4
$25,000 to $34,999	23.1	179.3	2,052	718	11.4
$35,000 to $49,999	37.3	194.0	2,262	793	11.7
$50,000 to $74,999	36.9	211.1	2,459	865	11.7
$75,000 or More	48.9	210.0	2,470	870	11.8
Don't Know	11.5	172.0	2,036	718	11.8
Income Relative to Poverty Line					
Below 100 Percent	13.3	168.0	1,896	665	11.3
100 to 150 Percent	11.5	181.4	2,040	714	11.2
Above 150 Percent	154.6	197.2	2,300	808	11.7
Don't Know	11.5	172.0	2,036	718	11.8
Number of Drivers					
1	37.8	161.4	1,827	642	11.3

Table A20. U.S. Number of Vehicles, Vehicle-Kilometers, Motor Fuel Consumption and Expenditures, 2001 (Continued)

2001 Household and Vehicle Characteristics	Number of Vehicles (million)	Average per Vehicle			Liters per 100 Kilometers
		Vehicle-Kilometers Traveled (hundreds)	Consumption (liters)	Expenditures (dollars)	
2	109.6	197.1	2,330	817	11.8
3	32.0	204.5	2,332	819	11.4
4 or More	11.2	222.3	2,510	889	11.3
Age of Primary Driver					
16 to 17 Years	2.4	187.2	2,001	701	10.7
18 to 22 Years	8.6	228.7	2,399	842	10.5
23 to 29 Years	16.1	227.4	2,449	862	10.8
30 to 39 Years	33.5	219.5	2,541	893	11.6
40 to 49 Years	38.7	208.6	2,448	860	11.7
50 to 59 Years	31.6	190.9	2,254	790	11.8
60 to 69 Years	19.4	160.8	1,954	685	12.2
70 to 79 Years	13.3	123.0	1,495	523	12.2
80 Years and Over	3.9	96.4	1,172	413	12.2
Don't Know	23.4	176.1	2,111	743	12.0
Sex of Householder					
Male	80.3	194.5	2,282	802	11.7
Female	110.8	191.4	2,210	775	11.5
Vehicle Characteristics					
Model Year					
2001 to 2002	12.5	237.4	2,783	976	11.7
2000	16.0	234.0	2,711	949	11.6
1999	14.6	234.3	2,713	951	11.6
1998	13.9	227.7	2,596	910	11.4
1997	12.8	220.2	2,473	864	11.2
1996	11.6	208.5	2,373	831	11.4
1995	12.8	202.0	2,265	795	11.2
1992 to 1994	31.1	193.4	2,215	777	11.5
1989 to 1991	24.5	165.3	1,877	662	11.4
1986 to 1988	16.1	149.0	1,739	614	11.7
1983 to 1985	8.4	135.6	1,639	581	12.1
1980 to 1982	2.8	113.6	1,488	526	13.1
1977 to 1979	3.0	87.0	1,418	503	16.3
1976 or Earlier	5.4	180.6	2,171	770	12.0
Don't Know	5.6	95.6	1,639	574	17.1
Type of Vehicle					
Passenger Car	112.4	184.1	1,853	651	10.1
Vans (Large and Minivans)	18.4	213.2	2,619	923	12.3
Sport Utility Vehicle	23.2	219.7	3,035	1,069	13.8
Pickup Truck	35.6	195.5	2,671	933	13.7
Recreational Vehicle	1.4	95.7	4,213	1,483	44.0

Table A20. U.S. Number of Vehicles, Vehicle-Kilometers, Motor Fuel Consumption and Expenditures, 2001 (Continued)

2001 Household and Vehicle Characteristics	Number of Vehicles (million)	Average per Vehicle			Liters per 100 Kilometers
		Vehicle-Kilometers Traveled (hundreds)	Consumption (liters)	Expenditures (dollars)	
Fuel Economy (miles per gallon)					
10.9 or Less	6.1	38.3	1,385	485	36.2
11 to 12.9	7.6	50.1	972	343	19.4
13 to 15.9	28.4	136.3	2,177	764	16.0
16 to 18.9	40.2	185.7	2,508	879	13.5
19 to 21.9	43.0	199.6	2,304	809	11.5
22 to 24.9	34.7	238.5	2,413	847	10.1
25 to 29.9	23.3	253.1	2,215	780	8.7
30 or More	7.7	274.2	1,959	691	7.1

1 = "Household Composition (EIA)" represents an equivalent category with previous household transportation studies conducted by the Energy Information Administration (EIA).

2 = "Household Composition (NHTS)" represents an equivalent category in the National Household Travel Survey (NHTS) conducted by the U.S. Department of Transportation.

underlined = Estimate, when rounded, displays as a zero value.

in red, italic format = Data withheld either because the relative standard error was greater than 50 percent or fewer than 10 reporting units were sampled.

Notes: ▪ "Gallons" and "Miles Per Gallon" are displayed in Gallon of Gasoline Equivalent (GGE) units due to the non-gasoline and diesel vehicles in the augmented NHTS data. ▪ Data in this table are for households with passenger vehicles operated for residential transportation. ▪ See glossary for definitions used in this table. ▪ "Income Relative to Poverty Line" category was calculated by evaluating the categorical average of household with Poverty Thresholds for 2001 by Size of Family and Number of Related Children Under 18 Years (http://www.census.gov/hhes/poverty/threshld.html), as published by the U.S. Department of Commerce, U.S. Census Bureau. ▪ Because of independent rounding, data may not sum to totals. ▪ "Householder" is defined as the person identified as the household respondent by the NHTS.

Sources: ▪ Energy Information Administration (EIA), Office of Oil and Gas, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," Form EIA-888, "On-Highway Diesel Fuel Price Survey," Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," ▪ EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." ▪ U.S. Department of Transportation, 2001 National Household Travel Survey (NHTS), January 2004 public-use file augmented by EIA. See http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html for details on augmentations to NHTS public-use data.

APPENDIX B: ESTIMATION METHODOLOGIES

APPENDIX B

ESTIMATION METHODOLOGIES

INTRODUCTION

The National Household Travel Survey (NHTS) is the nation's inventory of local and long distance travel, according to the U.S. Department of Transportation. Between April 2001 and May 2002, roughly 26 thousand households[39] were interviewed about their travel, based on the use of over 53 thousand vehicles. Using confidential data collected during those interviews, coupled with EIA's retail fuel prices, external data sources of test[40] fuel economy, and internal procedures for modifying test fuel economy to on-road, in-use fuel economy, EIA has extended this inventory to include the energy used for travel, thereby continuing a data series that was discontinued by EIA in 1994. This appendix presents the methods used for each eligible sampled vehicle to

1. provide three fundamental inputs crucial to developing annual household vehicles energy consumption and expenditures information: composite fuel economy, retail fuel price, and in-possession vehicle-miles traveled;

2. adjust imputed composite fuel economy to calculate an on-road fuel economy;

3. adjust on-road fuel economy to calculate an in-use fuel economy based on actual household driving characteristics; and,

4. derive annual energy consumption and motor fuel expenditures information from these adjusted inputs.

Such methods allow EIA to calculate estimates on the amount of and expenditures for energy consumed by the nation's vehicles operated for residential transportation. These estimates also include number and types of vehicles per household, and for each vehicle: annual miles traveled, gallons of fuel consumed, type of fuel used, price paid for fuel, and fuel economy (gasoline mileage).

DISCLAIMER

[39] The NHTS collected travel data from the civilian, non-institutionalized population of the United States. People living in medical institutions, prisons and in barracks on military bases were excluded from the sample. However, telephone numbers in dormitory rooms, fraternity and sorority houses were included so long as no more than 10 people shared the same telephone number.

[40] Federal law requires automobile manufacturers to determine the fuel economy of new vehicles offered for sale in the U.S. This information is provided on a fuel economy label affixed to each vehicle's window to help consumers make informed decisions regarding fuel economy when purchasing a new vehicle. While these labels may vary somewhat in appearance, they must all provide the same information.

Had these results come from information supplied by respondents to the NHTS directly, there would be no reason to provide an explicit warning to users about the uncertainty of these data. Since NHTS did not collect information on fuel economy, retail fuel price, or fuel type, EIA cautions readers that, for every single one of the over 53 thousand sampled vehicles, all energy and energy-related statistics in this report and associated tables, public-use files, and analyses are constructed from imputed information. Only light-duty passenger vehicles are included in this report because EIA has excluded motorcycles, mopeds, large trucks, and buses in an effort to continue its past residential transportation series, which was discontinued in 1994.

The calculation of energy-related statistics – vehicle fuel consumption and expenditures – in this report occurred in several steps. Multiple steps were required because respondents, when completing their NHTS survey questionnaires, were not directly asked to report information necessary to derive their vehicle's on-road, in-use fuel economy, nor were they asked to provide the type or price of the fuel that was used to power their vehicle(s). Without all of these critical components, there is no way to determine a vehicle's consumption of and expenditures for transportation fuel. With the use of confidential NHTS data and other external data sources, EIA's imputation procedures modeled these measures for most sampled vehicles (see "In-Scope Households and Vehicles" text boxes for details).

In-Scope Households and Vehicles

Not all NHTS sampled vehicles are considered in-scope for this report. For this study, except where noted, we include only those vehicles that (1) fit the definition of light-duty residential passenger vehicles and (2) belong in the sample of households having the "100-percent-household" national weight classification, as defined by the User's Guide of the NHTS.

In 2001, the NHTS interviewed the members of 26,308 households that had 53,275 vehicles at some point during the survey period. Of that vehicle total, about 80 percent, or 42,736 vehicles, conform to EIA's definition of a *vehicle* and also are identified as belonging to a "100-percent household" by the NHTS, which is to say that these households form a national representative sample of respondents whose entire adult members were directly interviewed. Likewise, the sample number of households is reduced to 21,178 from 26,308, after excluding those households where one or more adult members chose not to respond.

DATA SOURCES

To derive vehicle-miles traveled (VMT); assign and adjust vehicle fuel economy (given in terms of miles per gasoline equivalent gallon (MPG)); compute vehicle fuel consumption, and assign fuel prices to calculate vehicle fuel expenditures, EIA relied on data from several federal agencies. These statistical procedures relied on confidential data from the U.S. Federal Highway Administration's (FHWA) 2001 National Household Travel Survey (NHTS); the EIA's 1985, 1988, and 1991 Residential Transportation Energy Consumption Survey (RTECS)[41]; the U.S.

[41] This series was discontinued after EIA conducted the 1994 Residential Transportation Energy Consumption survey.

Environmental Protection Agency's (EPA) fuel economy test results[42]; and the EIA's retail pump price series[43] for 2001 and 2002.

In-Scope Households and Vehicles (Continued)

The NHTS has recommended that some data applications, such as planning models, use only the national sample of "100-percent households." EIA has kept with that recommendation for this report.

For the definition of a light-duty residential passenger vehicle used in this report, see *vehicle* in the "Glossary" of this report.

PROCEDURES AND DEFINITIONS

EIA's purpose in partnering with the U.S. Department of Transportation was to enhance the use and usefulness of the January 2004 release of the 2001 NHTS public-use file, augmenting it with energy-related data. Figure B1 depicts the estimation of those energy-related statistics: VMT, vehicle fuel economy, vehicle fuel consumption, and vehicle fuel expenditures. These steps were initially applied to each vehicle reported by households in the national sample of the NHTS. However, item nonresponse (mostly of crucial vehicle characteristics), incomplete fuel economy and sales data (generally for those vehicles having a gross vehicle weight rating heavier than 8,500 lbs), and the goal to update national estimates that conceptually compare to those found in EIA's previous residential transportation studies – 1985, 1988, 1991, and 1994 RTECS – guided the scope of EIA's augmented vehicle data. The effect of those inter-dependent challenges resulted in methodologies that applied only to light-duty passenger vehicles in households that are nationally weighted as "100-percent-household" by the NHTS.

First, the annual VMT was derived from the vehicle's two odometer readings or imputed using modeled data (see the NHTS User's Guide 2-B.5. ODOMETER READING and APPENDIX J). Moreover, because vehicles are acquired and disposed of by sample households during the survey year, the annual VMT were subsequently adjusted to reflect the period of the survey year in which the household "owned or used" the vehicle.[44] Second, the annual on-road

[42] Fuel economy test values and vehicle production sales data were received from the U.S. Department of Transportation, National Highway and Traffic Safety Administration for model year's 1978 through 2002.

[43] Energy Information Administration. Forms EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales report," and EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report." Form EIA-888, "On-Highway Diesel Fuel Price Survey." Form EIA-895, "Monthly Quantity and Value of Natural Gas Report." Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions."

[44] Thus, "number of vehicles" and "per vehicle" statistics in this report are displayed in units of vehicle-years. For example, if a vehicle was sold half-way through the survey year (i.e., household "owned" vehicle for six months of the year), then this vehicle is counted as 0.5 vehicle-years, while a vehicle "owned" for 365 days would equate to 1 vehicle-year. Likewise, a vehicle purchased during the survey period would also be prorated to its time of household use, as measured from its acquisition date and the end of the survey year. These dates are available from odometer reading flags. Hence, vehicle statistics in this report will differ from those published directly from NHTS public-use data because the duration of a vehicle's possession by a household is taken into account, calculating an accurate level of energy and vehicle use. Since NHTS did not collect an end-of-year vehicle inventory, a disposition date for each vehicle is not known.

fuel economy, reported in terms of MPG, was estimated using questionnaire responses[45], EPA fuel economy test results, and the period between May 1, 2001 and April 30, 2002 that the vehicle was in use.[46] The MPG values were adjusted to account for the difference between EPA test values and on-road, in-use values. Third, estimated vehicle fuel consumption was derived by dividing the prorated VMT by the estimated MPG. Then, multiplying the vehicle's fuel consumption by its fuel price, on a monthly basis, derives motor fuel expenditures. Unfortunately, the NHTS did not collect the vehicle's motor fuel prices via fuel purchase diaries. Instead, each NHTS vehicle was assigned a retail price based on its imputed fuel type. All price information, with the notable exception of fuel tax rates for gasoline obtained from FHWA's *Highway Statistic* reports, was obtained from the EIA's transportation fuel price series.

The following sections of this appendix describe the estimation procedures used for calculating a vehicle's monthly VMT, MPG, fuel consumption, fuel price, and fuel expenditure.

The following terms are used throughout this report:

Fuel Economy Term	Definition
EPA Composite MPG	The EPA dynamometer test procedure, performed on pre-production prototype vehicles, yields separate test values for EPA city and highway MPG. These city and highway MPG are often combined to form the "composite" MPG.
On-Road MPG	A Composite MPG that was adjusted to account for the shortfall between the test value and the fuel economy actually obtained on the road. The adjustment did not take into account the driving patterns of individual drivers and seasonal differences.
In-Use MPG	MPG that were adjusted for seasonal differences and annual miles driven. Vehicles that are driven relatively few miles during the year are assumed to be driven mostly on short trips that involve frequent stops. Vehicles that are driven relatively many miles are assumed to be driven mostly on long trips where few stops are needed.
MPG Shortfall	A measure of the difference between actual on-road MPG and the EPA laboratory test MPG, expressed as the ratio of test MPG to on-road MPG.

[45] FHWA/BTS collected make (MAKECODE), model (MODLCODE), model year (VEHYEAR), and 8 categories of vehicle type (VEHTYPE), as given in *Section B: Vehicle Data* of the 2001 NHTS questionnaire. The collection of Vehicle Identification Numbers (VIN) would have provided a more accurate and richer source of vehicle characteristics. It is not known whether VINs will be collected in future survey cycles of the NHTS.

[46] For 2002 model year vehicles, the NHTS calculates odometer-based VMT (BESTMILE) for the entire 12-month time period. EIA, however, adjusts all in scope, odometer-based VMT estimates to represent the time period in which the vehicle was "owned" by the household; this is an adjustment that serves to equate both travel and energy use with the vehicle's availability.

EPA test value data from NHTSA are restricted to vehicles that are used to derive Corporate Average Fuel Economy under Title V of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1901, et seq.) with subsequent amendments and Subtitle VI (49 U.S.C. 329). Corporate Average Fuel Economy (CAFE) is the sales-weighted average fuel economy, expressed in miles per gallon, of a manufacturer's fleet of passenger cars or light trucks with a gross vehicle weight rating (GVWR) of 8,500 lbs. or less, manufactured for sale in the United States, for any given model year.[47] Fuel economy is defined as the average mileage traveled by a vehicle per gallon of gasoline (or equivalent amount of other fuel) consumed as measured in accordance with the testing and evaluation protocol set forth by Environmental Protection Agency (EPA).

Manufacturers also perform their own fuel economy tests of new vehicle models and submit the results to EPA. EPA is responsible for conducting its own tests or verifying the manufacturers' dynamometer tests. EPA also is responsible for compiling the production data from manufacturers' reports and furnishing CAFE results to NHTSA.

Fuel economy test data from the manufacturers and EPA serves as the starting point for both CAFE values and real-world fuel economy projections. For CAFE, the test data are adjusted upward to account for any credits for dual-fuel alternative fuel vehicles (AFV) and dedicated AFV, and for passenger cars only, is also adjusted upward for credits available to manufacturers to account for test procedure changes since the CAFE program was established. For NHTS and this report, such credits and their associated upward adjustments were removed, if indicated by NHTSA.

Table B1. Sample Counts of Residential Passenger Vehicles by Type and Model Year, 2001

Vehicle Type	NHTS Vehicle Type Code	Model Year				Total
		Pre-1978	1978 - 2001	2002	Not Ascertained	
Automobile	01	842	22,468	381	571	24,262
Van	02	41	3,885	72	108	4,106
Sport Utility Vehicle	03	73	4,958	221	120	5,372
Pickup Truck	04	510	7,692	140	259	8,601
Recreation Vehicle	06	49	330	2	14	395
Total		1,515	39,333	816	1,072	42,736

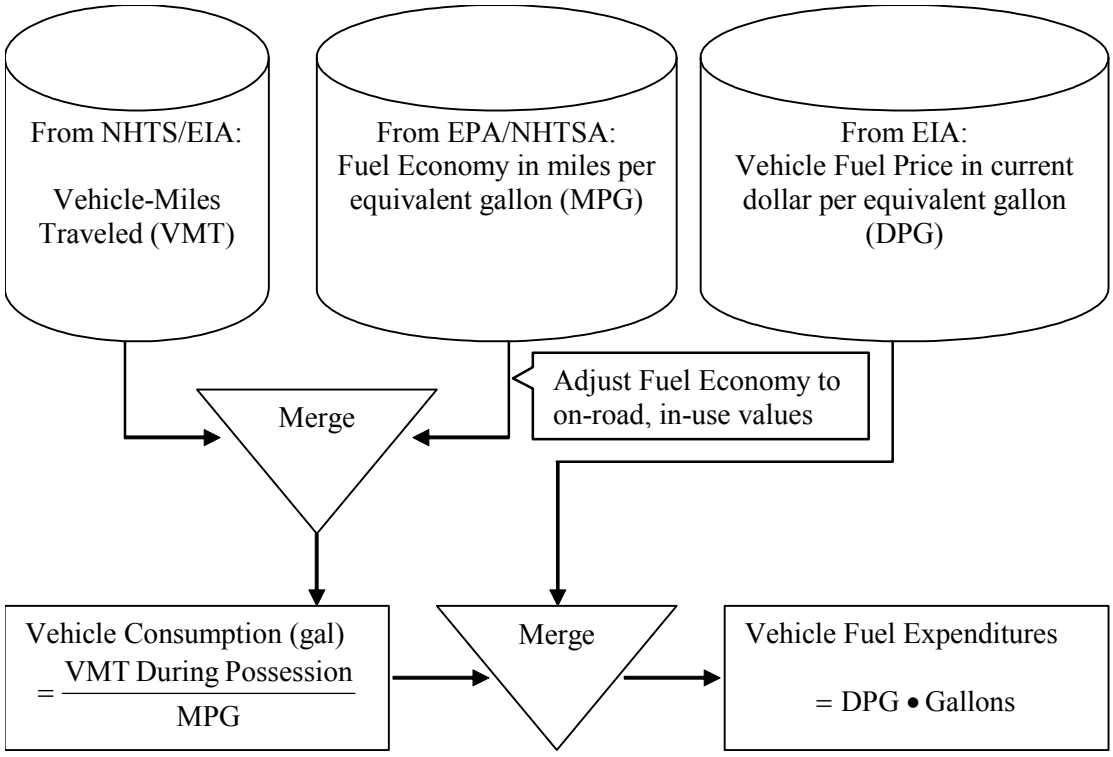
Source: U.S. Department of Transportation, Federal Highway Administration, *2001 National Household Travel Survey*, January 2004 release. (Washington, DC). Note: Not all NHTS sampled vehicles are displayed -- only *light-duty residential passenger vehicles* are tabulated here, fitting this report's definition of a *vehicle* (see "Glossary" for details).

Since the NHTS is a national survey, it collected data from a nationally representative sample of households to derive statistically reliable travel estimates at the national, region (4) and division (9) levels. Sample data in the NHTS are generally not adequate to provide state or smaller area-specific estimates. However, the 2001 NHTS sample included several jurisdictions

[47] These vehicles are conceptually consistent with 2001 NHTS sample vehicles having a vehicle type of "01" (Automobile), "02" (Van), "03" (Sport Utility Vehicle), "04" (Pickup Truck). EPA does not provide test data for vehicles such as the Ford Excursion, Hummer H1 and Hummer H2 because they have a GVWR greater than 8,500 lbs.

where additional sample households were purchased and interviewed. The jurisdictions that purchased these additional samples are referred to as the "add-on" areas. There are nine add-on areas: Baltimore Metropolitan Planning Organization (MPO), Maryland; Des Moines MPO, Iowa; Edmonson, Carter, Pulaski, and Scott Counties, Kentucky; Lancaster MPO, Pennsylvania; Oahu MPO, Hawaii; State of Hawaii, except Oahu; State of New York; State of Texas; and State of Wisconsin.[48] These additional sample cases were not included in developing the energy consumption and expenditures data, nor were any data developed for or applied to these vehicles.

Figure B1. Estimation Schematic



Note: NHTS – National Household Travel Survey, EPA – Environmental Protection Agency, EIA – Energy Information Administration, and NHTSA – National Highway Transportation Safety Administration.

VEHICLE MILES TRAVELED

When possible, VMT of sample vehicles were determined by taking the difference between two odometer readings, which spanned a period of time, and expanding this difference to cover the year, or 365 days. The exact methods for deriving annual VMT are discussed in Appendix J in the NHTS User's Guide, as written by the Oak Ridge National Laboratory (ORNL), Engineering Science Technology Division, Center for Transportation Analysis.

For 1,262 vehicles, the work conducted by ORNL did not result in a viable annual VMT estimate. The lack of such a VMT value is indicated in the NHTS public-use file with an insertion of negative value codes for these vehicles' value of "BESTMILE," which is the public-

[48] See http://www.bts.gov/external_links/government/metropolitan_planning_organizations.html for a complete list.

use variable denoting ORNL's annual VMT estimate. According to the NHTS public-use data, roughly 3 percent of the 42,736 vehicles deemed in-scope lack annual VMT estimates, all of which are coded as "8" or "9" in the January 2004 NHTS public-use data by the "*BEST_FLG"* public-use variable. To derive annual VMT estimates for these 1,262 vehicles, two methods were employed by EIA: (1) a standard annualization procedure to inflate spanned odometer readings (used for 626 vehicles) and simple multiple regression models (used for 636 vehicles).

For 626 vehicles, the NHTS public-use data file contains both valid odometer readings and dates (month, day and year) and, more importantly, these vehicles' reading dates spanned a period greater than 60 days. Thus, VMT for nearly half of the 1,262 vehicles were derived from EIA's standard annualization procedure. This procedure has been employed by previous EIA studies: RTECS in the years 1985, 1988, 1991, and 1994. Specifically, the annual VMT for vehicle *i* was computed by dividing the reported span of odometer readings with the monthly VMT fractions, F_j, of the time period covered by the i^{th} vehicle's travel, as determined from the standard distribution given in Table B2 of this appendix. Because odometer readings were recorded with the exact day of the month, some monthly VMT fractions were prorated to correspond to the exact span of odometer readings.[49] Generally, this resulted in prorated VMT fractions values of both starting and ending monthly fractions. Moreover, for vehicles reporting a span of odometer readings greater than 365 days, annual VMT were reduced by these same monthly driving fractions, which were prorated, as needed. It is important to point out that exact odometer reading dates were not released in the NHTS public-use files; rather, EIA accessed confidential NHTS data for assigning odometer reading dates.

For 636 vehicles, no odometer information was available. For most of these vehicles, annual VMT were imputed using multiple linear regressions in which the independent variable was the respondent's self-reported estimate of annual VMT obtained during the NHTS interview. If, on the other hand, the NHTS did not collect the vehicle's self-reported annual VMT, then EIA used a selection of predictors drawn from the household and vehicle's characteristics, which include the number of drivers, ratio of the number of vehicles per driver, household income, age of vehicle, type of vehicle, and household composition.

IN-POSSESSION VEHICLE-MILES TRAVELED

EIA also extended the logic of computing a vehicle's VMT by estimating the period of time that the vehicle was in the household's possession. This was done in multiple steps using public-use data provided by FHWA. Once annual VMT were obtained either through the work completed by ORNL or the two approaches (i.e., standard annualization or multiple regressions) undertaken by EIA, each vehicle's annual VMT value was adjusted to correspond to the time period that the vehicle was in the possession of the sample household during the survey year, which started on May 1, 2001 and ended on April 30,2002. Using a vehicle's acquisition and disposition dates, as derived from NHTS interview contact and odometer reading dates or other relevant contact information on survey follow-up procedures[50], an in-possession VMT value was

[49] Based on an EIA review of the NHTS public-use file that was released in January 2004, only month and year dates are available for odometer readings. However, EIA was provided access to actual odometer reading dates, including month, day and year of these readings.

[50] Follow-up contacts with NHTS respondents were undertaken within a set procedure, according to correspondences with NHTS contractor, Mark Freedman of Westat.

calculated based on standard monthly driving fractions, F_j.[51] By simply multiplying the annual VMT by the sum of the monthly driving fraction, prorated as needed, a *VMT during possession* was computed. Only 38,639 vehicles, or 90 percent of the eligible 42,736 vehicles, were retained for the entire survey period (365 days). As discussed later in this appendix, these *VMT-during-possession* values form the basis of both energy consumption and expenditures for residential passenger vehicle use.

VEHICLE FUEL ECONOMY

Fuel economy (MPG) must be estimated for each NHTS sample vehicle in order to estimate each vehicle's fuel consumption for the survey year. Then, fuel consumption is estimated by dividing the VMT for time of possession[52] by the MPG.[53] The NHTS neither obtained actual fuel consumption data nor on-road MPG from fuel purchase diaries maintained by the respondents. Because NHTS did not require these data or diaries, MPG values were estimated using EPA laboratory test MPG that were adjusted to account for differences between actual on-road MPG and the EPA test MPG. This difference is known as MPG "shortfall." Lax, 1987[54]; Mintz, 1993[55]; and Reichert, 2000[56], investigated the feasibility of using shortfall-adjusted MPG in a household survey. The Lax study verified that the method yielded unbiased MPG, when using a database from a 1984 fuel purchase diary study performed by NPD Research, Inc. The adequacy of current shortfall adjustment methods is sufficient for late 1980 through early 1993's motor vehicle model years also (RTECS Technical Note 5).[57] For the 2001 NHTS, the adequacy of shortfall adjustments has been presumed for 1994 through 2002's motor vehicle model years.

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[51] To ensure that the distribution of average monthly vehicle miles traveled given in Table B2 reflected 2001 driving patterns, EIA compared those fractions with the 2001 FHWA's highway-based values. No significant differences were found; however, the events occurring in September 2001 and soon thereafter may have unknown contributions to travel behavior patterns not shown here.

[52] While the NHTS public-use data, which was released on January 2004, assumes a fixed 12-month period (starting on May 1, 2001 and ending April 30, 2002) EIA has modified these same data in an attempt to compute the fraction of the year in which the household had "actual" possession of the vehicle. Because NHTS did not conduct an end-of-year audit of a household's vehicle stock, not all changes in vehicle stock are known.

[53] The 2001 NHTS was conducted over the 14-month period from March 2001 to May 2002. Unfortunately, that timing turned out to be problematic due to the September 11, 2001 terrorist attacks on the World Trade Center in New York and the Pentagon in Washington, DC. These attacks disrupted transport services for months, especially curtailing long-distance travel. It is not certain what impacts the attacks had on urban travel, but it seems likely that both the amount of travel and modal choice were affected. That may have distorted the survey results to some unknown extent. Information courtesy of John Pucher and John L. Renne, *Transportation Quarterly*, Vol. 57, No. 3, 2003.

[54] Lax, D. 1987. "Feasibility of Estimating In-Use Vehicle Fuel Efficiency from Household Survey Data." Research performed under contract for ORNL/DOE/EIA. Energy and Environmental Analysis Inc., Arlington, VA.

[55] Mintz, M., A. Vyas, and L. Conley, 1993. "Differences Between EPA-Test and In-Use Fuel Economy: Are the Correction Factors Correct?" Transportation Research Record 1416, pp. 124-130, Transportation Research Board, National Research Council, Washington, DC.

[56] Reichert, J. 2000. "Change in Method for Estimating Fuel Economy for the Residential Transportation Energy Consumption Survey," Energy Information Administration on www.eia.doe.gov/emeu/rtecs/contents.html.

[57] Harrison, I.M. "VMT 1991 Patterns," Residential Transportation Energy Consumption Survey Technical Note 5, unpublished document. (Washington, DC).

The NHTS sample vehicles were assigned EPA test MPG from the NHTSA Corporate Average Fuel Economy files. Each record of the NHTSA files contained an EPA Composite MPG (i.e., an unadjusted 45 percent highway and 55 percent city weighted estimate) for each unique combination of vehicle attributes within a given manufacture, model/carline, type and model year. These attributes included (1) number of cylinders, (2) cubic inches of engine displacement (CID), (3) type of transmission (manual or automatic), and (4) fuel metering (gasoline, diesel, electric, natural gas, duel-, or flexible-fuel vehicle).[58] Each record of the NHTSA files also contained the number of vehicles sold, in thousands of vehicles, for each unique combination of attributes. The vehicle attributes available to assign a Composite MPG for sample vehicles were the ones collected for each NHTS vehicle. Specifically, NHTS queried respondents on their vehicle's make, model, vehicle type, and model year attributes. Hence, merging, assigning and statistical linking to NHTSA's Corporate Average Fuel Economy files were restricted to those four attributes. If, in the future, NHTS were to collect Vehicle Identification Numbers (VIN), then these linking procedures might be performed on a more robust set of vehicle attributes.[59]

NHTSA files served multiple purposes. In addition to assigning a Composite MPG, the NHTSA files were used to impute "missing" vehicle attributes: fuel metering and engine type for purposes of assigning an appropriate fuel price. Based on the limited set of vehicle attributes obtained from the NHTS questionnaire, several records from the NHTSA files were usually found to be potential "matches" to a given sample vehicle. A matching record was chosen from among the several applicable ones, with probability proportional to sales, using the sales figures on the NHTSA files. Once chosen, a record provided (1) EPA Composite MPG, (2) fuel metering, and (3) engine type. Although more attributes were available for selection, EIA limited its matched attributes to those required to assign an appropriate fuel price to a sample vehicle. Of the 42,736 eligible vehicles, EIA selected a matching record for 39,879 vehicle, or 93 percent. This matching routine commonly resulted in 1-to-many record linkages (see Figure C1 for more details).

For the remaining 7 percent of in-scope sample vehicles, EIA employed expert knowledge and hot decking of median Composite MPG values for assigning on-road, in-use MPG values to 510 vehicles and Composite MPG to 2,347, respectively. Hot-decking techniques were sequentially executed, based on the vehicle's characteristics, such as make, model, model year, and vehicle type.

The EPA Composite MPG are just the starting point for fuel economy computations. For the 2001 NHTS, EIA employs a sequential adjustment procedure in which the EPA Composite MPG are adjusted first to an on-road MPG, and then to an in-use MPG.

[58] NHTSA file records do not include whether the vehicle's emissions control package met Federal or California standards.

[59] VINs may be decoded to yield the vehicle attributes, by use of the Highway Loss Data Institute's "Vindicator" software.

THE EPA COMPOSITE MPG

Beginning in the early 1970's, EPA measured fuel economy from tests that were conducted on a dynamometer to simulate actual driving conditions. By 1975, EPA had incorporated separate "city" and "highway" driving cycles into the test. The city and highway MPG were combined to form a "composite" MPG that was then weighted according to sales of the production vehicles in order to assess compliance with Corporate Average Fuel Economy (CAFE) standards. The EPA Composite MPG is based on the assumption of a "typical" vehicle-use pattern of 55 percent city driving and 45 percent highway driving, and has become a convenient single fuel economy measure for analytical and regulatory purposes.

The EPA Composite MPG[60] is defined as:

$$MPG_{(EPA\ 55/45)} = \frac{1}{0.55 \bullet \frac{1}{MPG_{(EPA\ city)}} + 0.45 \bullet \frac{1}{MPG_{(EPA\ hwy)}}} \qquad (1)$$

where:

$MPG_{(EPA\ 55/45)}$ denotes the composite MPG; $MPG_{(EPA\ city)}$ denotes the fuel economy when vehicle use pattern is city driving only; and, $MPG_{(EPA\ hwy)}$ denotes the fuel economy when vehicle use pattern is highway driving only.

Because separate city and highway fuel economy estimates were not available on the NHTSA files, a single "shortfall" adjustment factor was derived, approximating the adjustments given in the following sections.

FUEL ECONOMY SHORTFALL

Fuel economy shortfall occurs when the fuel economy that is actually obtained while using the vehicle is lower than the EPA test results. Reasons for this shortfall are (1) a result of the differences between EPA test vehicles and the vehicles actually in use and (2) the differences between EPA procedures for simulated driving conditions and actual driving conditions. For example, EPA test vehicles are prototypes that do not contain the wide variety of power-consuming accessories often found on vehicles sold to consumers. The test procedures also do not simulate the actual driving conditions that affect fuel economy such as speed and acceleration of individual drivers, road conditions, weather, and traffic. In the 2001 NHTS, adjustments for this fuel economy shortfall were made to the composite MPG ($MPG_{(EPA\ 55/45)}$) that were assigned to the sample vehicles.

Fuel economy shortfall was expressed in terms of the "Gallons per Mile Ratio" or GPMR:

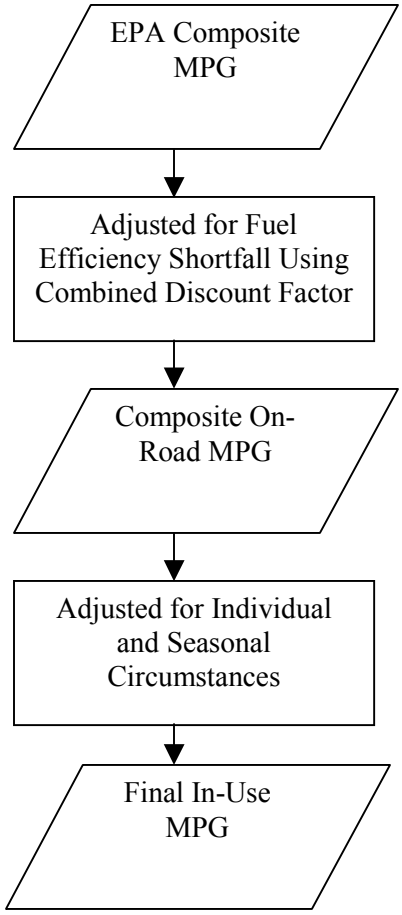
$$GPMR_i = \frac{MPG_{i\,(EPA55/45)}}{MPG_i} \qquad (2)$$

[60] Specifically, the following formulas, as stated in Part 600, Subpart F, §600.207-86, §600.208-77, §600.209-85, §600.510-86 of the 7-1-1994 edition of the 40 CFR, are identified for these calculations.

where:

$GPMR_i$ denotes Gallons per Mile Ratio for the i^{th} vehicle; MPG_i denotes the on-road MPG or in-use MPG for the i^{th} vehicle, depending on the analysis; and, $MPG_{i\ (EPA\ 55/45)}$ denotes the EPA Composite MPG applicable to the i^{th} vehicle.

Figure B2. Miles per Gasoline Equivalent Gallon Adjustment Procedures



If $GPMR_i = 1$ then there is no perceived shortfall. If $GPMR_i > 1$ then there is a shortfall for vehicle *i*. That is, the on-road or in-use fuel economy is less than the fuel economy indicated by the EPA Composite MPG. Note that $GPMR_i$ can represent shortfall with respect to either the on-road or in-use MPG_i, depending on the analysis being performed. $GPMR_i$ is commonly chosen as a measure of shortfall as opposed to MPG_i for the following reasons:

- A shortfall adjustment is most often thought of as a correction factor, or multiplicative constant, rather than as an additive correction. $GPMR_i$ satisfies this convention.

- Shortfall is usually dependent on a vehicle's fuel economy level. That is, shortfall is usually higher at high levels of $MPG_{(EPA\ 55/45)}$ than at low levels of $MPG_{(EPA\ 55/45)}$.

Therefore, it is more informative to express the amount of shortfall relative to $MPG_{(EPA\ 55/45)}$ rather than as an absolute quantity.

- $GPMR_i$ is a linear function of $MPG_{(EPA\ 55/45)}$ and can be modeled using ordinary least squares linear regression.

- $GPMR_i$ is a transformation that stabilizes error variances for the purposes of least squares linear regression.

THE ON-ROAD MPG

On-road MPG is a composite MPG that was adjusted to account for the shortfall between the EPA fuel economy and the actual fuel economy obtained on the road.

The EPA developed two general procedures for adjusting $MPG_{(EPA\ 55/45)}$ to an on-road value. One procedure bases the size of the adjustment on specific technology features of the vehicle. The other procedure uses just two MPG discount factors, one to adjust the EPA highway estimate, the other to adjust the city estimate. These two factors are used for all vehicles, regardless of technology class. For our purposes, we approximated the earlier procedure with a single adjustment factor.

Either of these procedures could have been approximated to adjust $MPG_{(EPA\ 55/45)}$ to an on-road MPG value for use in the 2001 NHTS. Since both procedures were unbiased for trucks, the choice as to which to employ in the 2001 NHTS should be based on their performance with cars. According to the 1994 RTECS, the adjustment based on discount factors seemed to be less biased than the Technology-Specific Adjustment. Further, the discount factors are also less expensive since they do not require collection or imputation of information on fuel delivery system and drive-train. Because of these reasons the Discount Factors Adjustment Method was selected for approximation.

SHORTFALL ADJUSTMENT BASED ON DISCOUNT FACTORS

EPA's discount factors have widespread appeal because of their simplicity (Hellman and Murrell, 1985[61]; Hellman and Murrell, 1984[62]). The factors are 10 percent for city MPG and 22 percent for highway MPG. That is, for any vehicle *i*,

$$\begin{aligned} MPG_{i(\text{on - road, EPA city})} &= 0.90 \bullet MPG_{i(\text{epa city})} \\ MPG_{i(\text{on - road, EPA hwy})} &= 0.78 \bullet MPG_{i(\text{EPA hwy})} \end{aligned} \qquad (3)$$

These discount factors are the ones used to produce the "sticker" MPG figures seen on vehicles on dealer lots, and are used to produce the DOE/EPA Gas Mileage Guide. The analysis

[61] Hellman, K.H., and Murrell, J.D. 1985. "On the Stability of the EPA MPG Adjustment Factors." Society of Automotive Engineers Technical Paper Series, SAE Paper No. 851216, Warrendale, PA.

[62] Hellman, K.H., and Murrell, J.D. 1984. "Development of Adjustment Factors for the EPA City and Highway MPG Values." Society of Automotive Engineers Technical Paper Series, SAE Paper No. 840496, Warrendale, PA.

behind the development of these factors was performed on a conglomerate database with data from Ford Motor Company, General Motors, Chrysler Corporation, DOE, and EPA. The database contained approximately 38,000 vehicle records with model years from 1979 through 1981 with some 1982 models included. The database contained predominately American-made vehicles, but also included foreign vehicles as well. The technology mix was dominated by rear-wheel drive and carbureted vehicles, but contained some vehicles with front-wheel drive or fuel injection. Vehicle records contained make, model, year, vehicle characteristics, the MPG as measured on the road, $MPG_{(EPA\ city)}$, and $MPG_{(EPA\ highway)}$. The database also included the driver's perceptions of the proportion of their travel that was mostly urban (so called "city fraction"), and their average miles driven per day (AMPD).

Fuel economy shortfall is affected by the vehicle use pattern: frequent starts and short trip lengths characterize city-driving pattern, while highway-driving pattern is characterized by infrequent starts and long trips. AMPD is a good surrogate variable for representing these different driving patterns.

The city-driving pattern was characterized by AMPD from 5 to 22 miles per day, while the highway-driving pattern was characterized by AMPD's from 15 to 105 miles per day (Hellman and Murrell, 1984). City fraction and AMPD were used to split the data into two sets, one for development of the city discount factor, the other for development of the highway factor. The "city" and "highway" data sets were each stratified by vehicle technology classes. Linear regression was performed within each stratum. GPMR was regressed on city fraction, AMPD, $MPG_{(EPA\ 55/45)}$, odometer reading, and average temperature. The fitted models were then weighted and combined across vehicle technology strata, to produce a single "city" shortfall model and a single "highway" shortfall model. The weights were used to increase the influence of those models that represented technology mixes expected to become more prominent in the future (e.g., front-wheel drive and fuel-injected vehicles). The discount factors were derived from the two weighted models set at average or typical values of the independent variables.

For each NHTS vehicle, if and only if separate city and highway MPG were available, discounted city and highway on-road MPG may be computed and then combined to form an on-road 55/45 composite as follows:

$$MPG_{(on\text{ - }road,\,55/45)} = \frac{1}{0.55 \bullet \frac{1}{MPG_{(on\text{ - }road,\,EPA\ city)}} + 0.45 \bullet \frac{1}{MPG_{(on\text{ - }road,\,EPA\ hwy)}}} \qquad (4)$$

Then, a shortfall ratio based on EPA discount factors would be computed for each NHTS vehicle as follows:

$$GPMR_{i(on\text{ - }road)} = \frac{MPG_{i(EPA\ 55/45)}}{MPG_{i(on\text{ - }road,55/45)}} \qquad (5)$$

Unfortunately, separate on-road city and highway test MPG were not available from the NHTSA Corporate Average Fuel Economy files. Although a literature review reveals that shortfalls vary for particular vehicles or groups of vehicles, we have used a combined shortfall

estimate of 15 percent, equating to a $GMPR_{i(on\text{-}road)}$ of 1/0.85, which may also be written to reveal that $MPG_{i(on\text{-}road,\ 55/45)} = 0.85 \bullet MPG_{i(EPA55/45)}$.[63]

THE IN-USE MPG

In-use MPG are MPG that are adjusted for individual driving circumstances. The on-road adjustments to $MPG_{(EPA\ 55/45)}$ discussed in the previous sections were "general" in that they did not take into account any effects on fuel economy that are due to the driver's individual circumstances. They, instead, utilized general attributes such as the technology features of the vehicle and average driving conditions. Fuel economy shortfall estimates can be refined for an individual vehicle by taking into account the following "in-use" effects.

- Urban versus rural driving pattern. That is, frequent starts and short trips as opposed to infrequent starts and longer trips. As mentioned in the previous section, a useful single variable for representing this effect is AMPD. High AMPD's usually represent mileage accumulated on the highway.
- Traffic congestion, which increases with population density.
- Seasonal temperature variations, especially for gasoline-carbureted vehicles.
- Humidity, which together with temperature affects air-conditioner use.
- Differences among geographic areas of the country.
- Altitude.
- Wind.
- Road gradient and road surface conditions.

Additionally, the seasonal change in gasoline composition and the mechanical condition of the sample vehicles affect on-road fuel economy. Both of these effects are unknown. More importantly, EIA has made no attempt to account for these unknown effects.

However, this appendix does address some of the individual vehicle influences. In general, the first four items are considered the most significant in-use influences (Crawford, 1983).[64] In the cited study, shortfall variations as high as 25 percent or more occurred over the range of typical AMPD. Shortfall was 16 percent higher in urban areas than in completely uncongested areas, and was 12 percent higher in suburban areas. Shortfall varied seasonally (i.e., monthly) by 7 percent in the South and by 13 percent in the North.

[63] Hellman, K.H. and Murrell J.D., June 1982. "Why Vehicles Don't Achieve EPA MPG On the Road and How That Shortfall Can Be Accounted For," Society of Automotive Engineers Technical Paper Series, SAE Paper 820791.

[64] Crawford, R. 1983. "Seasonal and Regional MPG as Influenced by Environmental Conditions and Travel Patterns." Research performed under contract for U.S. DOE. Energy and Environmental Analysis, Inc., Arlington, VA.

Regression models were developed (Crawford, 1983) for use in adjusting $GPMR_{i(on\text{-}road)}$ to an in-use shortfall employing measurements of several in-use effects as the independent variables.

The regressions yielded a shortfall adjustment that was an additive one, which may be written as follows:

$$GPMR_{ij(in\ -\ use)} = GPMR_{i(on\ -\ road)} + \delta_{ij} \tag{6}$$

where GPMRij(in-use) denotes the in-use shortfall ratio estimate for the i^{th} vehicle during the j^{th} month (j = 1, 2, … 12); GPMRi(on-road) denotes the combined shortfall ratio fixed for the i^{th} vehicle; and, δ_{ij} denotes the adjustment calculated for the i^{th} vehicle during month j, from the a regression model.

One regression model from the Crawford reference that is appropriate for use in NHTS is as follows:

$$\begin{aligned}\delta_{ij} = {} & 3.296 \bullet \left[\left(\frac{1}{AMPD_{ij}}\right) - \left(\frac{1}{35.6}\right)\right] + \\ & NORTH \bullet \left[0.050 \bullet \sin\left(\frac{j\pi}{6}\right) + 0.075 \bullet \cos\left(\frac{j\pi}{6}\right)\right] + \\ & SOUTH \bullet \left[0.030 \bullet \sin\left(\frac{j\pi}{6}\right) + 0.031 \bullet \cos\left(\frac{j\pi}{6}\right)\right]\end{aligned} \tag{7}$$

where $AMPD_{ij}$ = Average Miles per Day for vehicle *i* and month *j*, typically 35.6 (i.e., 13,000 miles per year); NORTH = 1 if the household is in the North, otherwise NORTH = 0 if the household is not in the North; and, SOUTH = 1 if the household is in the South, otherwise SOUTH = 0 if the household is not in the South.

This regression model was chosen because the independent variables that are important in explaining shortfall were readily available from the 2001 NHTS data, using BESTMILE and the distribution of average monthly vehicle miles travel fractions found in Table B2. The model had two components. One component involved $AMPD_{ij}$ and represented the influence of individual driving patterns for a given vehicle and month. The other component represented the change in shortfall that occurred throughout the seasons, due to the annual temperature cycle. The original regression equation also contained a minor term that accounted for the influence of air-conditioner use during hot, humid weather. This term was dropped in the estimations because it involved the rather complex computation of "Discomfort Index" from NOAA weather records, and the slight additional precision was judged insufficient to warrant the additional processing expense. Additional terms representing geographic regional effects, and the natural logarithm of population density (people per square mile, to represent the influence of traffic congestion) were not considered because of the computational cost.

Once a $GPMR_{ij(in\text{-}use)}$ was estimated it was used to estimate the final in-use fuel economy for vehicle *i* and month *j* as follows:

$$MPG_{ij(in\ -\ use)} = \frac{MPG_{i(EPA\ 55/45)}}{GPMR_{ij(in\ -\ use)}} \tag{8}$$

The regression equation had separate seasonal components for the "North" and "South" because the difference between the winter shortfall and the summer shortfall was greater in the North than in the South. This difference can be seen in the model parameters. To define the North and South geographic areas the continental United States were divided into 97 two-digit ZIP Code regions. These regions were grouped to form two aggregate regions ("North" and "South") according to average winter and summer temperatures, and seasonal shortfall trends.

ANNUAL VEHICLE FUEL CONSUMPTION

In the 2001 NHTS, annual consumption was calculated by dividing the annual VMT by the annual MPG. The derivation of the "annualized" VMT is given in Appendix J of the NHTS User's Guide.

The $MPG_{ij(in\text{-}use)}$ shown in the above section about fuel economy estimation procedures were final estimates of monthly in-use fuel economies for vehicle *i*, and could have been used for estimating monthly fuel consumptions and expenditures, if monthly VMT were known. Unfortunately, NHTS only collected data to annualize VMT. Nevertheless, the 2001 NHTS still made use of the $MPG_{ij(in\text{-}use)}$ by disaggregating the annualized VMT of sample vehicles into monthly VMT, using monthly VMT driving fractions from the standard distribution in Table B2.[65]

Table B2. Distribution of Average Monthly Vehicle-Miles Traveled Fractions

$Month_j$	Average VMT per Vehicle	F_j
January	688	0.0728
February	697	0.0738
March	771	0.0816
April	783	0.0829
May	832	0.0880
June	847	0.0896
July	868	0.0919
August	872	0.0923
September	800	0.0847
October	802	0.0849
November	756	0.0800
December	734	0.0777
Total	9,450	1.0000

[65] Following the quality controls used in past RTECS surveys, EIA investigated the possibility that monthly travel patterns had changed based on a comparison of estimates between those found in Table B2 and the highway usage estimates from the Federal Highway Administration's *Traffic Volume Trends* data. The differences were negligible; thus, EIA applied the distribution given in Table B2 in order to compute annualized VMT. Some would argue that a update of Table B2 is needed; unfortunately, a reasonable travel diary study has not been conducted to EIA's knowledge that would provide such an update.

Source: 1984 Petroleum Marketing Index (PMI) Survey, NPD Research Inc. The survey is a demographically and geographically balanced-quota sample of 4,100 households. Respondents maintained fuel purchase diaries for an average of 10 months. As part of the survey, information was collected on the characteristics of trips taken in vehicles during a designated day. Trip lengths were recorded as respondent perception rather than from odometer readings. The distribution of monthly mileage fractions has been obtained from this survey.

The annual consumption for vehicle *i* can be thought of as the sum of the individual monthly consumptions:

$$C_i = \sum_{j=1}^{12} c_{ij} \tag{9}$$

where C_i denotes annual consumption of vehicle fuel for the i^{th} vehicle, in gasoline equivalent gallons and c_{ij} denotes consumption of vehicle motor fuel for the i^{th} vehicle during the j^{th} month.

Because the VMT values – as computed by ORNL and discussed in the NHTS User's Guide – in the January 2004 public-use file provided by NHTS assume each vehicle was available for the *entire* 12-month period of the survey year, consumption and expenditure values for vehicle use are over-estimated. To eliminate, where possible, such over-estimation, EIA has provided another public-use file in which the annual consumption for vehicle *i* can be thought of as the sum of the monthly consumption values, where the period covered equals the possession time of vehicles. Thus, the starting and ending months refer to the possession time of vehicle *i* by the household.

In EIA's public-use file, consumption is calculated only over those months that vehicle *i* was derived to be owned or used by the household. In this sense, "annual" does not necessarily mean a full 12-month period. This is an important point since fuel economy varies seasonally.

Consumption for each month may be expressed in terms of monthly VMT and monthly in-use fuel economy:

$$c_{ij} = \frac{m_{ij}}{mpg_{ij}}, \forall\ j = 1, 2, \ldots, 12 \tag{10}$$

where m_{ij} denotes VMT for the i^{th} vehicle during the j^{th} month and mpg_{ij} denotes fuel economy in miles per gasoline equivalent gallon for the i^{th} vehicle during the j^{th} month. Now, Equation 10 can be rewritten as:

$$C_i = \sum_{j \in used} \frac{m_{ij}}{mpg_{ij}} \tag{11}$$

ORNL (41,474 vehicles) and EIA (1,262 vehicles) provided the annualized VMT estimate (i.e., owned or available for use for the entire year) for NHTS that was used to calculate monthly VMT values. Given that value, a monthly VMT was derived for each annualized vehicle VMT as:

$$m_{ij} = M_i \bullet f(i, j) \tag{12}$$

where M_i denotes for the i^{th} vehicle, calculated using odometer readings and procedures discussed in Appendix J and f_{ij} denotes the average fraction of "annual" VMT that was driven during the j^{th} month, estimate for the i^{th} vehicle. For all sample vehicles, $f_{(i,j)}$ is a function of the average fractions, F_j, found in Table B2.

There is no single distribution of average monthly VMT fractions, $f_{(i,j)}$. Rather, there was a family of distributions, depending on which particular months a vehicle was owned or used by a household. Because the monthly VMT fractions for a given vehicle *i* always sums to one – no matter the timeframe in which the vehicle was owned or used by the household – the following identity is always true:

$$\sum_{j \in used} f(i,j) = 1, \forall = 1,2,3,\ldots,n \tag{13}$$

The i^{th} vehicle's $f_{(i,j)}$ were derived from F_j values found in Table B2 as follows:

$$f(i,j) = \frac{F_j}{\sum_{j \in used} F_j} \tag{14}$$

If we assume that each and every vehicle is owned or used by its sampled household, then substituting $mpg_{ij} = MPG_{ij(in\text{-}use)}$ and m_{ij} from Equation 12 into Equation 11 yields the following estimate of annual consumption for the i^{th} vehicle:

$$C_i = \sum_{j=1}^{12} \frac{M_i \bullet F_{ij}}{MPG_{ij(in\ -\ use)}} \tag{15}$$

The public-use file disseminated by NHTS (January 2004) makes the above assumption on the timeframe for vehicle use. While the NHTS public-use file provide estimates based on the assumption that each and every sample vehicle was present in the sample household for 12 months, EIA's created an alternate estimator for consumption, $C_i^{(EIA)}$, in which acquired and disposed vehicles during the survey period are accounted for. This estimator is written as:

$$C_i^{(EIA)} = \sum_{j \in used} \frac{M_i \bullet f(i,j)}{MPG_{ij(in\ -\ use)}} \tag{16}$$

To simply calculations, a single "annualized" fuel economy, analogous to the "annualized" MPG_i from previous EIA surveys of the residential transportation sector, was estimated as:

$$MPG_{i(annualized)} = \frac{MPG_{i(EPA\ 55/45)}}{\sum_{j \in used} f(i,j) \bullet GPMR_{ij(in\ -\ use)}} \tag{17}$$

Thus, annual consumption equals:

$$C_i = \frac{M_i}{MPG_{i(annualized)}}. \quad (18)$$

ANNUAL VEHICLE FUEL EXPENDITURES AND PRICE

VEHICLE FUEL EXPENDITURES

In the 2001 NHTS, fuel expenditures were calculated by multiplying the vehicle-fuel consumption by the price of the vehicle fuel. The 2001 NHTS did not collect vehicle fuel prices via fuel purchase diaries. Instead, each NHTS sample vehicle was assigned a price based on imputed engine type and fuel metering values obtained from the NHTSA Corporate Average Fuel Economy files for model year's 1978-2001. For pre-1978 model year vehicles, otto engine and gasoline were imputed for engine type and fuel metering, respectively. Fuel prices, by month, were obtained from the following Energy Information Administration survey questionnaires:

- Form EIA-782A[66] "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report."
- Form EIA-782B[67] "Resellers'/Retailers' Monthly Petroleum Product Sales Report."
- Form EIA-888[68] "On-Highway Diesel Fuel Price Survey."
- Form EIA-895[69] "Monthly Quantity and Value of Natural Gas Report."
- Form EIA-826[70] "Monthly Electric Utility Sales and Revenue Report with State Distributions."

It is important to define the transportation fuels included in each of these prices. See the following sections for further details on transportation fuel prices.

[66] Price and volume data at a State level for 14 petroleum products for various retail and wholesale marketing categories are reported by the universe of refiners and gas plant operators.

[67] Price and volume data at the State level for gasoline, No. 2 distillate, propane, and residual fuel are reported by a sample of distillate fuel oil resellers and retailers, motor gasoline wholesalers, and residual fuel oil resellers and retailers.

[68] The Form EIA-888 survey collects data on the National and Petroleum Administration for Defense (PAD) District level cash price of self-serve, motor vehicle diesel fuel. The data are used to monitor changes in motor vehicle diesel fuel prices and to report to the Congress and others when requested. Respondents are a scientifically selected sample of companies owning retail outlets which sell motor vehicle diesel fuel.

[69] Monthly and annual production data are collected from the appropriate agencies of the natural gas producing States.

[70] Form EIA-826 collects information from regulated and unregulated companies that sell or deliver electric power to end users, including electric utilities, energy service providers, and distribution companies..

It is also important to point out that the NHTS did not collect information on the use of alternate fuels. Because of that omission, it was not possible to properly assign fuel consumption for dual-fuel (or flexible-fuel) vehicles. While these supplemental data do not explicitly account for alternative fuel use, the supplemental NHTS data should allow for a user to freely assign an alternative fuel use fraction. For example, one common assumption is to assign an operating scenario where 50 percent of the time the vehicle runs on alternative fuel (e.g., E85) and 50 percent of the time on conventional fuel (i.e., gasoline). Using the supplemental data and VMT estimate, in conjunction with EIA's fuel economy adjustment methodology, a user may make their own assignment of alternative fuel use. Because allowances have been made for self-estimating alternate fuel use and, more importantly, the NHTS collected no data to verify any method for assigning alternative fuel use, all consumption and expenditures supplemental data are based on a dedicated use of motor gasoline, diesel, natural gas, or electricity. That is, all flexible-fuel vehicles are assumed to operate on 100 percent gasoline. Thus, estimates for flexible-fuel vehicles are accurate to the extent that this assumption is valid.

Unfortunately, respondents were not asked the type of fuel purchased for their transportation demands. Further, respondents were not queried on the grade of their purchased fuels. Thus, fuel type was imputed to a sample vehicle based on its representative "match" with the selected vehicle from the NHTSA files. A matching record was chosen from among the several applicable ones, with probability proportional to sales, using the sales figures on the NHTSA files. Once chosen, a record provided (1) EPA Composite MPG, (2) fuel metering, and (3) engine type. The later two items provided enough information to impute a fuel type to a "matched" sample vehicle.

The EIA price series are published by month, by State, 5 PAD districts (PADD), and by type and grade of fuel. For the 2001 NHTS, annual fuel expenditures, E_i, was estimated by multiplying monthly gasoline prices by monthly consumption to produce monthly expenditures, summing over the monthly expenditures derived annual expenditures.

TYPE OF FUEL USED

Table B3 provides the percentage distribution of RTECS vehicles by fuel type categories. In 1994, the latest year for which RTECS estimates are available, 97.9 percent of the 156.8 million RTECS vehicles used gasoline. The remaining 2.1 percent of vehicles used diesel fuel or other fuel types.

Table B3. Distribution of Residential Transportation Energy Consumption Survey Vehicles by Type of Fuel Used, 1994

Type of Vehicle Fuel	Number of Vehicles	Percent of Vehicles
Total	156.8	100.0
Gasoline	153.4	97.9
Leaded	Q	Q
Unleaded	151.5	96.7
Regular	14.2	66.4
Premium	26.7	17.1
Intermediate	20.6	13.2

Table B3. Distribution of Residential Transportation Energy Consumption Survey Vehicles by Type of Fuel Used, 1994

Type of Vehicle Fuel	Number of Vehicles	Percent of Vehicles
Diesel	1.8	1.1
Gasohol	1.4	0.9

Notes: Because of rounding, data may not sum to totals. 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, *1994 Residential Transportation Energy Consumption Survey*.

Comparing the 1994 RTECS and augmented 2001 NHTS estimates is not advisable because of the differences in data collected by the RTECS and the imputed information for the NHTS. Unfortunately, no fuel metering or fuel type information was collected on the NHTS for such a comparison.

GASOLINE PRICES

Prices published by the EIA supplier surveys are pre-tax prices for conventional, oxygenated, and reformulated motor gasoline. Pre-tax prices were supplemented with Federal and State tax rates, by month, to derive retail motor gasoline prices; information on tax rates for gasoline are available from the Federal Highway Administration's web site. These pre-tax prices are published monthly, by State, in EIA's *Petroleum Marketing Monthly*, which includes price (excluding taxes) and volume data at a State level for 14 petroleum products for various retail and wholesale marketing categories are reported by the universe of refiners and gas plant operators.

Because the NHTS did not collect the type or grade of gasoline consumed in each sample vehicle, gasoline price was assigned a monthly fuel price that represents a State's volume-weighted average of gasoline. The below is an excerpt from the glossary of the *Petroleum Marketing Monthly*, as reported by EIA, which identifies the composition of the motor gasoline prices used in this appendix.

> ***Motor Gasoline (Finished)****: A complex mixture of relatively volatile hydrocarbons with or without small quantities of additives, blended to form a fuel suitable for use in spark-ignition engines. Motor gasoline, as defined in ASTM Specification D-4814 or Federal Specification VV-G-1690B, is characterized as having a boiling range of 122 to 158 degrees Fahrenheit at the 10 percent recovery point to 365 to 374 degrees Fahrenheit at the 90 percent recovery point. "Motor Gasoline" includes conventional gasoline; all types of oxygenated gasoline, including gasohol; and reformulated gasoline, but excludes aviation gasoline.*
>
> ***Conventional Gasoline****: Motor gasoline not included in the oxygenated or reformulated gasoline categories. Excludes reformulated gasoline blendstock for oxygenate blending (RBOB).*

***Oxygenated Gasoline**: Finished motor gasoline, other than reformulated gasoline, having an oxygen content of 2.7 percent or higher by weight and required by the U.S. Environmental Protection Agency (EPA) to be sold in areas designated by EPA as carbon monoxide (CO) nonattainment areas. Note: Oxygenated gasoline excludes oxygenated fuels program reformulated gasoline (OPRG) and reformulated gasoline blendstock for oxygenate blending (RBOB). Data on gasohol that has at least 2.7 percent oxygen, by weight, and is intended for sale inside CO nonattainment areas are included in data on oxygenated gasoline. Other data on gasohol are included in data on conventional gasoline.*

***Reformulated Gasoline**: Finished motor gasoline formulated for use in motor vehicles, the composition and properties of which meet the requirements of the reformulated gasoline regulations promulgated by the U.S. Environmental Protection Agency under Section 211(k) of the Clean Air Act. Note: This category includes oxygenated fuels program reformulated gasoline (OPRG) but excludes reformulated gasoline blendstock for oxygenate blending (RBOB).*

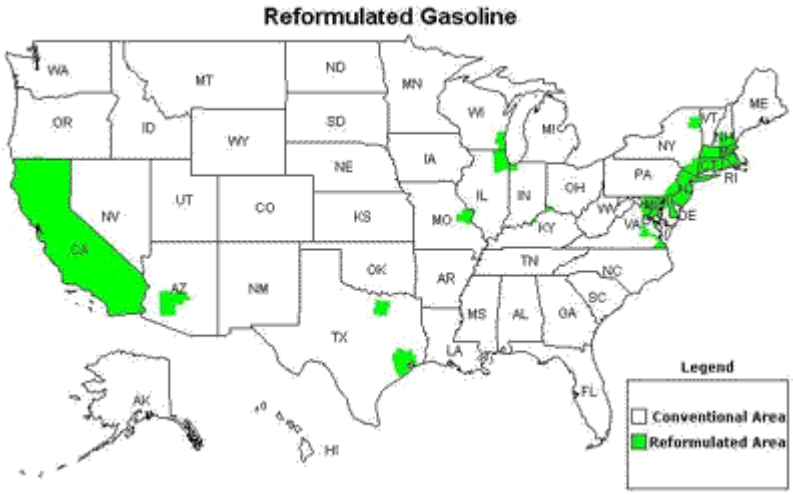
Further, EIA classifies gasoline by octane ratings, where each type of gasoline (conventional, oxygenated, and reformulated) is classified by three grades:

1) Regular Gasoline: Gasoline having an antiknock index (i.e., octane rating) greater than or equal to 85 and less than 88. Note: Octane requirements may vary by altitude.

2) Midgrade Gasoline: Gasoline having an antiknock index (i.e., octane rating) greater than or equal to 88 and less than or equal to 90. Note: Octane requirements may vary by altitude.

3) Premium Gasoline: Gasoline having an antiknock index (i.e., octane rating) greater than 90. Note: Octane requirements may vary by altitude.

Figure B3. Area Map for Reformulated Gasoline



Source: Energy Information Administration, website www.eia.doe.gov/oil_gas/petroleum/data_publications/wrgp/reformulated_map.html.

DIESEL FUEL PRICES

Prices published by the EIA supplier surveys are at the retail level for diesel fuel. The form EIA-888 survey collects data on the National and Petroleum Administration for Defense (PAD) District[71] level cash price of self-serve, motor vehicle diesel fuel. The data are used to monitor changes in motor vehicle diesel fuel prices and to report to the Congress and others when requested. Respondents are a scientifically selected sample of companies owning retail outlets that sell motor vehicle diesel fuel. Prices are published on http://tonto.eia.doe.gov/oog/info/wohdp/diesel.asp by EIA.

EIA conducts weekly Computer Assisted Telephone Interview surveys that collect prices at the outlet level. The EIA-888 collects prices of diesel fuel from truck stops and service stations across the country each Monday morning. Average prices of diesel fuel through outlets at the five Petroleum Administration for Defense District (PADD) levels, regions of the country, sub-PADD levels, and the state of California are released by the end of the day through Listserv, the Web, Fax, and telephone hotline.

Because the NHTS did not collect the type or grade of diesel consumed in each sample vehicle, diesel price was assigned to a diesel-powered vehicle based on a monthly fuel price

[71] PAD District 1 (East Coast) is composed of the following three subdistricts: Subdistrict 1A (New England): Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont. Subdistrict 1B (Central Atlantic): Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania. Subdistrict 1C (Lower Atlantic): Florida, Georgia, North Carolina, South Carolina, Virginia, West Virginia. PAD District 2 (Midwest): Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, Ohio, Oklahoma, Tennessee, Wisconsin. PAD District 3 (Gulf Coast): Alabama, Arkansas, Louisiana, Mississippi, New Mexico, Texas. PAD District 4 (Rocky Mountain): Colorado Idaho, Montana, Utah, Wyoming. PAD District 5 (West Coast): Alaska, Arizona, California, Hawaii, Nevada, Oregon, and Washington.

represented by a PAD that includes the State in which the sample vehicle resides, according to NHTS, with the notable exception of the state of California where assignment was completed within state geographic boundaries.

Figure B4. Map of Petroleum Administration for Defense Districts

OTHER FUEL TYPE PRICES

According to the 1994 RTECS, approximately 1.4 million vehicles were reported using gasohol. Unfortunately, in the 2001 NHTS, there is no comparable statistic because alternative-fuel vehicles were imputed as dedicated gasoline vehicles. That imputation rule was applied because (1) NHTS did not collect fuel type information on its survey questionnaire and (2) the majority of owners of vehicles capable of being powered by methanol, ethanol, and other alternative fuels are consuming motor gasoline since alternative fueling stations do not serve large areas of the nation.[72]

While the NHTS cannot delineate gasohol use, this appendix does address dedicated compressed natural gas (CNG) and electric vehicles.[73] For CNG, retail prices were obtained from form EIA-895, "Monthly Quantity and Value of Natural Gas Report". The EIA-895 collects monthly information from the applicable State agencies that collect data concerning natural gas production. Data are published in several of EIA's monthly and annual reports. For electricity, retail prices were obtained from form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." Form EIA-826 collects information from regulated and unregulated companies that sell or deliver electric power to end users. While three customer groups were available, residential customers were selected to represent electric prices because

[72] U.S. Department of Energy, Energy Efficiency and Renewable Energy, Alternative Fuels Data Center reports that nearly 5 thousand fueling stations dispense alternative fuels (see listing details on http://www.eere.energy.gov/afdc/infrastructure/station_counts.html, accessed March 9, 2005).

[73] Propane vehicles are not included in the NHTSA files. Thus, no propane-fuel vehicles are found in the additions made by EIA to NHTS data.

this group most accurately reflected the retail electric price for NHTS households. State and regional summaries of these data are published by EIA and used by public and private analysts.

APPENDIX C: QUALITY OF THE DATA

APPENDIX C

QUALITY OF THE DATA

INTRODUCTION

This section discusses several issues relating to the quality of the National Household Travel Survey (NHTS) data and to the interpretation of conclusions based on these data. In particular, the focus of our discussion is on the quality of specific data items, such as the fuel economy and fuel type, that were imputed to the NHTS via a cold-decking imputation procedure. This imputation procedure used vehicle-level information from the NHTSA Corporate Average Fuel Economy files for model year's 1978 through 2001. It is nearly impossible to quantify directly the quality of this imputation procedure because NHTS does not collect the necessary fuel economy information for comparison. At best, we have indirect evidence on the quality of our imputations, which is addressed in the following sections. Indeed, such an imputation procedure could be vastly improved with the collection of Vehicle Identification Number (VIN), fuel type and retail fuel price for each sample vehicle. However, those collections may represent an unreasonable burden on NHTS respondents.

The quality of the data collection and the processing of the data affect the accuracy of estimates based on survey data. All the statistics published in this appendix, such as total vehicle-miles traveled (VMT), are estimates of population values. These estimates are based on observations from a randomly chosen subset of the entire population of occupied housing units. Consequently, the estimates always differ from the true population values. Because the NHTS is a sample survey, data from the survey are subject to various sources of nonsampling and sampling error.

Nonsampling error is a measure of variability due to the execution and processing of the survey. These errors can include: population undercoverage during sampling; questionnaire wording and format; response bias and variance; interviewer error; coding and/or keypunching error; and nonresponse bias. Nonsampling errors are treated in several sections of this appendix. The main section pertains to the imputation procedures used for "missing" fuel economy, fuel type, and fuel economy adjustments. In the previous sections, fuel economy adjustments were addressed. This section deals mainly with imputing fuel economy or $MPG_{i(EPA\ 55/45)}$ to each appropriate sample vehicle.

NONSAMPLING ERROR

Nonsampling errors are due to the conduct of the survey, 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.

In surveys with complex questionnaires and procedures, such as the NHTS, the final dataset reflects fundamental approaches taken in the data collection and editing processes. For the 2001 NHTS, two approaches may have had considerable impact on the resulting data.

The first is the reluctance to impute data. If the respondent did not answer an item, its value was generally not imputed, (i.e., determine what the logical response would be given the response to other items). Carefully performed imputation has its place in many statistical surveys, however Westat and U.S. DOT determined that imputation would be limited in the NHTS data. If data were imputed, an imputation/edit flag was set for the variable to indicate the values that were imputed. The treatment in the NHTS of these types of errors is discussed in 3-D.3. APPROACH TO POST INTERVIEW EDITING of the NHTS User's Guide.

Supplemental data, by definition, are 100 percent imputed. Thus, it is important that EIA thoroughly present the approach used to impute energy-related supplemental NHTS data (see Appendix B).

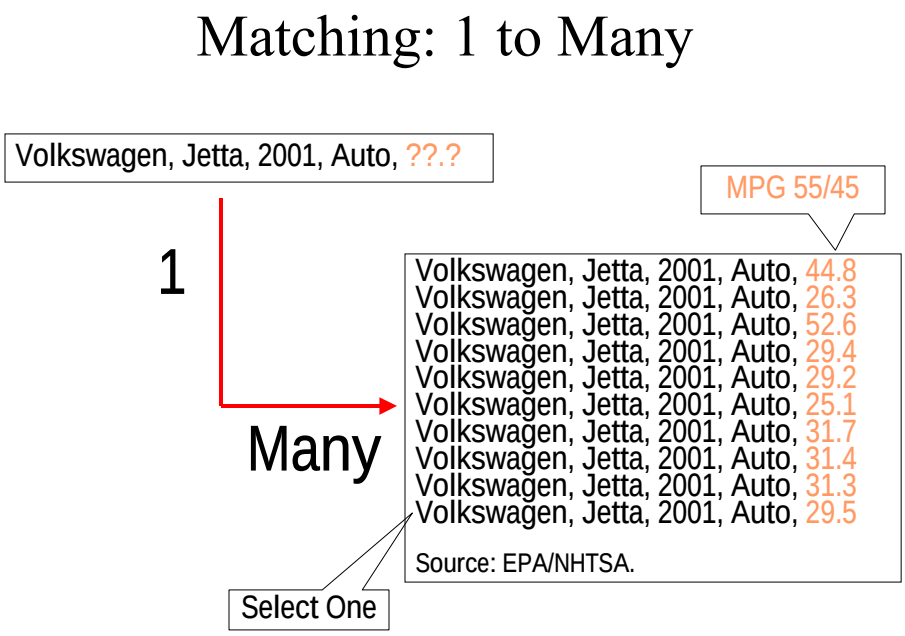
UNIT NONRESPONSE

Unit nonresponse is the type of nonresponse that occurs when no data are available for an entire sampled household. The respondent being unavailable or the respondent's refusal to cooperate causes most unit nonresponse cases. See the NHTS User's Guide, CHAPTER 4. SURVEY RESPONSE RATES, for further details on unit nonresponse.

IMPUTATION PROCEDURES FOR SUPPLEMENTAL DATA

Imputation procedures fill in the gaps of "missing" data. Item nonresponse occurs when the respondents do not know the answer or refuse to answer a question, or when an interviewer does not ask a question or does not record an answer. Or, as in the case of this appendix, item nonresponse occurs when a question was not asked, such that imputation procedures are required to address the need to append supplemental data to a pre-existing file from other external, but related, files. As already mentioned, NHTS took a conservative approach to item nonresponse. For supplemental data, in an effort to facilitate "full-sample" data analyses, imputations were made to provide the most probable responses when responses were "missing." For linking supplemental data, a pseudo cold-decking imputation was employed. Figure C1 depicts the cold-deck approach, using NHTS make, model, model year, and vehicle type information to "match" with eligible donors from the NHTSA CAFE files.

Figure C1. Schematic for Linking or Matching a NHTS Sample Vehicle to Eligible EPA/NHTSA Vehicles



Note: EPA – Environmental Protection Agency, NHTSA – National Highway Transportation Safety Administration.

COLD-DECK PROCEDURE

Because the fuel economy for a sampled vehicle could not be unequivocally determined by its NHTS-collected descriptors, a cold-deck imputation procedure was employed to "match" a NHTSA file record to a sample vehicle. A matching record was chosen from among the several applicable ones, with probability proportional to sales, using the sales figures on the NHTSA files. Once chosen, a record provided (1) EPA Composite MPG, (2) fuel metering, and (3) engine type. Although more attributes were available for selection, EIA limited its "donated" vehicle attributes to those required to assign an appropriate fuel price to a sample vehicle. This matching routine commonly resulted in a 1-to-many record linkage (see Figure C1 for an example).

Cold-deck procedures make use of a fixed set of values, which covers all of the perspective data items. These values can be constructed with the use of historical data, subject-matter expertise, or a combination of both. Such a procedure is an attempt to create a "perfect'" questionnaire in order to fill in the missing data gaps or, in this case, append supplemental data. If these procedures are completed properly and with limited bias, imputation has the ability to derive a complete and accurate record that (1) contains an audit trail for evaluation purposes; and (2) ensures that the imputed records are internally consistent.

Multiple paths were used to "match" recipient NHTS sample vehicles to eligible donor NHTSA file record vehicles. Because matching used a combination of four common linking variables – vehicle manufacturer, vehicle model, vehicle model year, and vehicle type – several

"matching" paths were followed. These paths are denoted (i.e., internally audited) with imputation flags, which are defined for each vehicle as follows:

- 10# denotes a NHTS sample vehicle that had a single model name "matching" to eligible NHTSA file records using four linking variables: vehicle manufacturer, vehicle model, vehicle model year, and vehicle type.

- 20# denotes a NHTS sample vehicle that had multiple model names "matching" to eligible NHTSA file records using four linking variables: vehicle manufacturer, vehicle model, vehicle model year, and vehicle type.

- 30# denotes a NHTS sample vehicle that had a single model name "matching" to eligible NHTSA file records using three linking variables: vehicle manufacturer, vehicle model, and vehicle model year.

- 40# denotes a NHTS sample vehicle that had multiple model names "matching" to eligible NHTSA file records using three linking variables: vehicle manufacturer, vehicle model, and vehicle model year.

- 50# denotes a NHTS sample vehicle that had a single model name "matching" to eligible NHTSA file records using three linking variables: vehicle manufacturer, vehicle type, and vehicle model year.

- 60# denotes a "match" based on EIA expert analysis using subject matter experience, in conjunction with past RTECS. Additionally, this imputation flag value represents recreational vehicles (VEHTYPE = "06"), where $MPG_{(EPA\ 55/45)}$ has been fixed at a yearly estimate based on the U.S. Department of Transportation, *National Transportation Statistics 2000*.[74]

- 001 denotes a NHTS sample vehicle that was internally hot-decked to match with its median Composite fuel economy value as defined by one or more vehicle characteristics, such as make, model, model year, and vehicle type. These flagged values become more meaningful with pre-1978 model year vehicles since NHTSA's CAFE exclude pre-1978 model years. EIA, therefore, recommends that users take extreme caution when making inferences concerning pre-1978 model year vehicles from this report.

- 999 denotes an imputation flag where no eligible NHTSA file records were found to "match" a NHTS sample vehicle.

In the above listing, # is a number between 0 and 5. This number, #, represents a year increment. Due to the errors in respondents reporting accurate model year or, to a lesser extent, due to deficiencies in the NHTSA files, it was necessary to incrementally increase or decrease (not simultaneously increase and decrease) the model year for "matching" to successively larger range of years. If, for example, an eligible match was not found for a NHTS sample vehicle

[74] Table 4-11. Passenger Car and Motorcycle Fuel Consumption and Travel, *National Transportation Statistics 2000* Bureau of Transportation Statistics, U.S. Department of Transportation. (Washington, DC).

having the following attributes: Volkswagen, Scirocco, 1990, Automobile. Toggling of model years, by a single year increase followed by a single year decrease of the reported model year, resulted in a match with a Volkswagen, Scirocco, 1988, Automobile. In this example, the Volkswagen, Scirocco, 1990, Automobile, while seemingly a respondent reporting error, would receive an imputation flag of "102" due to the "match" with the NHTSA file record corresponding to a Volkswagen, Scirocco, 1988, Automobile.

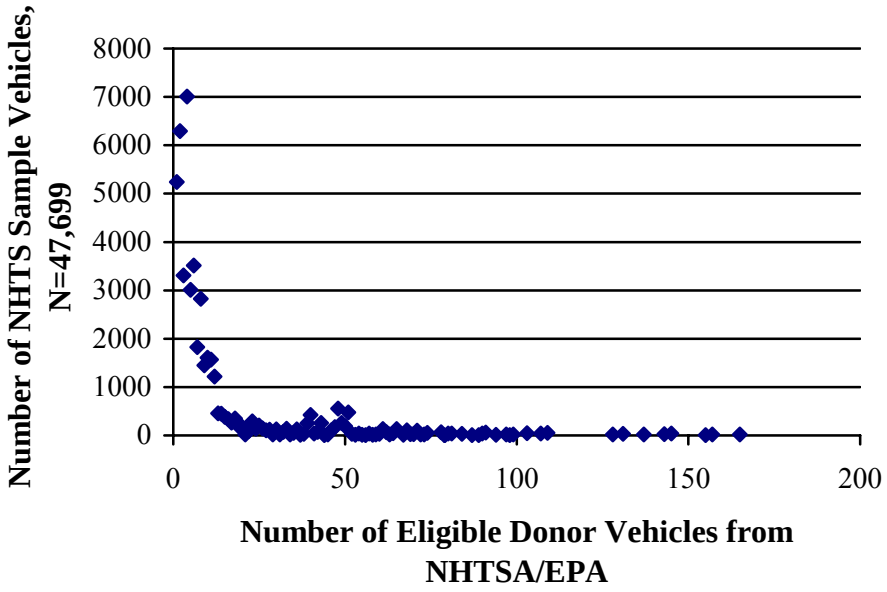
Table C1. Distribution of NHTS Sample Vehicles by Fuel Economy Imputation Flag, 2001

Imputation Flag for $MPG_{(EPA\ 55/45)}$	Number of Vehicles in NHTS Sample
001	2,347
100	3,122
101	103
102	39
103	28
104	23
105	44
200	31,407
201	1,428
202	397
203	272
204	172
205	63
300	33
301	4
302	1
303	4
400	582
401	35
402	54
403	28
404	10
405	5
500	1,907
501	38
502	33
503	20
504	8
505	19
600	510
Total	**42,736**

Source: U.S. Department of Transportation, Federal Highway Administration, *National Household Travel Survey 2001*, augmented release by the Energy Information Administration, (Washington, DC).

While the distribution of imputation flags is helpful, further evidence is needed to quantify the quality of this procedure. Figure C2 expands our coverage to include all national sample vehicles (of which "100-percent-reporting household" is just a subset) and charts the 1-to-many "matching" relationship for the 47,669 "matched" sample vehicles, or 53,278 less 3,696 (for 999 flag) less 1,856 (for 600 flag).[75]

Figure C2. Distribution of NHTS Sample Vehicles "Matched" with Vehicles "Donated" by NHTSA File Records



Source: U.S. Department of Transportation, Federal Highway Administration, *National Household Travel Survey 2001*, preliminary National and Add-on release, January 2004. (Washington, DC).

To make the "match" distribution display more revealing, values from the above figure are tabulated to present range categories of donor vehicles in Table C2.

Table C2. Distribution of All NHTS Sample Vehicles "Matched" by Range of Donor Vehicles

Range of Eligible Donor Vehicles	Number of Vehicles in NHTS Sample
1	5,238
2 to 5	19,617
6 to 10	11,225
11 to 20	5,399
21 to 30	1,273
31 to 40	1,148

[75] Estimates were drawn from the public-use file released by FHWA in January 2003. In the January 2004 public-use file, three vehicles were deleted, yielding 53,275 vehicles in the complete national vehicle sample, including 100-percent and 50-percent reporting households, as defined by NHTS.

Table C2. Distribution of All NHTS Sample Vehicles "Matched" by Range of Donor Vehicles

Range of Eligible Donor Vehicles	Number of Vehicles in NHTS Sample
41 to 50	1,672
51 or more	2,127
Total	47,699

Source: U.S. Department of Transportation, National Household Travel Survey 2001, preliminary National and Add-on release, Federal Highway Administration, January 2004. (Washington, DC).

QUALITY OF SPECIFIC SUPPLEMENTAL DATA ITEMS

COLD-DECK PROCEDURE: SENSITIVITY ANALYSIS

Although the accuracy and robustness of the cold-deck procedure and subsequent fuel economy adjustments are not quantifiable because we lack both fuel purchase and mileage diaries for calculating a vehicle's actual on-road, in-use fuel economy, we can assess the sensitivity of the cold-deck procedure in an effort to measure its robustness.

Because we use a single value imputation approach, multiple imputations is one approach available for investigating the uncertainty of our imputed values. Indeed, imputing a single value may result in estimating measures of precision (e.g., standard errors) that are too small because a single value ignores the uncertainty found in selecting from a listing of donated values. Rather than perform a series of multiple imputations, we have assumed that each sample vehicle's list of eligible donors represents a complete set of values for its "missing" fuel economy variable. Therefore, the uncertainty associated with the imputation procedure may be assessed by imputing a pre-determined subset of values; that is, ones that represent the extremes and average of eligible donors. P5 and P95 – the 5th and 95th percentiles of sales-weighted fuel economy, respectively – represent our extreme distribution values, while the average value corresponded to the sales-weighted average of the eligible donor vehicles. Using Figure 2 as an example, we calculate: P5 = 25.1, P95 = 44.8 and a sales-weighted average of 30.8 miles per gallon.

By separately totaling the consumption of transportation fuel for each of these 3 outcomes and, then, comparing them to our single-value total, it is not surprising that we find that

- applying sales-weighted fuel economy values yields a energy consumption total 2 percent less than the single-value total;
- applying 5th percentile values yields an energy consumption total 7 percent more than the single-value total; and,
- applying 95th percentile values yields an energy consumption total 9 percent less than the single-value total.

Clearly, applying extreme distribution values – P5 and P95 – to each and every eligible sample vehicle results in biased energy-related estimates. While these extreme values are not acceptable to a researcher, such biased estimates illustrate the upper and lower uncertainty bounds associated with cold-deck estimates. Given these bounds, along with survey sampling and non-sampling errors, the use and usefulness of an enhanced 2001 National Household Travel Survey should be evaluated against a researcher's project requirements.

VEHICLE FUEL PRICE AND EXPENDITURES

In the 2001 NHTS, fuel price data were not collected via fuel purchase diaries, compared to previous EIA studies (e.g., RTECS). Instead, fuel prices were determined from EIA price series. Unfortunately, there is no way to validate the price methodology used to assign a monthly price paid for transportation fuel because EIA lacks the necessary fuel purchase diaries from NHTS repondents.

The Bureau of Labor Statistics (BLS) *Retail Pump Average Gasoline Prices* and the Lundberg Survey, Inc. offer alternate price series. However, there was a general consistency with using a price series from one statistical agency.

GASOLINE EQUIVALENT GALLON

The following table provides the gasoline equivalent gallon conversion used in this appendix. All conversion values, to the extent possible, have been made to mirror the conversion values used in deriving equivalent-gallon fuel economy estimates found in the NHTSA CAFE files.

Table C3. Gasoline Equivalent Gallon Conversion Values

Transportation Fuel	Gasoline Equivalent Gallon
Diesel	1 diesel gallon = 1 gasoline equivalent gallon
Electricity	33,705 Watt-hours = 1 gasoline equivalent gallon
Compressed Natural Gas	121.5 cubic feet = 1 gasoline equivalent gallon

Sources: 40 CFR Parts 80, 85, 86, 88, and 600 and 10 CFR Part 474.

GREET MODEL

Of course, there are other conversion factors available, depending on the various fuel-specific factors. For the Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model, the U.S. Department of Energy, Argonne National Laboratory uses the following:

Table C4. Lower and Higher Heating Values for Select Transportation Fuels Based on the GREET Model

Transportation Fuel	LHV (net) Btu per gallon	HHV (gross) Btu per gallon	Density Grams per gallon	Carbon Content (% by wt)	Sulfur Content (ppm by wt)
Conv.Gasoline	115,500	125,000	2,791	85.5%	200
Ref. Gasoline	112,265	121,456	2,795	82.9%	30
Diesel	128,500	138,700	3,240	87.0%	250
Methanol	57,000	65,000	2,996	37.5%	0
Ethanol	76,000	84,500	2,996	52.2%	0
LPG	84,000	91,300	2,000	82.0%	0
Natural gas	928	1,031	21	74.0%	7

Table C4. Lower and Higher Heating Values for Select Transportation Fuels Based on the GREET Model

Transportation Fuel	LHV (net) Btu per gallon	HHV (gross) Btu per gallon	Density Grams per gallon	Carbon Content (% by wt)	Sulfur Content (ppm by wt)
Electricity	3,412	Btu/kWh			

Source: M. Wang, GREET 1.5 -- *Transportation Fuel-Cycle Model*, Volume 1: Methodologies, Development, Use, and Results, Center for Transportation Research, Argonne National Laboratory, ANL/ESD-39, Vol.1, Aug. 1999. M. Wang, GREET 1.5 -- Transportation Fuel-Cycle Model, Volume 2: Appendices of Data and Results, Center for Transportation Research, Argonne National Laboratory, ANL/ESD-39, Vol.2, Aug. 1999. Notes: 1) Gasoline results are for the mix of 70% conventional gasoline and 30% reformulated gasoline. 2) LPG results are for the mix of 40% LPG produced from crude and 60% from natural gas. 3) Electricity results are for the current average electricity generation mix.

TRANSPORTATION ENERGY DATA BOOK: EDITION 22 — 2002

Likewise, the Energy Information Administration, U.S. Department of Energy (according to the latest *Transportation Energy Data Book*) applies the following approximate heat content for various fuels:

Table C5. Lower and Higher Heating Values for Various Transportation Fuels

Transportation Fuel	HHV (gross) equivalent to LHV (net)
Automotive gasoline	125,000 Btu/gal (gross) = 115,400 Btu/ gal(net)
Diesel motor fuel	138,700 Btu/gal (gross) = 128,700 Btu/gal (net)
Biodiesel	126,206 Btu/gal (gross) = 117,093 Btu/gal (net)
Methanol	64,600 Btu/gal (gross) = 56,560 Btu/gal (net)
Ethanol	84,600 Btu/gal (gross) = 75,670 Btu/gal (net)
Gasohol	120,900 Btu/gal (gross) = 112,417 Btu/gal (net)
Aviation gasoline	120,200 Btu/gal (gross) = 112,000 Btu/gal (net)
Propane	91,300 Btu/gal (gross) = 83,500 Btu/gal (net)
Butane	103,000 Btu/gal (gross) = 93,000 Btu/gal (net)
Jet fuel (naphtha)	127,500 Btu/gal (gross) = 118,700 Btu/gal (net)
Jet fuel (kerosene)	135,000 Btu/gal (gross) = 128,100 Btu/gal (net)
Lubricants	144,400 Btu/gal (gross) = 130,900 Btu/gal (net)
Waxes	131,800 Btu/gal (gross) = 120,200 Btu/gal (net)
Natural Gas	
Wet	1,109 Btu/ft^3
Dry	1,027 Btu/ft^3
Compressed	20,551 Btu/pound
	960 Btu/ft^3
Liquid	90,800 Btu/gal (gross) = 87,600 Btu/gal (net)

Table C5. Lower and Higher Heating Values for Various Transportation Fuels

Transportation Fuel	HHV (gross) equivalent to LHV (net)
Fuel Oils	
Residual	149,700 Btu/gal (gross) = 138,400 Btu/gal (net)
Distillate	138,700 Btu/gal (gross) = 131,800 Btu/gal (net)

Source: U.S. Department of Energy, Oakridge National Laboratory, Center for Transportation Analysis, *Transportation Energy Data Book Edition 22*, Washington, DC, 2002, Table B.1, ORNL-6967.

According to ORNL's latest *Data Book*,

> *The heat content of a fuel is the quantity of energy released by burning a unit amount of that fuel. However, this value is not absolute and can vary according to several factors. For example, empirical formulae for determining the heating value of liquid fuels depend on the fuels' American Petroleum Institute (API) gravity. The API gravity varies depending on the percent by weight of the chemical constituents and impurities in the fuel, both of which are affected by the combination of raw materials used to produce the fuel and by the type of manufacturing process. Temperature and climatic conditions are also factors.*
>
> *Because of these variations, the heating values in above table may differ from values in other publications. The figures in the Edition 22 report are representative or average values, not absolute ones. The gross heating values used here agree with those used by the Energy Information Administration.*
>
> *Heating values fall into two categories, gross and net. If the products of fuel combustion are cooled back to the initial fuel-air or fuel-oxidizer mixture temperature and the water formed during combustion is condensed, the energy released by the process is the higher (gross) heating value. If the products of combustion are cooled to the initial fuel-air temperature, but the water is considered to remain as a vapor, the energy released by the process is lower (net) heating value. Usually the difference between the gross and net heating values for fuels used in transportation is around 5 to 8 percent; however, it is important to be consistent in their use.*

EIA strongly encourages a consistent use of heating values.

APPENDIX D: DESCRIPTION OF DATA

APPENDIX D

DESCRIPTION OF DATA

STRUCTURE OF THE DATA FILES

BASIC STRUCTURE

The EIA public-use data are organized into two different data files, which are available to users in two formats: Microsoft Excel and ASCII (comma-separated values) on http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/index.html#pubuse. Table D1 illustrates the structure of the two files, with a description of which data are included in each file, the record level, and the variables that are needed to uniquely identify a record (i.e., Identifier or ID variable).

For each data variable, the codebook contains:

- a variable name,
- a code(s) associated with the variable and code descriptions,
- a variable label.

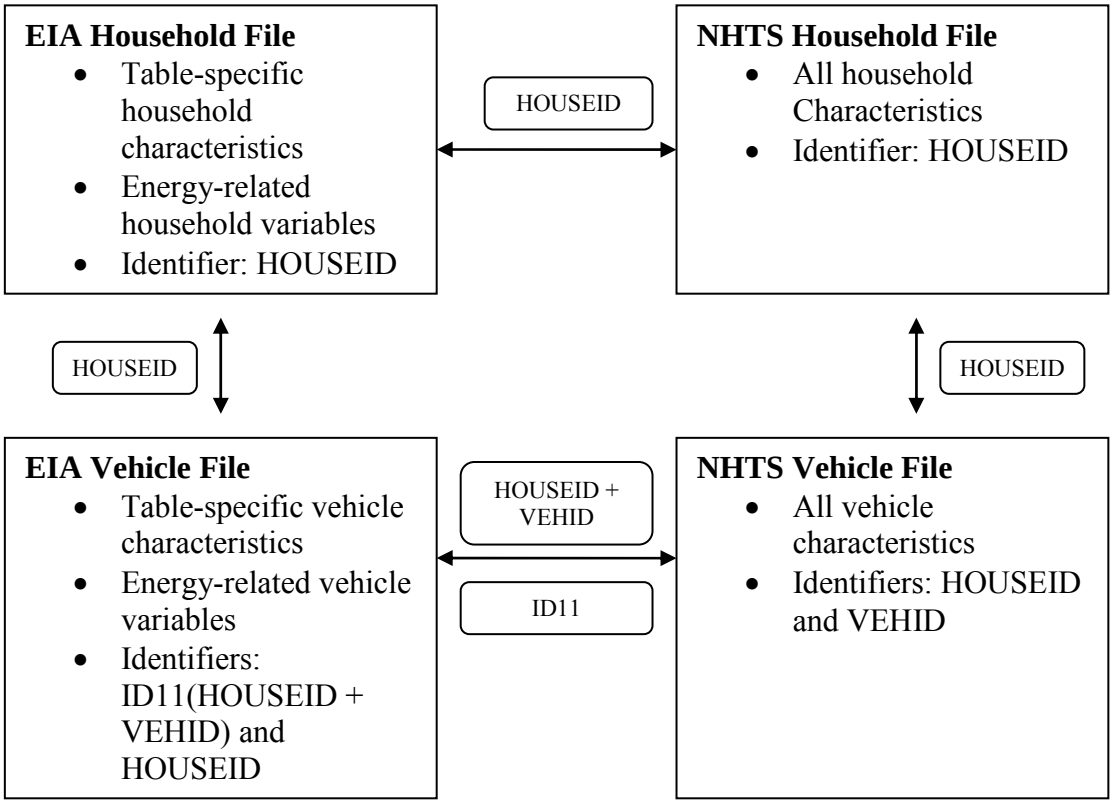
Table D1. Data Files

Data File	Information Included	Observation Level	ID Variable	National Sample Weight
EIA Household File	Energy-related data for households	One record per household	HOUSEID	EXPFLHHN
EIA Vehicle File	Energy-related data for vehicles	One record per vehicle	HOUSEID VEHID ID11 (HOUSEID + VEHID)	EXPFLHHN

RELATIONSHIP AMONG U.S. DOT AND EIA PUBLIC-USE DATA FILES

The figure below depicts the EIA and the January 2004 release of the 2001 NHTS data, as well as their inter-relationships.

Figure D1. Relationships among Data Files Released by EIA and NHTS



UNDERSTANDING THE DATA FILES

The purpose of this section is to present information about the EIA household and vehicle file to data users. Based on a recommendation from U.S. DOT, only "100-percent households" and their light-duty vehicles are contained in EIA's public-use files; hence, care should be taken when combining data from NHTS with EIA's augmented energy and energy-related data to avoid any misinterpretations.

The following files are available as public-use data:

- **EIA Household File** contains table-specific household characteristics and energy-related household variables for 21,178 households. **Important**: To calculate results comparable to those found in this report, data users must exclude in their tabulations those households that do not have light-duty vehicles. EIA has included a variable, HHVEHLC, for that purpose.

- **EIA Vehicle File** contains table-specific vehicle characteristics and energy-related vehicle variables for 42,736 light-duty vehicles that EIA used to calculate the number and type of light-duty passenger vehicles, annual mileage, type of fuel used, and price paid for fuel, all of which are required to measure the consumption and expenditure associated with the nation's residential travel.

- **NHTS Household File** contains all the households data collected during by the NHTS. To identify the households in the national sample of "100-percent household" having at least one light-duty passenger vehicle (passenger cars, vans, sport utility vehicles, pickup trucks and recreational vehicles), use the VEHTYPE and SMPLSRCE variables found on the **NHTS Vehicle File**.

- **NHTS Vehicle File** contains all vehicles and vehicle data collected from NHTS survey respondents.

CODEBOOK FOR EIA AUGMENTATIONS

This section contains information on the variables in each of the two EIA data files: household and vehicle data files. The codebook has been included first for household variables, followed by the codebook for the vehicle variables.

For each variable the codebook provides:

- variable name, this is the variable name used in the 2001 NHTS;

- data level, either household- or vehicle-level data file;

- type, numeric or character (alphanumeric) data

- codes and descriptions, a description of every possible code identified with a variable; and,

- label, a brief description of a variable.

Table D2. Codebook for Public-Use Data Produced by EIA

	Variable Name	Data Level	Type	Codes and Descriptions	Label
1	AVGVEHS	Household	N	Numeric values	Number of vehicles in a household, expressed as vehicle-years, AVGVEHS
2	CENSUS_D	Household	C	"1" - New England "2" - Middle Atlantic "3" - East North Central "4" - West North Central "5" - South Atlantic "6" - East South Central "7" - West South Central "8" - Mountain "9" - Pacific	Household Census Division, CENSUS_D

Table D2. Codebook for Public-Use Data Produced by EIA

	Variable Name	Data Level	Type	Codes and Descriptions	Label
3	CENSUS_R	Household	C	"1" - Northeast "2" - North Central "3" - South "4" - West	Household Census Region, CENSUS_R
4	DRVRCNTC	Household	N	1 - 1 driver 2 - 2 drivers 3 - 3 drivers 4 - 4 or more drivers	EIA Number of drivers, DRVRCNTC
5	EHHWT#	Household	N	Replicate weight values	Replicate weight_#, EHHWT#
6	EXPFLHHN	Household	N	National sample weight values	HH Weight-100% completed - NATL, EXPFLHHN
7	HHCHILD	Household	N	0 - Households without children 1 - Households with children	EIA Household has children, HHCHILD
8	HHCOMP	Household	N	1 - Under 7 year, age of oldest child, household with children 2 - 7 to 15 years, age of oldest child, household with children 3 - 16 to 17 years, age of oldest child, household with children 4 - Under 35 years, age of householder, one adult with no children 5 - 35 to 59 years, age of householder, one adult with no children 6 - 60 years or more, age of householder, one adult with no children 7 - Under 35 years, age of householder, two or more adults with no children 8 - 35 to 59 years, age of householder, two or more adults with no children 9 - 60 years or more, age of householder, two or more adults with no children	EIA Household composition, HHCOMP

Table D2. Codebook for Public-Use Data Produced by EIA

	Variable Name	Data Level	Type	Codes and Descriptions	Label
9	HHINCOME	Household	N	1 - Less than $5,000 2 - $5,000 to $9,999 3 - $10,000 to $14,999 4 - $15,000 to $19,999 5 - $20,000 to $24,999 6 - $25,000 to $34,999 7 - $35,000 to $49,999 8 - $50,000 to $74,999 9 - $75,000 or more -9 - Don't know	EIA Family income, HHINCOME
10	HHR_HISP	Household	C	“1” - Yes ”2” - No	Hispanic status of HH respondent, HHR_HISP
11	HHR_RACEC	Household	N	1 - White 2 - Black 3 - Other	EIA Race of householder, HHR_RACEC
12	HHR_SEX	Household	C	“1” - Male ”2” - Female	Gender of HH respondent, HHR_SEX
13	HHSIZEC	Household	N	1 - One person 2 - Two persons 3 - Three persons 4 - Four persons 5 - Five persons 6 - Six or more persons	EIA Household size, HHSIZEC
14	HHVEHLC	Household	N	Numeric Values	Filter variable for calculating estimates and std errors for household statistics, HHVEHLC
15	HOUSEID	Household	C	Character Values	Household Identification Number, HOUSEID
16	LIF_CYC	Household	C	"01" - One adult, no children "02" - Two plus adults, no children "03" - One adult, youngest child 0-5 "04" - Two plus adults, youngest child 0-5 "05" - one adult, youngest child 6-15 "06" - Two plus adults, youngest child 6-15 "07" - One adult, youngest child 16-21	HH Life Cycle, LIF_CYC

Table D2. Codebook for Public-Use Data Produced by EIA

	Variable Name	Data Level	Type	Codes and Descriptions	Label
				"08" - Two plus adults, youngest child 16-21 "09" - One adult, retired, no children "10" - Two plus adults, retired, no children	
17	PDRVAGEC	Household	N	1 - 16 to 17 years 2 - 18 to 22 years 3 - 23 to 29 years 4 - 30 to 39 years 5 - 40 to 49 years 6 - 50 to 59 years 7 - 60 to 69 years 8 - 70 to 79 years 9 - 80 years and over -9 - Don't know	EIA Age of primary driver, PDRVAGEC
18	PERCOSTC	Household	N	1 - Less than 2 2 - 2 to 3.9 3 - 4 to 5.9 4 - 6 to 7.9 5 - 8 or more	EIA Percent of income for motor fuel, PERCOSTC
19	POOR100	Household	N	Numeric values	Households with incomes below 100 percent of the poverty level, POOR100
20	POOR125	Household	N	Numeric values	Households with incomes between 100 to 150 percent of the poverty level, POOR125
21	POOR150	Household	N	Numeric values	Households with incomes above 150 percent of the poverty level, POOR150
22	POORC	Household	N	1 - Below 100 percent 2 - 100 to 150 percent 3 - Above 150 percent -9 - Don't know	EIA Income relative to poverty line, POORC

Table D2. Codebook for Public-Use Data Produced by EIA

	Variable Name	Data Level	Type	Codes and Descriptions	Label
23	SMPLSRCE	Household	C	"01" - National Sample "02" - Baltimore Add-on "03" - Des Moines Add-on "04" - Hawaii Add-on "05" - Kentucky Add-on "06" - Lancaster PA Add-on "07" - New York Add-on "08" - Oahu Add-on "09" - Texas Add-on "10" - Wisconsin Add-on	Sample where the case originated, SMPLSRCE
24	TOTBTUSINK	Household	N	Numeric values	Total household fuel consumed in units of 1000 British Thermal Units (BTUs), TOTBTUSINK
25	TOTCOST	Household	N	Numeric values	Household Expenditures, TOTCOST
26	TOTCOSTC	Household	N	1 - $500 or less 2 - $501 to $1,000 3 - $1001 to $1,500 4 - $1,501 to $2,000 5 - $2,001 or more	EIA Motor fuel expenditures, TOTCOSTC
27	TOTGALS	Household	N	Numeric values	Household gallon of gasoline equivalent, TOTGALS
28	TOTMILES	Household	N	Numeric values	Household vehicle miles traveled, TOTMILES
29	URBRUR	Household	C	“1” - Urban ”2” - Rural	Household in urban/rural area, URBRUR
1	BTUSINK	Vehicle	N	Numeric values	Fuel consumed in units of 1000 British Thermal Units (BTUs), BTUSINK
2	COST	Vehicle	N	Numeric values	Motor fuel expenditures, COST
3	EHHWT#	Vehicle	N	Replicates sample weight values	Replicate weight_#, EHHWT#
4	EIADMPG	Vehicle	N	Numeric values	EIA derived miles per equivalent-gallon, EIADMPG

Table D2. Codebook for Public-Use Data Produced by EIA

	Variable Name	Data Level	Type	Codes and Descriptions	Label
5	EIADMPGC	Vehicle	N	1 - 10.9 or less 2 - 11 to 12.9 3 - 13 to 15.9 4 - 16 to 18.9 5 - 19 to 21.9 6 - 22 to 24.9 7 - 25 to 29.9 8 - 30 or More	EIA Fuel economy, EIADMPGC
6	EPATMPG	Vehicle	N	Numeric values	Unadjusted 55/45 combined fuel economy, EPATMPG
7	EPATMPGF	Vehicle	C	"10#" - represents a NHTS sample vehicle that had a single model name "matching" to eligible NHTSA file records using four linking variables: vehicle manufacturer, vehicle model, vehicle model year, and vehicle type. "20#" - represents a NHTS sample vehicle that had multiple model names "matching" to eligible NHTSA file records using four linking variables: vehicle manufacturer, vehicle model, vehicle model year, and vehicle type. "30#" - represents a NHTS sample vehicle that had a single model name "matching" to eligible NHTSA file records using three linking variables: vehicle manufacturer, vehicle model, and vehicle model year. "40#" - represents a NHTS sample vehicle that had multiple model names "matching" to eligible NHTSA file records using three linking variables: vehicle manufacturer, vehicle model, and vehicle model year.	Imputation flag for EPATMPG variable, EPATMPGF

Table D2. Codebook for Public-Use Data Produced by EIA

Variable Name	Data Level	Type	Codes and Descriptions	Label
			"50#" - represents a NHTS sample vehicle that "matched" to eligible NHTSA file records using three linking variables: vehicle manufacturer, vehicle type, and vehicle model year. "600" - represents a "match" based on EIA expert analysis using subject matter experience, in conjunction with past RTECS. Additionally, this imputation flag value represents recreation vehicles (VEHTYPE = "06"), where MPG(EPA 55/45) has been fixed at a fuel economy rates based on the U.S. Department of Transportation, National Transportation Statistics 2000. "001" - denotes a NHTS sample vehicle that was internally hot-decked to match with a median value of the Composite fuel economy defined by categories of one or more vehicle characteristics, such as make, model, model year, and vehicle type. None of these imputed values were subsequently re-used in the actual hot-decking procedure of median values. "999" - represents an imputation flag where no eligible NHTSA file records were found to "match" a NHTS sample vehicle.	

*** = For EPATMPGF codes, # is a number between 0 and 5. This number, #, represents a year increment. Due to the errors in respondents reporting accurate model year or, to a lesser extent, due to deficiencies in the NHTSA files, it was necessary to incrementally increase or decrease (not simultaneously increase and decrease) the model year for "matching" to successively larger range of years. If, for example, an eligible match was not found for a NHTS sample vehicle having the following attributes: Volkswagen, Sirocco, 1990, Automobile. Toggling of model years, by a single year increase followed by a single year decrease of the reported model year, resulted in a match with a Volkswagen, Sirocco, 1988, Automobile. In this example, the Volkswagen, Sirocco, 1990, Automobile, while seemingly a respondent reporting error, would receive an imputation flag of**

Table D2. Codebook for Public-Use Data Produced by EIA

	Variable Name	Data Level	Type	Codes and Descriptions	Label
"102" due to the "match" with the NHTSA file record corresponding to a Volkswagen, Sirocco, 1988, Automobile.					
8	EXPFLHHN	Vehicle	N	Numeric national weight values	HH Weight-100% completed - NATL, EXPFLHHN
9	FUELTYPE	Vehicle	N	1 - Diesel 2 - Natural gas 3 - Electricity 4 - Gasoline	Type of transportation fuel, FUELTYPE
10	GALS	Vehicle	N	Numeric values	Motor fuel consumption, GALS
11	ID11	Vehicle	C	Character Values	HOUSEID plus VEHID, ID11
12	MILES	Vehicle	N	Numeric Values	Vehicle miles traveled, MILES
13	SMPLSRCE	Vehicle	C	"01" - National Sample "02" - Baltimore Add-on "03" - Des Moines Add-on "04" - Hawaii Add-on "05" - Kentucky Add-on "06" - Lancaster PA Add-on "07" - New York Add-on "08" - Oahu Add-on "09" - Texas Add-on "10" – Wisconsin Add-on	Sample where the case originated, SMPLSRCE
14	TVEHSHARE	Vehicle	N	Numeric values (between 0 and 1)	Prorated fraction of possession of vehicle, in vehicle-year, TVEHSHARE
15	VEHID	Vehicle	C	Character values	Vehicle ID number, VEHID
16	VEHTYPE	Vehicle	C	"01" – Passenger car "02" - Vans (Large and Minivans) "03" - Sport Utility Vehicle "04" - Pickup truck "06" - Recreational vehicle	Type of vehicle, VEHTYPE

Table D2. Codebook for Public-Use Data Produced by EIA

	Variable Name	Data Level	Type	Codes and Descriptions	Label
17	VEHYEARC	Vehicle	N	1 - 2001 to 2002 2 - 2000 3 - 1999 4 - 1998 5 - 1997 6 - 1996 7 - 1995 8 - 1992 to 1994 9 - 1989 to 1991 10 - 1986 to 1988 11 - 1983 to 1985 12 - 1980 to 1982 13 - 1977 to 1979 14 - 1976 or earlier -9 - Don't know	EIA Model year, VEHYEARC

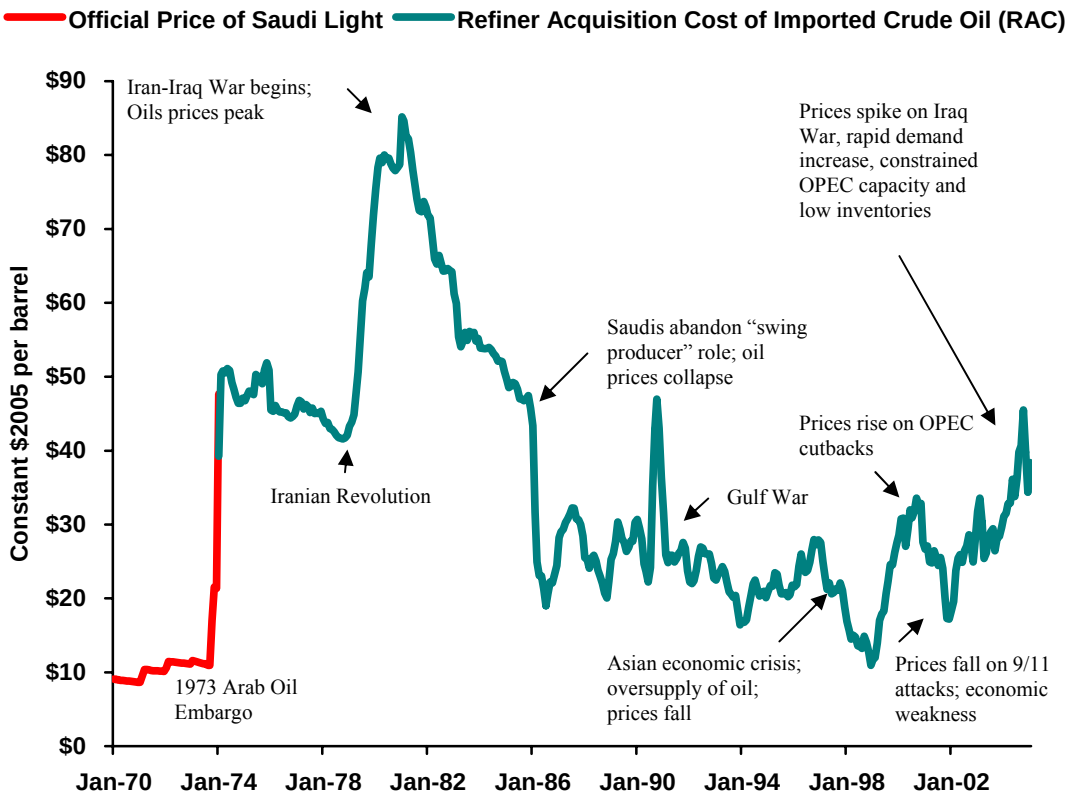
Figure D2. Map of U.S. Census and Division Areas

APPENDIX E: CHRONOLOGY OF WORLD OIL MARKET EVENTS

APPENDIX E

MAJOR EVENTS AND REAL WORLD OIL PRICES, 1970-2005

Figure E1.Major Events and Real World Oil Prices, 1970-2005



Source: Energy Information Administration.

GLOSSARY

Aggregate Ratio: See Mean and Ratio Estimate.

AMPD: Average miles driven per day.

Annual Vehicle-Miles Traveled: See Vehicle-Miles Traveled.

Automobile: Includes standard passenger car, 2-seater car and station wagons; excludes passenger vans, cargo vans, motor homes, pickup trucks, and sport-utility or similar vehicles. See Vehicle.

Average Number of Vehicles per Household: The average number of vehicles used by a household for personal transportation. For this report, the average number of vehicles per household is computed as the ratio of the total number of vehicles to the total number of households within any subgroup or "table cell." The total number of vehicles used by a household is based on the number of days each vehicle is used. For example, a total of one vehicle may represent two vehicles, each used for half of the year. See Vehicle.

Average Vehicle Fuel Consumption: A ratio estimate defined as total gallons of fuel consumed by all vehicles, divided by: (1) the total number of vehicles (for average fuel consumption per vehicle) or (2) the total number of households (for average fuel consumption per household). See Ratio Estimate.

Average Vehicle-Miles Traveled: A ratio estimate defined as total miles traveled by all vehicles, divided by: (1) the total number of vehicles (for average miles traveled per vehicle) or (2) the total number of households (for average miles traveled per household). See Ratio Estimate and Vehicle Miles Traveled.

BLS: Bureau of Labor Statistics within the U.S. Department of Labor. See Price.

British Thermal Unit (Btu): The amount of energy required to raise the temperature of 1 pound of water 1 degree Fahrenheit (F) at or near 39.1 degrees F and 1 atmosphere of pressure. One Btu is about equal to the heat given off by a blue-tip match. See Conversion Factor.

Btu: See British Thermal Unit.

Btu Conversion Factor: See Conversion Factor.

Bureau of Labor Statistics (BLS) Pump Price Series: See Price.

Carburetor: A fuel delivery device for producing a proper mixture of gasoline and air, and delivering it to the intake manifold of an internal combustion engine. The efficiency of carburetors is more temperature dependent than fuel injection systems. See Fuel Injection and Diesel Fuel System.

Census Division: A geographic area consisting of several States as defined by the U.S. Department of Commerce, Bureau of the Census. The States are grouped into nine divisions and four regions:

Census Division States

Northeast:

New England: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont

Middle Atlantic: New Jersey, New York, and Pennsylvania

Midwest

East North Central: Illinois, Indiana, Michigan, Ohio, and Wisconsin

West North Central: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota

South:

South Atlantic: Delaware, the District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia

East South Central: Alabama, Kentucky, Mississippi, and Tennessee

West South Central: Arkansas, Louisiana, Oklahoma, and Texas

West:

Mountain: Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming

Pacific: Alaska, California, Hawaii, Oregon, and Washington

Census Region: See Census Division.

Central City: Usually one or more legally incorporated cities within the Metropolitan Statistical Area (MSA) that is significantly large by itself or large relative to the largest city in the MSA. Additional criteria for being classified "central city" include having at least 75 jobs for each 100 employed residents and having at least 40 percent of the resident workers employed within the city limits. Every MSA has at least one central city, which is usually the largest city. Central cities are commonly regarded as relatively large communities with a denser population and a higher concentration of economic activities than the outlying or suburban areas of the MSA. "Suburban" are those parts of the MSA that are not designated as central city. (See Metropolitan Statistical Areas, Urban, Suburban, and Rural.)

CID: Cubic Inch Displacement. See Engine Size.

Cold-Deck Imputation: A statistical procedure that replaces a missing value of an item with a constant value from an external source such as a value from a previous survey.

Conversion Factor: A number that translates units of one system into corresponding values of another system. Conversion factors are used to translate physical units of measures for various fuels into Btu equivalents.

Diesel Fuel: A fuel composed of distillates obtained in petroleum refining operation or blends of such distillates with residual oil used in motor vehicles. The boiling point and specific gravity are higher for diesel fuels than for gasoline. See Diesel Fuel System.

Diesel Fuel System: Diesel engines are internal combustion engines that burn diesel oil rather than gasoline. Injectors are used to spray droplets of diesel oil into the combustion chambers, at or near the top of the compression stroke. Ignition follows due to the very high temperature of the compressed in-take air, or to the use of "glow plugs," which retain heat from previous ignitions (spark plugs are not used). Diesel engines are generally more fuel economic than gasoline engines, but must be stronger and heavier due to high compression ratios. See Diesel Fuel, Carburetor, and Fuel Injection.

Drivers: Household members who drove a vehicle on a regular basis at the time of the survey.

E85: A fuel containing a mixture of 85 percent ethanol and 15 percent gasoline.

E95: A fuel containing a mixture of 95 percent ethanol and 5 percent gasoline.

EIA: The Energy Information Administration. An independent agency within the U.S. Department of Energy that develops surveys, collects energy data, and analyzes and models energy issues. The Agency must meet the requests of Congress, other elements within the Department of Energy, Federal Energy Regulatory Commission, the Executive Branch, its own independent needs, and assist the general public, or other interest groups, without taking a policy position. See more information about EIA at http://www.eia.doe.gov/neic/aboutEIA/aboutus.htm.

Engine Size: The total volume within all cylinders of an engine, when pistons are at their lowest positions. The engine is usually measured in "liters" or "cubic inches of displacement (CID)." Generally, larger engines result in greater engine power, but less fuel economy. There are 61.024 cubic inches in a liter. See Number of Cylinders.

Environmental Protection Agency (EPA) Certification Files: Computer files produced by EPA for analysis purposes. For each vehicle make, model, and year, the files contain the EPA test miles-per-gallon (mpg) values (city, highway, and 55/45 composite). These mpg values are associated with various combinations of engine and drive-train technologies (e.g., number of cylinders, engine size, gasoline or diesel fuel, and automatic or manual transmission). These files also contain information similar to that in the DOE/EPA Gas Mileage Guide, although the mpg values in that publication are adjusted for shortfall.

EPA Certification Files: See Environmental Protection Agency (EPA) Certification Files.

EPA Composite Miles per Gallon (mpg): The harmonic mean of the EPA city and highway mpg, weighted under the assumption of 55 percent city driving and 45 percent highway driving.

Ethanol (CH_3-CH_2OH): A clear, colorless, flammable oxygenated hydrocarbon. Ethanol is typically produced chemically from ethylene, or biologically from fermentation of various sugars from carbohydrates found in agricultural crops and cellulosic residues from crops or wood. It is used in the United States as a gasoline octane enhancer and oxygenate (blended up to 10 percent concentration). Ethanol can also be used in high concentrations (E85) in vehicles designed for its use. See **Fuel ethanol** and **E85**. Note: The lower heating value, equal to 76,000 Btu per gallon, is assumed for estimates in EIA's *Renewables Energy Annual* report.

Family Income: The total combined annual income of all members of the family from all sources before taxes and deductions. It includes wages, salaries, tips, commissions, income from Social Security, pensions, interest, dividends, rent, public assistance, and unemployment insurance. This includes the total income for all family members who lived in the household. Income of nonfamily members of the household is not included. "Family" includes the following types of relationships: mother, father, sister, brother, son, daughter, father-in-law, uncle, aunt, niece, grandchild, foster child, and similar relationships.

Four-Wheel Drive: See Type of Drive.

Front-Wheel Drive: See Type of Drive.

Fuel Consumption: See Vehicle Fuel Consumption.

Fuel Economy: See Miles per Gallon.

Fuel Expenditures: See Vehicle Fuel Expenditures.

Fuel Injection: A fuel delivery system whereby gasoline is pumped to one or more fuel injectors under high pressure. The fuel injectors are valves that, at the appropriate times, open to allow fuel to be sprayed or atomized into a throttle bore or into the intake manifold ports. The fuel injectors are usually solenoid operated valves under the control of the vehicle's on-board computer (thus the term "electronic fuel injection"). The efficiency of fuel-injection systems is less temperature dependent than carburetor systems. Diesel engines always use injectors. See Carburetor and Diesel Fuel Systems.

Fuel: Any material substance that can be consumed to supply heat or power. Included are petroleum, coal, and natural gas (the fossil fuels), and other consumable materials, such as uranium, biomass, and hydrogen.

Fuel ethanol (CH_3-CH_2OH): An anhydrous denatured aliphatic alcohol intended for gasoline blending as described in the definition of oxygenates. It is also used in high concentrations to produce E85. See E85, ethanol, and oxygenates.

Fuel Type: See Type of Vehicle Fuel Purchased.

Full Service: See Type of Primary Service.

GPMR (Gallons per Mile Ratio): See Miles-per-Gallon (mpg) Shortfall.

Gasohol: A fuel used in motor vehicles that is a blend of finished motor gasoline (leaded or unleaded) and alcohol (generally ethanol, but sometimes methanol), limited to 10 percent alcohol by volume. See Gasoline.

Gasoline: A complex mixture of relatively volatile hydrocarbons, with or without small quantities of additives, obtained by blending appropriate refinery streams to form a fuel suitable for use in spark ignition engines. Motor gasoline includes both leaded or unleaded grades of finished motor gasoline, blending components, and gasohol.

Hispanic Descent: This, as the question on origin, was self-determined by the respondent. See Origin.

Hot-Deck Imputation: A statistical procedure for deriving a probable response to a questionnaire item concerning a household or vehicle, where no response was given during the survey. To perform the procedure, the households or vehicles are sorted by variables related to the missing item. Thus, a series of "sort categories" are formed, which are internally homogeneous with respect to the sort variables. Within each category, households or vehicles for which the questionnaire item is not missing are randomly selected to serve as "donors" to supply values for the missing item of "recipient" households or vehicles.

Household: A family, an individual, or a group of up to nine unrelated persons occupying the same housing unit at the time of the interview. "Occupy" means the housing unit was the person's usual or permanent place of residence at the time of the first field contact. The household includes babies, lodgers, boarders, employed persons who live in the housing unit, and persons who usually live in the household but are away traveling or in a hospital. The household does not include persons who are normally members of the household but who were away from home as college students or members of the armed forces at the time of the contact. The household does not include persons temporarily visiting with the household if they have a place of residence elsewhere, persons who take their meals with the household but usually lodge or sleep elsewhere, domestic employees or other persons employed by the household who do not sleep in the same housing unit, or persons who are former members of the household, but have since become inmates of correction or penal institutions, mental institutions, homes for the aged or needy, homes or hospitals for the chronically ill or handicapped, nursing homes, convents or monasteries, or other places in which residents may remain for long periods of time. By definition, the number of households is the same as the number of occupied housing units. The number or households for a subgroup or table cell is estimated by summing the survey weights over all sample households in that subgroup.

Householder: The person (or one of the people) in whose name the home is owned or rented. If there is no lease or similar agreement, or if the person who owns the home or pays the rent does not live in the housing unit, the householder is the person responsible for paying the household bills, or whoever is generally in charge. Note that “household” in the NHTS corresponds to the contact person for interview purposes.

Household Composition: The configuration of the household members including number of children, number of household members, and age of household members. For this report, households were divided into households with children and households without children. Within the households with children, a further division was made depending on the age of the oldest child. Within households without children, a further division was made depending on the number

of adults and then within that category, the age of the households. See Household, Householder, and Housing Unit.

Household Size: Number of individuals occupying a housing unit. See Household, and Housing Unit.

Housing Unit: A structure or part of a structure where a household lives. It has direct access from the outside of the building, either directly or through a common hall. Housing units do not include group quarters such as prisons or nursing homes where 10 or more unrelated persons live. Hotel and motel rooms are considered housing units if occupied as the usual or permanent place of residence.

Imputation: A group of statistical techniques for estimating probable responses to questionnaire items concerning households or vehicles, where no responses or poor quality responses were given during the survey. The three most common techniques employed in this survey were "hot-deck," "regression," and "predictive mean matching." See Hot-Deck Imputation, Cold-Deck Imputation, Predictive Mean Matching, and Regression Imputation.

Intermediate-Grade Gasoline: An increasingly common grade of unleaded gasoline with an octane rating intermediate between "regular" and "premium." Octane boosters are added to gasoline to control engine pre-ignition or "knocking" by slowing combustion rates. See Regular-Grade Gasoline and Premium-Grade Gasoline.

In-Use Miles per Gallon (mpg): A mpg value that was adjusted for seasonality and annual miles traveled.

Jeep-like Vehicle: These vehicles are now referred to as sport-utility. See Sport-Utility Vehicle.

Joule (J): The meter-kilogram-second unit of work or energy, equal to the work done by a force of one newton when its point of application moves through a distance of one meter in the direction of the force; equivalent to 107 ergs and one watt-second. A petajoule (PJ) is 10^{15} Joules.

Large Van: See Van.

Leaded Gasoline: A fuel that contains more than 0.05 gram of lead per gallon or more than 0.005 gram of phosphorus per gallon. See Gasoline and Unleaded Gasoline.

Liters: See Engine Size.

Light-duty vehicles: Vehicles weighing less than 8,500 lbs (include automobiles, motorcycles, and light trucks).

Light trucks: All single unit two-axle, four-tire trucks, including pickup trucks, sports utility vehicles, vans, motor homes, etc. This is the Department of Transportation definition. The Energy Information defined light truck as all trucks weighing 8,500 pounds or less.

Lundberg Survey Inc. Price Series: See Price.

Mean: The simple arithmetic average for a population; that is, the sum of all the values in a population divided by the size of the population. For this report, population means are estimated by computing the weighted sum of the sample values, then dividing by the sum of the sample weights. The mean is, thus, an aggregate ratio whose denominator is the total number of households or vehicles. See Ratio Estimate.

Methanol (CH_3OH): A light, volatile alcohol eligible for gasoline blending.

Methanol blend: Mixtures containing 85 percent or more (or such other percentage, but not less than 70 percent) by volume of methanol with gasoline. Pure methanol is considered an "other alternative fuel."

Metropolitan: See Urban.

Metropolitan Statistical Area (MSA): Areas defined by the U.S. Office of Management and Budget in 1992. An MSA is (1) a county or group of contiguous counties that contain at least one city of 50,000 inhabitants or more, or (2) an urbanized area of at least 50,000 inhabitants and a total MSA population of at least 100,000 (75,000 in New England). The contiguous counties are included in an MSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city. In New England, MSAs consist of towns and cities, rather than counties. (See Urban, Central City, Suburban, and Rural.)

Metropolitan Status: Refers to the geographic location of the households in relationship to MSA's. See Metropolitan, Nonmetropolitan, and Central City.

Miles per Gallon (mpg): A measure of vehicle fuel economy. Miles per gallon (mpg) as presented in this report represents "fleet miles per gallon." For each subgroup or "table cell," mpg is computed as the ratio of the total number of miles traveled by all vehicles in the subgroup to the total number of gallons consumed.

Mini-Service Pumps: See Type of Primary Service.

Minivan: New type of small van that first appeared with that designation in 1984. Any of the smaller vans built on an automobile-type frame. Earlier models such as the Volkswagen van are now included in this category.

Model Year: As determined by the manufacturer, the model year is the year that appears in the vehicle identification number. For the NHTS, model year values were reported directly by respondents.

Motor Fuel Consumption: See Vehicle Fuel Consumption.

Motor Fuel Expenditures: See Vehicle Fuel Expenditures.

mpg: See Miles per Gallon.

Miles-per-Gallon (mpg) Shortfall: The difference between actual on-road mpg and EPA laboratory test mpg. Miles-per-gallon (mpg) shortfall is expressed as gallons-per-mile ratio (GPMR).

MSA: See Metropolitan Statistical Area (MSA).

National Household Travel Survey (NHTS): A survey of the nation's inventory of daily and long-distance travel. The survey includes demographic characteristics of households, people, vehicles, and detailed information on daily and longer-distance travel for all purposes by all modes. NHTS survey data are collected from a sample of U.S. households and expanded to provide national estimates of trips and miles by travel mode, trip purpose, and a host of household attributes.

The daily travel surveys were conducted in 1969, 1977, 1983, 1990 and 1995. This data series provides a rich source of detailed information on personal travel patterns in the U.S. Longer-distance travel was collected in 1977 and 1995. The 2001 NHTS collects both daily and longer-distance trips in one survey.

No. 1 diesel fuel: A light distillate fuel oil that has distillation temperatures of 550 degrees Fahrenheit at the 90-percent point and meets the specifications defined in ASTM Specification D 975. It is used in high-speed diesel engines, such as those in city buses and similar vehicles. See No. 1 distillate below.

No. 1 distillate: A light petroleum distillate that can be used as either a diesel fuel (see No. 1 diesel fuel above) or a fuel oil (see No. 1 fuel oil (below).

No. 1 fuel oil: A light distillate fuel oil that has distillation temperatures of 400 degrees Fahrenheit at the 10-percent recovery point and 550 degrees Fahrenheit at the 90-percent point and meets the specifications defined in ASTM Specification D 396. It is used primarily as fuel for portable outdoor stoves and portable outdoor heaters.

No. 2 diesel fuel: A fuel that has distillation temperatures of 500 degrees Fahrenheit at the 10-percent recovery point and 640 degrees Fahrenheit at the 90-percent recovery point and meets the specifications defined in ASTM Specification D 975. It is used in high-speed diesel engines, such as those in railroad locomotives, trucks, and automobiles.

No. 2 distillate: A petroleum distillate that can be used as either a diesel fuel (see No. 2 diesel fuel above) or a fuel oil (see No. 2 fuel oil below).

No. 2 fuel oil (heating oil): A distillate fuel oil that has distillation temperatures of 400 degrees Fahrenheit at the 10-percent recovery point and 640 degrees Fahrenheit at the 90-percent recovery point and meets the specifications defined in ASTM Specification D 396. It is used in atomizing type burners for domestic heating or for moderate capacity commercial/industrial burner units.

No. 2 fuel oil and No. 2 diesel sold to consumers for all other end uses: Those consumers who purchase fuel oil or diesel fuel for their own use including: commercial/institutional buildings (including apartment buildings), manufacturing and nonmanufacturing establishments, farms (including farm houses), motor vehicles, commercial or private boats, military,

governments, electric utilities, railroads, construction, logging or any other nonresidential end-use purpose.

No. 2 fuel oil sold to private homes for heating: Private household customers who purchase fuel oil for the specific purpose of heating their home, water heating, cooking, etc., excluding farm houses, farming and apartment buildings.

No. 4 fuel oil: A distillate fuel oil made by blending distillate fuel oil and residual fuel oil stocks. It conforms with ASTM Specification D 396 or Federal Specification VV-F-815C and is used extensively in industrial plants and in commercial burner installations that are not equipped with preheating facilities. It also includes No. 4 diesel fuel used for low- and medium-speed diesel engines and conforms to ASTM Specification D 975.

No. 5 and no. 6 fuel oil sold directly to the ultimate consumer: Includes ships, mines, smelters, manufacturing plants, electric utilities, drilling, railroad.

No. 5 and no. 6 fuel oil sold to refiners or other dealers who will resale the product: Includes all volumes of No. 5 and No. 6 fuel oil purchased by a trade or business with the intent of reselling the product to the ultimate consumers.

Nonattainment area: Any area that does not meet the national primary or secondary ambient air quality standard established by the Environmental Protection Agency for designated pollutants, such as carbon monoxide and ozone.

Nonmetropolitan: Households not located within MSAs as defined by the U.S. Office of Management and Budget. See Metropolitan Statistical Area (MSA).

Number of Cylinders: In a reciprocating engine, a cylinder is the chamber in which combustion of fuel occurs and the piston moves, ultimately delivering power to the wheels. Common engine configurations include 4, 6, and 8 cylinders. Generally, the more cylinders a vehicle has, the greater the amount of engine power it has. However, more cylinders often result in less fuel economy. See Engine Size.

Number of Households: The total number of households in the United States that are represented by the sample households. In this report, most statistics are shown for the number of households with vehicles, which is a subset of the total number of households.

Number of Vehicles: See Vehicle and Vehicle Stock.

Occupied Housing Unit: A unit someone was living in as his or her usual or permanent place of residence when the first field contact was made. See Housing Unit.

On-Road Miles per Gallon (mpg): A composite mpg that was adjusted to account for the difference between the test value and the fuel economy actually obtained on the road.

Origin: The primary ethnic background of the person considered to be the householder as self-determined by the respondent. Origin of householder was collected in the 1993 RECS. Each respondent was asked, "Which of the groups on this exhibit best describes the householder?" The groups included: white, black or Negro, American Indian, Alaskan native, Asian, and Pacific

Islander. The word "race" was not used in either the questionnaire or the instructions. See Hispanic Descent.

Outside Central City: See Central City.

Oxygenated gasoline: Finished motor gasoline, other than reformulated gasoline, having an oxygen content of 2.7 percent or higher by weight and required by the U.S. Environmental Protection Agency (EPA) to be sold in areas designated by EPA as carbon monoxide (CO) nonattainment areas. See Nonattainment area. Note: Oxygenated gasoline excludes oxygenated fuels program reformulated gasoline (OPRG) and reformulated gasoline blendstock for oxygenate blending (RBOB). Data on gasohol that has at least 2.7 percent oxygen, by weight, and is intended for sale inside CO nonattainment areas are included in data on oxygenated gasoline. Other data on gasohol are included in data on conventional gasoline.

Oxygenated gasoline (includes Gasohol): Finished motor gasoline, other than reformulated gasoline, having an oxygen content of 2.7 percent or higher by weight. Includes gasohol. Note: Oxygenated gasoline excludes oxygenated fuels program reformulated gasoline (OPRG) and reformulated gasoline blendstock for oxygenate blending (RBOB).

Oxygenates: Substances which, when added to gasoline, increase the amount of oxygen in that gasoline blend. Ethanol, Methyl Tertiary Butyl Ether (MTBE), Ethyl Tertiary Butyl Ether (ETBE), and methanol are common oxygenates.

Passenger Car: See Vehicle and Automobile.

Pickup Truck: Includes compact and full-size pickup trucks. See Vehicle.

Poverty: Low-income classifications to which certain households are assigned based on the household's annual income reported in the NHTS. "Below 100 percent of poverty" encompasses a group of households with incomes below the poverty level as defined by the Bureau of the Census. "Below 125 percent of poverty" includes a group of households with incomes below 125 percent of the poverty level. These groups of the poor and near-poor represent alternative levels for defining poverty. The definitions of "poor" are based on the number of family members in the household and the income of the entire family.

Premium-Grade Gasoline: A grade of unleaded gasoline with a high octane rating, (approximately 92) designed to minimize preignition or engine "knocking" by slowing combustion rates. See Regular-Grade Gasoline and Intermediate-Grade Gasoline.

Price: The dollar amount per gallon of fuel purchased.

Quadrillion: The number 1,000,000,000,000,000 or 10e15.

Ratio Estimate: The ratio of two population aggregates (totals). For example, "average miles traveled per vehicle" is the ratio of total miles driven by all vehicles, over the total number of vehicles, within any subgroup or "table cell." In this report, there are two types of ratio estimates: those computed using aggregates for vehicles and those computed using aggregates for households. See Mean.

Rear-Wheel Drive: See Type of Drive.

RECS: See Residential Energy Consumption Survey (RECS).

Regression Imputation: A statistical technique for predicting the value of a numerical variable that is missing. The technique involves developing a regression equation that predicts the value of the missing variable based upon variables that are not missing or have already been imputed.

Regular-Grade Gasoline: A grade of unleaded gasoline with a lower octane rating (approximately 87) than other grades. Octane boosters are added to gasoline to control engine pre-ignition or "knocking" by slowing combustion rates. See Intermediate-Grade Gasoline and Premium-Grade Gasoline.

Relative Standard Error: See RSE (Relative Standard Error).

Residential: Occupied housing units, including mobile homes, single-family housing units (attached and detached), and apartments. The definition of "occupied housing units" is the same as that used by the U.S. Bureau of the Census. See Household and Housing Unit.

Residential Energy Consumption Survey (RECS): A national multistage probability sample survey conducted by the Energy Consumption Division of the Energy Information Administration. The RECS provides baseline information on how households in the United States use energy.

RSE (Relative Standard Error): A measure of the reliability or precision of a survey statistic. Variability occurs in survey statistics because the different samples that could be drawn would each produce different values for the survey statistics. The RSE is a measure of precision on a percentage scale. The RSE is defined as the standard error of a survey estimate, divided by the survey estimate and multiplied by 100. (Standard error is the square root of the variance.) For example, an RSE of 50 percent means that the standard error is half as large as the survey estimate.

Rural: Households not located within Metropolitan Statistical Areas as defined by the U.S. Office of Management and Budget. See Metropolitan Statistical Area and Urban Status.

Self-Service or Mini-Service: See Type of Primary Service.

Shortfall: See Miles-per-Gallon (mpg) Shortfall.

Sport-Utility Vehicle: Includes light trucks that are similar to jeeps. Other common terms for these vehicles are sport-utility, special purpose, utility or off-the-road vehicles. They may have a four- or two-wheel drive. See Vehicle.

Suburban: Those parts of the MSA that are not designated as central city. Suburban areas are referred to as "outside central city." See Metropolitan Statistical Area.

Transmission Type: The householder was asked if each vehicle had an automatic or manual shift transmission. The transmission is the part of a vehicle that transmits motive force from the engine to the wheels, usually by means of gears for different speeds using either a hydraulic "torque-converter" (automatic) or clutch assembly (manual). On front wheel drive cars, the transmission is often called a "transaxle." Fuel economy is usually higher with manual

transmissions than automatic transmissions, although newer automatic transmissions are narrowing the difference.

Transportation Energy Expenditures: See Vehicle Fuel Expenditures and Combined Household Energy Expenditures.

Type of Drive: Refers to which wheels the engine power is delivered to, the so-called "drive wheels." Rear-wheel drive, has drive wheels on the rear of the vehicle. Front-wheel drive, a newer technology, has drive wheels on the front of the vehicle. Four-wheel drive uses all four wheels as drive wheels, and is found mostly on sport-utility vehicles and trucks, though it is becoming increasingly more common on station wagons and vans.

Type of Fuel System: See Carburetor, Fuel-Injection, and Diesel Fuel Systems.

Type of Vehicle Fuel Purchased: The predominant type of fuel purchased during survey period, which was assigned by EIA because NHTS did not collect this information.. Data categories are gasoline motor fuel, diesel motor fuel, electric, and natural gas, excluding propane because NHTSA's CAFE program does not track these vehicles. See Gasoline, Gasohol, Unleaded Gasoline, Leaded Gasoline, Regular-Grade Gasoline, Intermediate-Grade Gasoline, and Premium- Grade Gasoline.

Type of Primary Service: The dominant type of service the respondent uses at the service station. Response categories include "full-service pumps," "self- or mini-service pumps," or "both equally." Mini-service is provided when attendants pump the vehicle fuel but do not provide any other service, such as checking the tire pressure.

Urban: Urban refers to a group of households located within Metropolitan Statistical Areas (MSAs) as defined by the U.S. Office of Management and Budget. For this report, urban is composed of central city and suburban areas. An MSA is (1) a county or group of contiguous counties that contain at least one city of 50,000 inhabitants or more, or (2) an urbanized area of at least 50,000 inhabitants and a total MSA population of at least 100,000 (75,000 in New England). The contiguous counties are included in an MSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city. In New England, MSAs consist of towns and cities rather than counties. (See Central City, Suburban, and Rural.)

Unleaded Gasoline: Contains not more than 0.05 gram of lead per gallon and not more than 0.005 gram of phosphorus per gallon. Premium, regular and intermediate grades are included, depending on the octane rating. See Gasoline, Leaded Gasoline, Regular-Grade Gasoline, Intermediate-Grade Gasoline, and Premium-Grade Gasoline.

Van: Includes large vans. Generally, the distinction between large vans and minivans is made by the respondents' answers to "Type of Vehicle" question.

Vehicle: For this past EIA transportation reports, vehicles were any motorized vehicles used by U.S. households for personal transportation. Excluded were: motorcycles, mopeds, large trucks, and buses. Included were: automobiles, station wagons, passenger vans, cargo vans, motor homes, pickup trucks, and sport-utility or similar vehicles. In order to be included, vehicles must be: (1) owned by members of the household; (2) company cars not owned by household members but regularly available to household members for their personal use and are ordinarily kept at

home; or (3) rented or leased for 1 month or more. See Vehicle Stock, Vehicles Used on the Job, Automobile, Minivans, Vans, Pickup Trucks, and Sport-Utility Vehicles.

Vehicle Acquisition: The number of vehicles a household acquires or obtains during the survey year. The average number of vehicles in the stock is computed using these data. See Vehicle Disposition.

Vehicle Disposition: The number of vehicles a household disposes of during the survey year. Disposed vehicles include those sold, traded, or the owner moved out of the household. The average number of vehicles in the stock is computed using these data. See Vehicle Acquisition.

Vehicle Fuel Consumption: Vehicle fuel consumption is computed as the vehicle-miles traveled divided by the fuel economy reported in miles per gallon (mpg). For the 2001 NHTS, vehicle fuel consumption was derived from the actual vehicle mileage collected in the NHTS and the assigned mpg values were obtained from the EPA certification files and adjusted for on-road, in-use driving.

Vehicle Fuel Economy: See Miles per Gallon (mpg).

Vehicle Fuel Expenditures: The cost, including taxes, of the gasoline, gasohol or diesel fuel added to the vehicle's tank. Expenditures do not include the cost of oil or other items that may have been purchased at the same time as the vehicle fuel.

Vehicle Identification Number (VIN): A set of codes, usually alpha-numeric characters, assigned to a vehicle at the factory and inscribed on the vehicle. When decoded, the VIN provides vehicle characteristics. The VIN was used in EIA's RTECS to help match vehicles to the EPA certification file for calculating miles-per-gallon values; however, NHTS did not collect VINS to limit respondent burden. See Environmental Protection Agency (EPA) Certification Files.

Vehicle-Miles Traveled (VMT): The number of miles traveled nationally by sampled vehicles for a period of 1 year. VMT was calculated using (1) a regression method developed by Oak Ridge National Laboratories, Center for Transportation Analysis (2) two odometer readings or, (3) for vehicles with less than two odometer readings, imputed using a regression estimate. See Average Vehicle-Miles Traveled.

VIN: See Vehicle Identification Number.

VMT: See Vehicle-Miles Traveled.