4. Vehicle Fuel Efficiency and Consumption

Fuel consumption is estimated from RTECS data on the vehicle stock (Chapter 2) and miles traveled (Chapter 3), in combination with vehicle fuel efficiency ratings, adjusted to account for individual driving circumstances. The first two sections of this chapter present estimates of household vehicle fuel efficiency and household fuel consumption calculated from these fuel efficiency estimates. These sections also discuss variations in fuel efficiency and consumption based on differences in household and vehicle characteristics. The third section presents EIA estimates of the potential savings from replacing the oldest (and least fuel-efficient) household vehicles with new (and more fuel-efficient) vehicles. The final section of this chapter focuses on households receiving (or eligible to receive) supplemental income under government programs, in particular programs targeted at low-income households.

Vehicle Fuel Efficiency

The fuel efficiency of household vehicles averaged 19.3 miles per gallon (MPG) in 1991. This represents an increase of 1 MPG (5.5 percent) since the 1988 RTECS, when household vehicles averaged 18.3 MPG. Fuel efficiency varies by the age and type of vehicle. Newer cars are more fuel efficient than older cars, averaging 20.6 to 22.0 MPG for model year 1983 or later compared with 12.2 MPG for model year 1973 or earlier. On average, passenger cars are the most fuel efficient (21.1 MPG) and full-size vans the least efficient (13.7 MPG).

Calculation of Vehicle Fuel Efficiency

The vehicle fuel efficiencies presented in this report were calculated using the Environmental Protection Agency (EPA) laboratory test results, adjusted for on-road driving. Information on vehicle characteristics, obtained from the Vehicle Identification Number (VIN) and from the respondent, enhanced the matching of vehicles to the EPA certification files. Earlier RTECS (prior to 1988) calculated fuel efficiencies using information recorded by respondents in vehicle fuel-purchase diaries.

A sequential adjustment procedure was used to adjust the EPA test data for each RTECS sample vehicle. First, the EPA test data were adjusted to account for an MPG shortfall between the test data and the actual, on-road fuel efficiency for a combination of both city and highway driving conditions. The resulting composite, or on-road MPG, is the "sticker" MPG reported on new vehicles and published in the DOE/EPA *Gas Mileage Guide*. Next, the data were adjusted to account for individual driving circumstances, in particular the effect of urban versus rural driving conditions and seasonal effects. For each vehicle in the RTECS sample, the on-road MPG was adjusted based on the average number of miles driven per day and whether the vehicle was driven in the North or the South. These adjustments provided specific in-use MPG values for each vehicle in the RTECS sample. See Appendix B for additional details.

Two factors that also contribute to vehicle fuel efficiency--individual driving behavior and aging of vehicles--cannot be determined because the RTECS fuel efficiency data were not measured from actual driving. This is important to keep in mind when considering the information presented in this report, as driver behavior and vehicle aging have an additional but unknown effect on the MPG of individual vehicles.

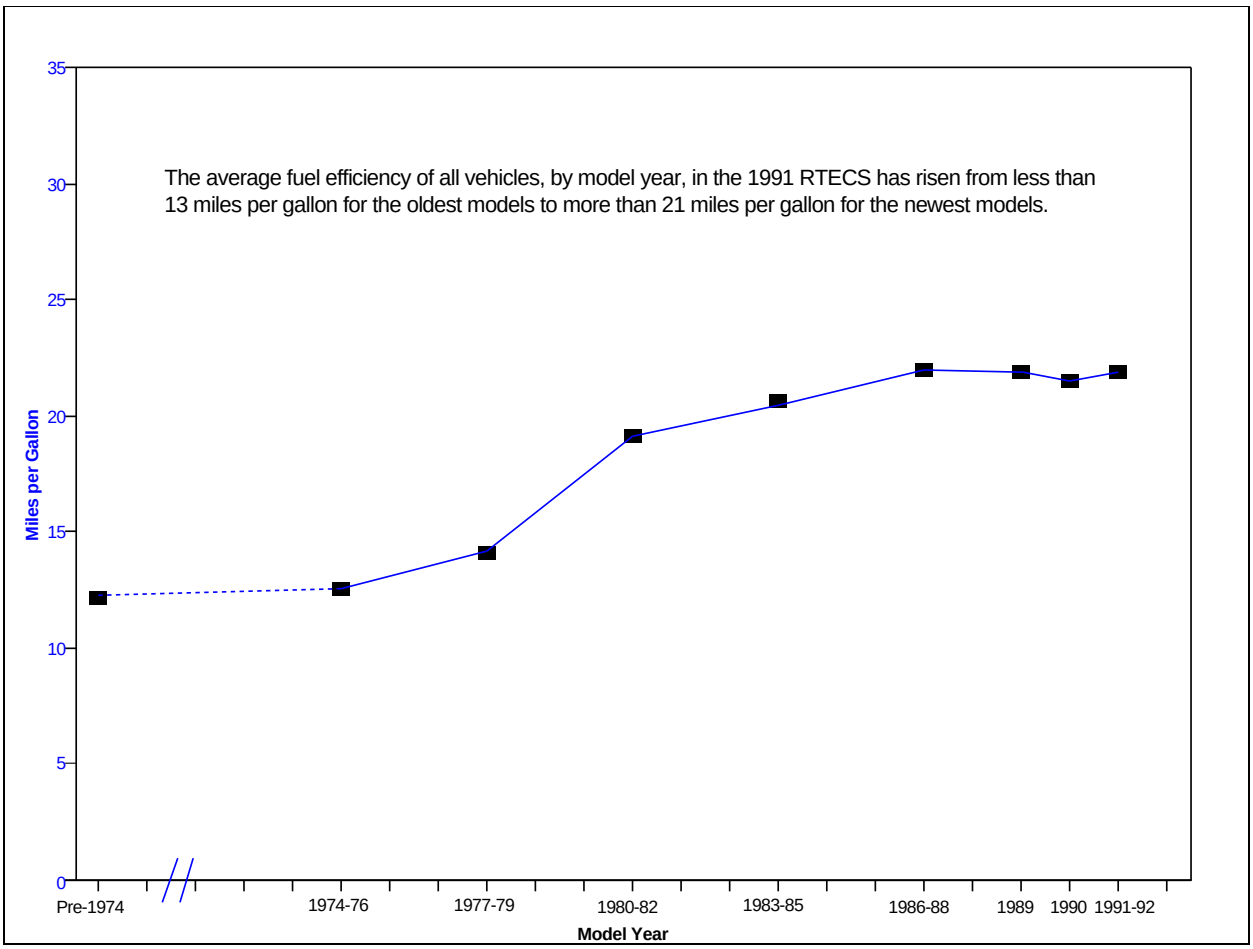
Of the vehicle characteristics measured in the 1991 RTECS, the two most important ones affecting fuel efficiency are the model year and the type of vehicle. The 1991 RTECS also identified differences in average vehicle fuel efficiency based on household location, composition, and income.

Model Year

The fuel efficiency of household vehicles has increased significantly over the past 14 years. For 1979 and earlier models, the average is 14.1 MPG or less. Since 1983, the average has risen above 20 MPG and has leveled out at close to 22 MPG (Figure 13). The increase is largely due to a combination of the sharp increase in gasoline prices in the 1970's, which stimulated demand for more fuel-efficient vehicles, and the implementation of Corporate Average Fuel Economy (CAFE)[6] standards.

Figure 13. Average Fuel Efficiency of All Vehicles, by Model Year

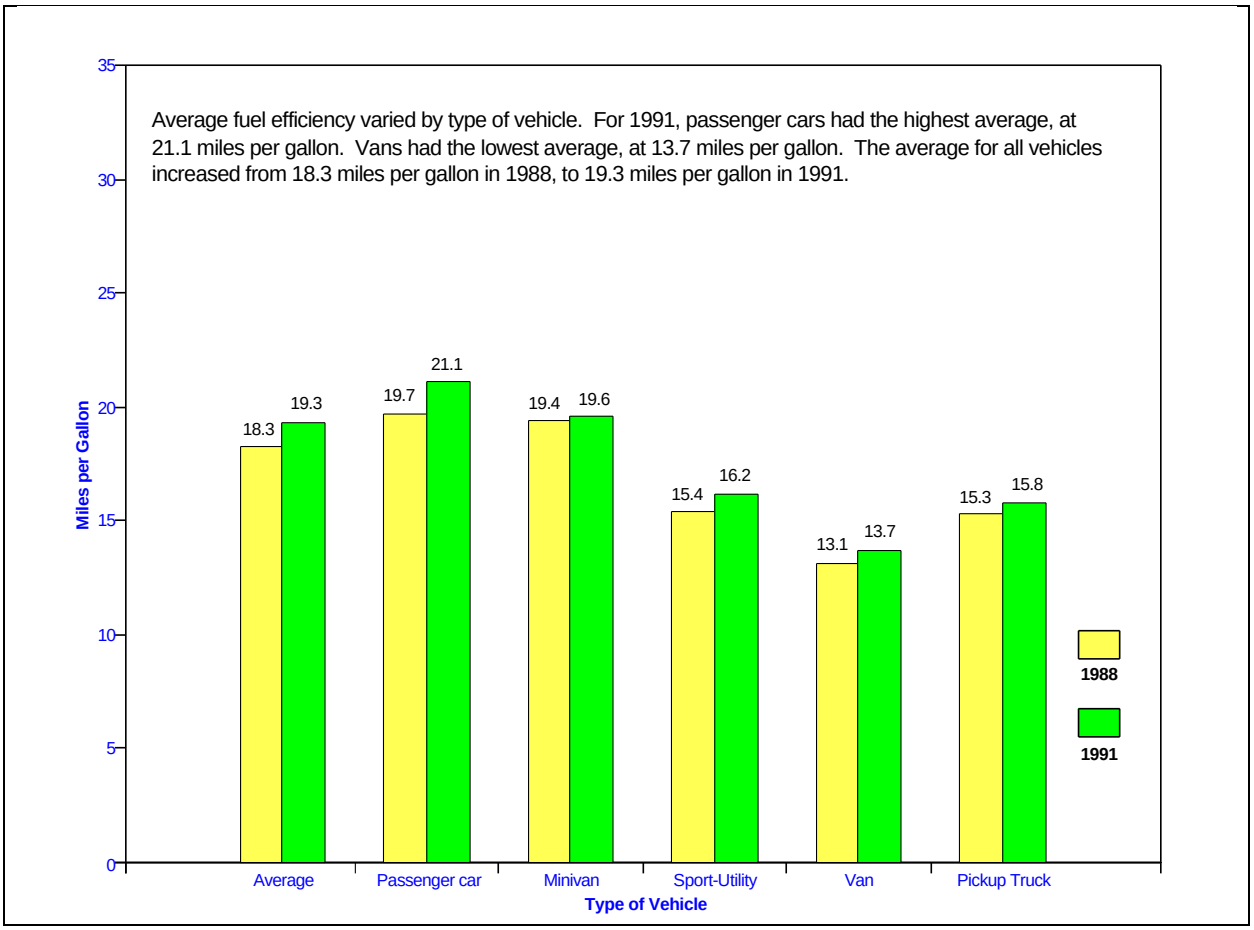
[6]Corporate Average Fuel Economy (CAFE) standards were established by the Energy Policy and Conservation Act of 1975. The standards took effect in 1978.



Source: Energy Information Administration, Office of Energy Markets and End Use, 1991 Residential Transportation Energy Consumption Survey.

Even though the average fuel efficiency of new vehicles has stabilized over the past several years, the average for the entire stock is still increasing as older, less fuel-efficient vehicles are replaced by newer vehicles that are more fuel efficient. Between 1988 and 1991,[7] average fuel efficiency increased for all vehicles and for passenger cars in particular (Figure 14). The fuel economy of the total stock is expected to improve further as older, less efficient vehicles continue to be replaced; however, the rate of improvement will slow as the percentage of pre-1979 vehicles being replaced declines. Eventually, the fuel efficiency of new vehicles will need to be improved further in order to boost the average fuel economy.

Figure 14. Average Fuel Efficiency of All Vehicles, by Type of Vehicle



Source: Energy Information Administration, Office of Energy Markets and End Use, 1991 Residential Transportation Energy Consumption Survey.

[7]Fuel-efficiency data from the 1983 and 1985 RTECS cannot be directly compared to the 1988 or 1991 RTECS because of the change in the RTECS fuel-efficiency methodology.

Type of Vehicle

Another factor affecting average fuel efficiency is the composition of the vehicle stock. There is a fairly large variation in fuel efficiency between different vehicle types, which are subject to different CAFE standards.[8] For example, minivans, large vans, and pickup trucks are less fuel efficient and have lower CAFE standards than passenger cars. These types of vehicles have increased in popularity in recent years, reducing the proportion of more fuel-efficient passenger cars in the residential fleet--from about 75 percent of the new vehicle stock (1988-1989 models) in 1988 to only 66 percent of the new vehicle stock (1991-1992 models) in 1991. Because of the increasing proportion of minivans, large vans, and pickup trucks, the new vehicle fleet is less fuel efficient on average than it would have been if the mix of passenger cars and other vehicles had not changed.

Between 1988 and 1991, vehicles with three types of characteristics showed significant improvements in fuel efficiencies: passenger cars (from 19.7 MPG in 1988 to 21.1 MPG in 1991), vehicles equipped with automatic transmissions (from 17.1 MPG to 18.4 MPG), and vehicles with engines 4.5 liters or larger (from 11.8 MPG to 14.0 MPG). Differences between the 1988 and 1991 surveys for other vehicle characteristics are not statistically significant.

Location of Household

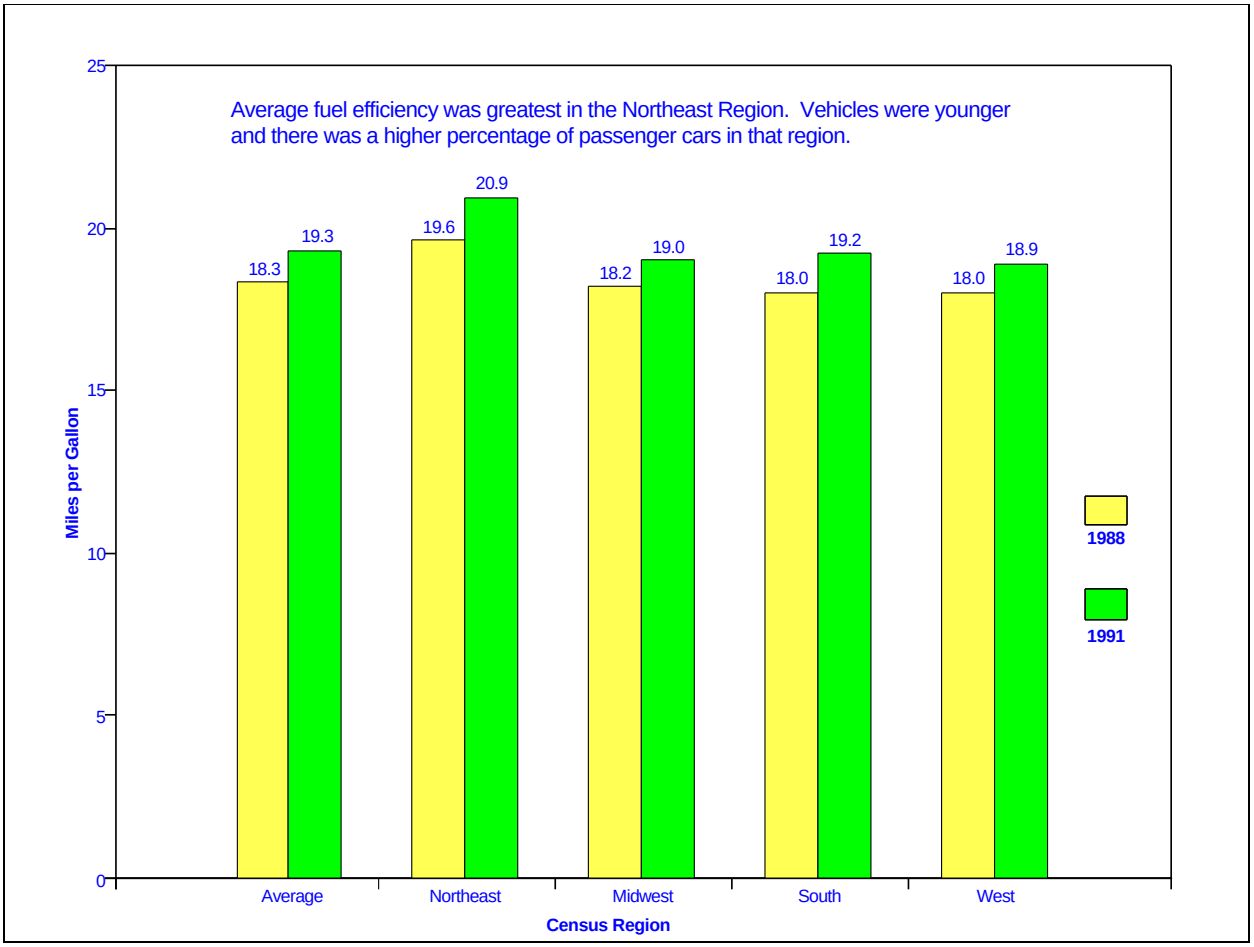
As in the 1988 RTECS, vehicles in households located in the Northeast were, on average, more fuel efficient in 1991 than those in other regions (Figure 15). Vehicles in the Northeast averaged nearly 21 MPG while those in the Midwest, South, and West averaged closer to 19 MPG. The apparent reason for this finding is that, on average, vehicles in the Northeast were newer and more likely to be passenger cars--two of the key factors that contribute to higher average fuel efficiency (Figures 13 and 14). Newer vehicles are defined as model years 1983 and later, and older models as 1979 or earlier. In the Northeast, about 12 percent of the vehicles were older (compared with 24 to 30 percent in the other three regions) and about 77 percent were newer (compared with 58 to 65 percent in the other regions). The Northeast also had a higher proportion of passenger cars in its vehicle mix (80 percent compared with 67 to 71 percent in the other three regions).

On average, vehicles in the central city and suburbs were more fuel efficient than vehicles used in rural[9] areas (close to 20 MPG for central cities and suburbs compared with 18 MPG for nonmetropolitan areas). The two primary factors contributing to the lower fuel efficiency in rural areas are the relatively older age of the vehicle and the relatively smaller percentage of passenger cars in the vehicle stock. In rural areas, 31 percent of the vehicles were older vehicles and 56 percent were newer vehicles. This compares with 20 percent older/70 percent newer in suburban areas and 22 percent older/65 percent newer in central cities. In addition, only 60 percent of all vehicles in rural areas were classified as passenger cars (the rest were primarily pickup trucks and sport-utility vehicles) compared with 74 percent in suburban areas and 78 percent in central cities.

[8]Since 1983, CAFE standards for new model passenger cars have been set in the 26.0 to 27.5 MPG range (27.5 for 1990 and newer models). Standards for light trucks, which include mini-vans and sport-utility vehicles, have been in the 19.0 to 20.5 range since 1983 (20.2 MPG in 1991). For a manufacturer to meet the passenger car or light-truck standard, the models in the fleet that fall below the standard must be offset by models that exceed the standard, such that a sales-weighted fleet average MPG meets the CAFE standards.

[9]When the term "rural" is used, it refers to all nonmetropolitan areas in the United States. These are areas that are not located in a Metropolitan Statistical Area. (See the Glossary for definition.)

Figure 15. Average Fuel Efficiency of All Vehicles, by Census Region



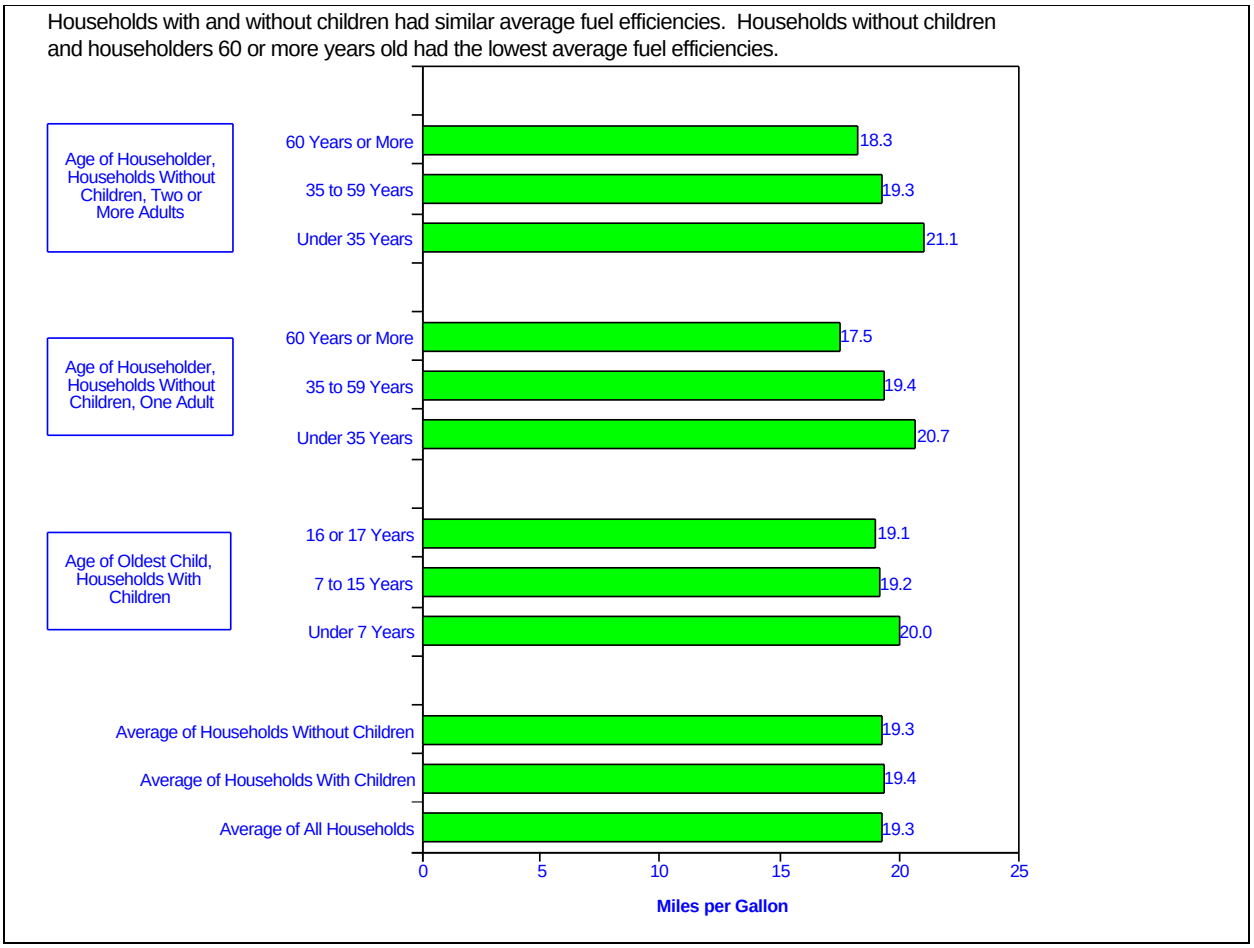
Source: Energy Information Administration, Office of Energy Markets and End Use, 1991 Residential Transportation Energy Consumption Survey.

Composition of Household

No significant differences in fuel efficiency were found between households with children and households without children. Vehicles in households with children averaged 19.4 MPG, compared with 19.3 MPG for vehicles in households without children.

In households without children, average fuel efficiencies varied based on the age of the oldest household member (Figure 16). Vehicles in households in which the oldest adult was under 35 years old were more fuel efficient than those with older drivers. This difference can be attributed to the fact that older drivers, on average, had older vehicles which are, on average, less fuel efficient.

Figure 16. Average Fuel Efficiency of All Vehicles, by Household Composition

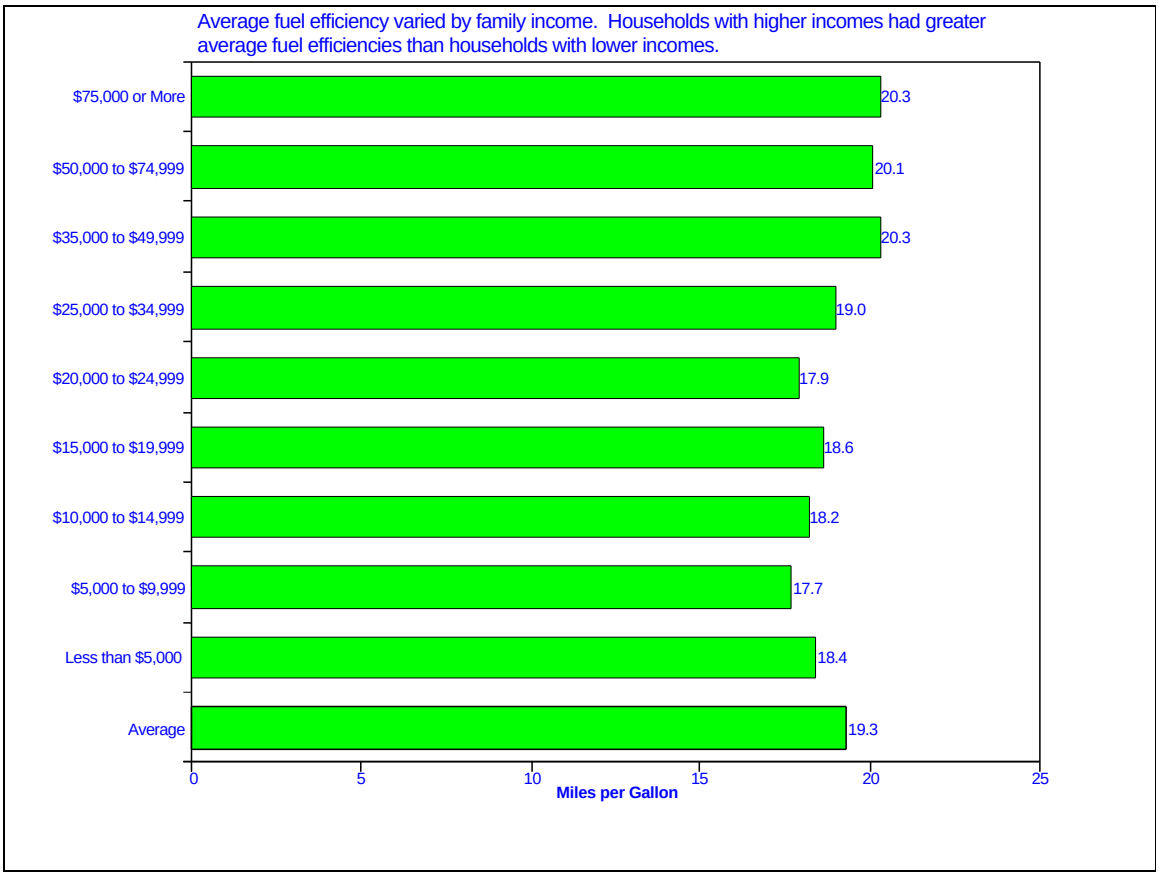


Source: Energy Information Administration, Office of Energy Markets and End Use, 1991 Residential Transportation Energy Consumption Survey.

Family Income

Vehicles in households with higher incomes had higher average fuel efficiencies than those in households with lower incomes (Figure 17). Households in the income categories starting at $35,000/year averaged at least 20 MPG, while those in income groups below $35,000/year averaged 19 MPG or less. This could be explained by the consistent increase in the percentage of newer models (1983 and later) with each higher income category. Partially offsetting the effect of vehicle age is the distribution of vehicle type as a function of income. Households in income categories below $20,000/year had a higher percentage of passenger cars than households in the next higher income categories up to $75,000/year (75-83 percent versus 67-70 percent). For households in the highest income categories (over $75,000/year), the percentage of passenger cars was similar to the lowest income categories (79 percent).

Figure 17. Average Fuel Efficiency of All Vehicles, by 1990 Family Income



Source: Energy Information Administration, Office of Energy Markets and End Use, 1991 Residential Transportation Energy Consumption Survey.

Vehicle Fuel Consumption

Household vehicles consumed a total of 82.8 billion gallons of fuel in 1991 (compared to 82.4 billion gallons in

1988). This equates to 548 gallons per vehicle (559 gallons in 1988) and 979 gallons per household (1,014 gallons in 1988). The 1991 RTECS identified differences in average household and vehicle fuel consumption based on household characteristics (location and composition) and vehicle characteristics (type and model year).

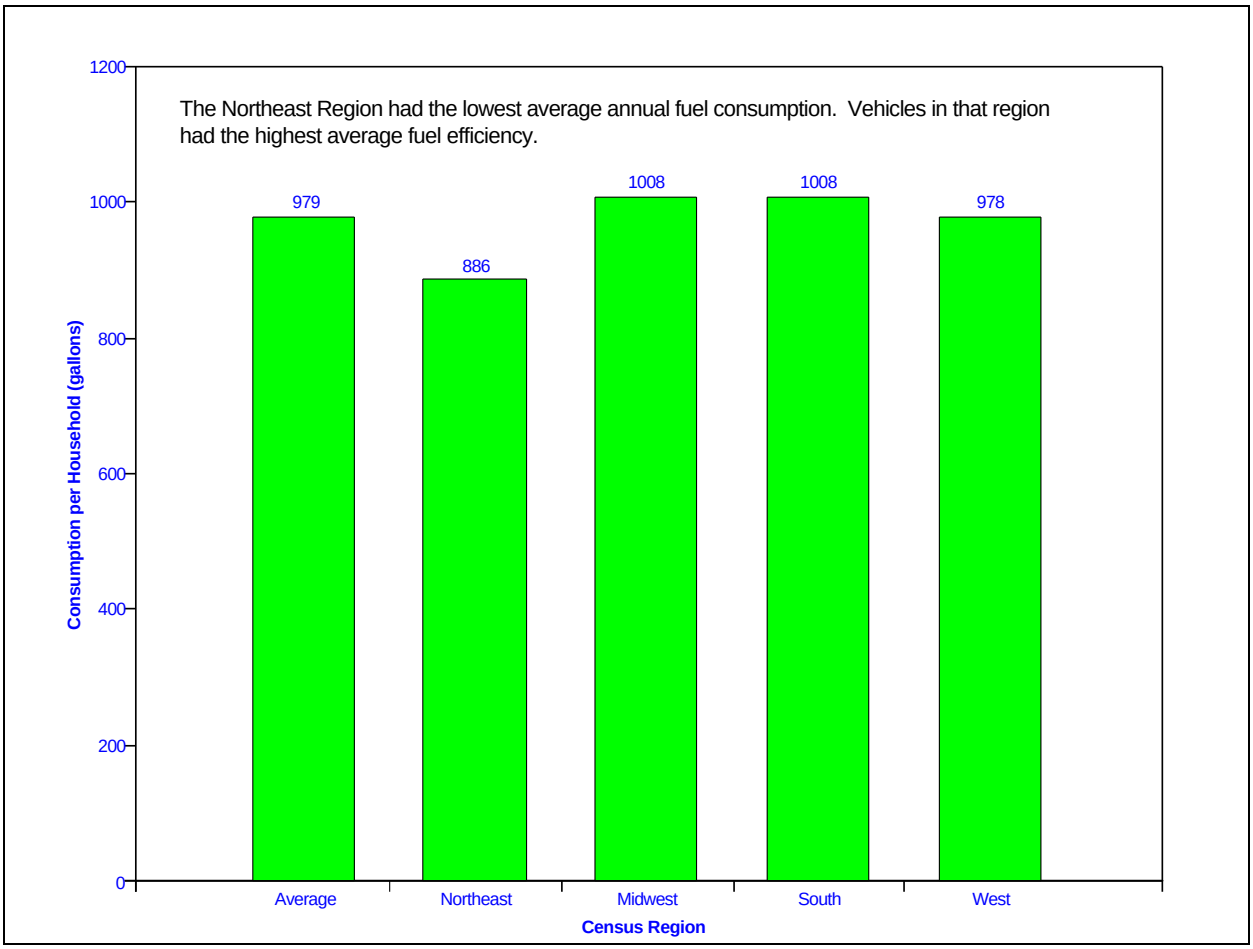
Location of Household

Average annual vehicle fuel consumption was lower in the Northeast than in any other Census region (Figures 18 and 19). Households in the Northeast consumed a total of 886 gallons per household, compared with an average range of 978 to 1,008 gallons per household in the other three regions. Households in the Northeast also consumed

Calculation of Vehicle Fuel Consumption

Total vehicle fuel consumption is a function of fuel efficiency and the number of miles traveled. The 1991 RTECS calculated annual vehicle fuel consumption by dividing the annual vehicle miles traveled (VMT) by the annual fuel efficiency. These fuel efficiencies were derived based on EPA test data rather than on actual fuel purchases (see Calculation of Vehicle Fuel Efficiency). Because the RTECS did not directly measure fuel consumption, this report does not consider the effects of driving behavior and vehicle aging on energy consumption.

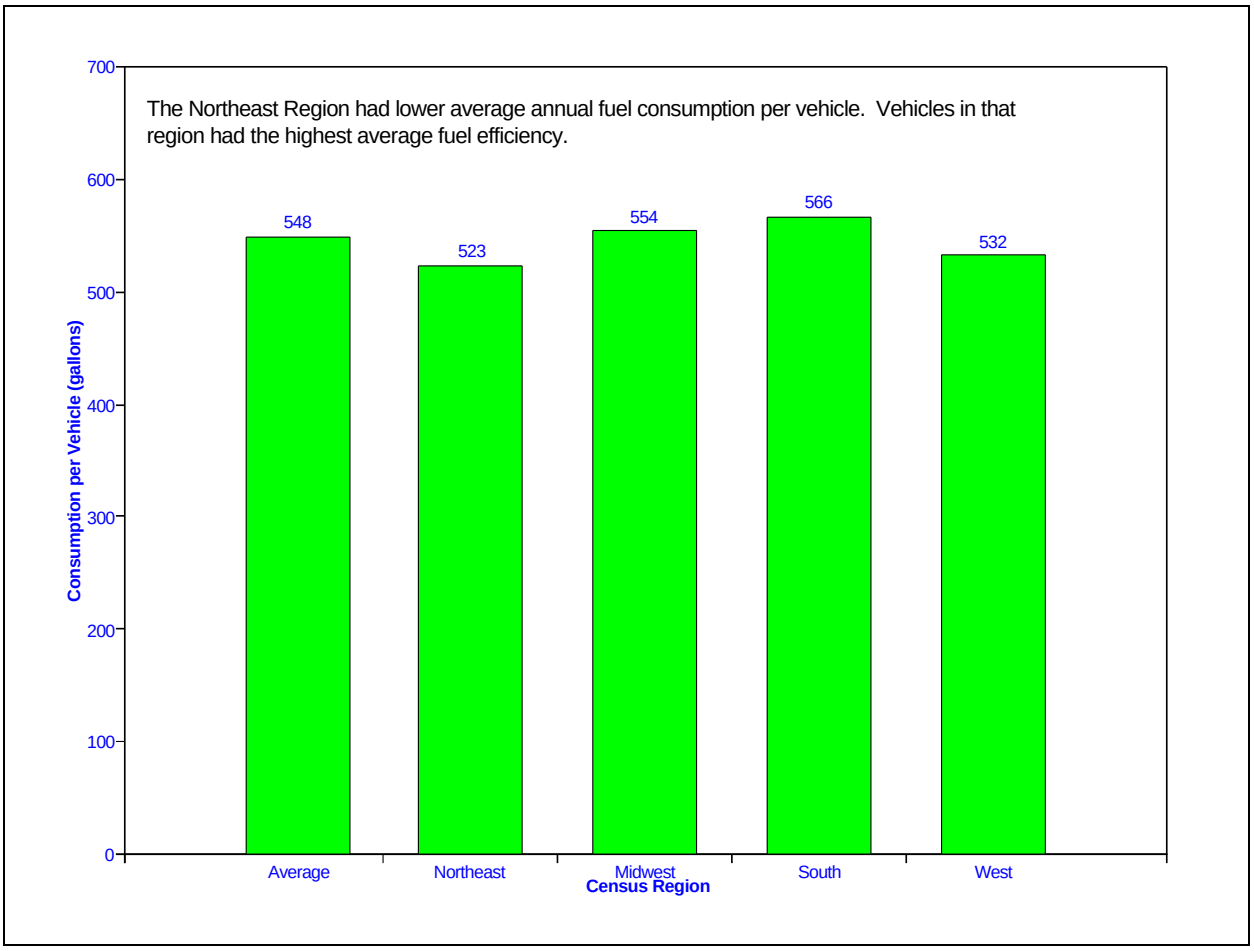
Figure 18. Average Annual Household Fuel Consumption, by Census Region



Source: Energy Information Administration, Office of Energy Markets and End Use, 1991 Residential Transportation Energy Consumption Survey.

less on average per vehicle than the South (523 gallons versus 566 gallons), but not significantly less than the other two regions. The lower average consumption for the Northeast was largely due to the higher fuel efficiency of vehicles in the region. Vehicle miles traveled (VMT), per household as well as per vehicle, were similar for all four regions.

Figure 19. Average Annual Vehicle Fuel Consumption, by Census Region



Source: Energy Information Administration, Office of Energy Markets and End Use, 1991 Residential Transportation Energy Consumption Survey.

Households in rural areas used more fuel per household and per vehicle than central city households (34 percent greater per household and 13 percent greater per vehicle) or suburban households (26 percent greater per household and 9 percent greater per vehicle). These differences can be explained by the lower fuel efficiency in rural areas (which accounted for greater average consumption) and the lower VMT per household in central city areas (which

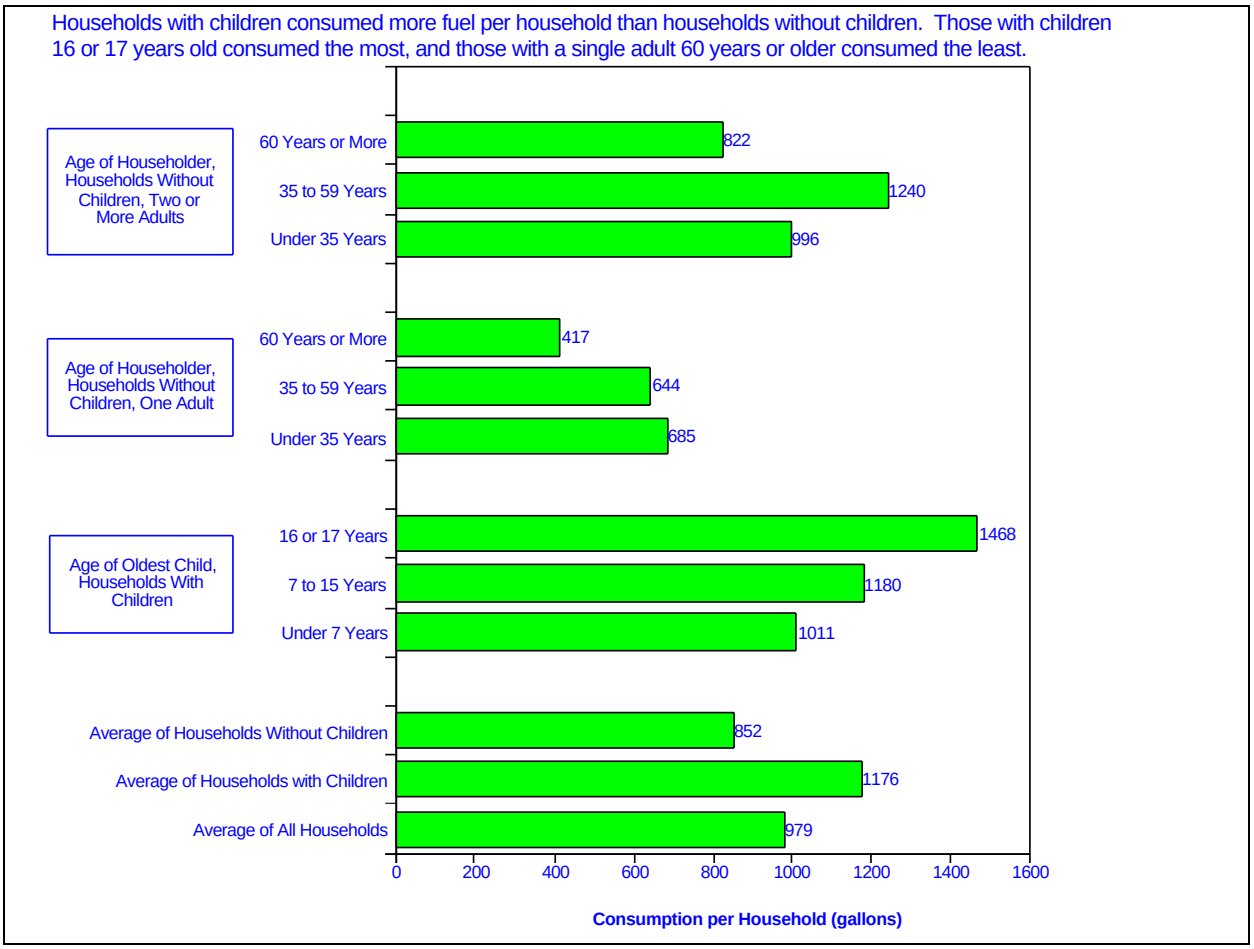
reduced average household and vehicle consumption).

Composition of Household

Trends in average household fuel consumption parallel trends in VMT per household. The variation in consumption among different household categories was largely controlled by VMT per household and less by other factors.

Households without children consumed more fuel in total than households with children (44.0 billion gallons compared with 38.9 billion gallons). However, households with children consumed more fuel on average (1,176 gallons per year compared with 852 gallons in households without children--Figure 20). Those whose oldest child was 16 or 17 years old consumed more fuel than any other group (1,468 gallons). Not surprisingly, households with no children and only one adult consumed the least fuel (556 gallons per year). These observations are consistent with the finding that lower VMT correlated with lower fuel consumption (see Chapter 3).

Figure 20. Average Annual Household Fuel Consumption, by Household Composition



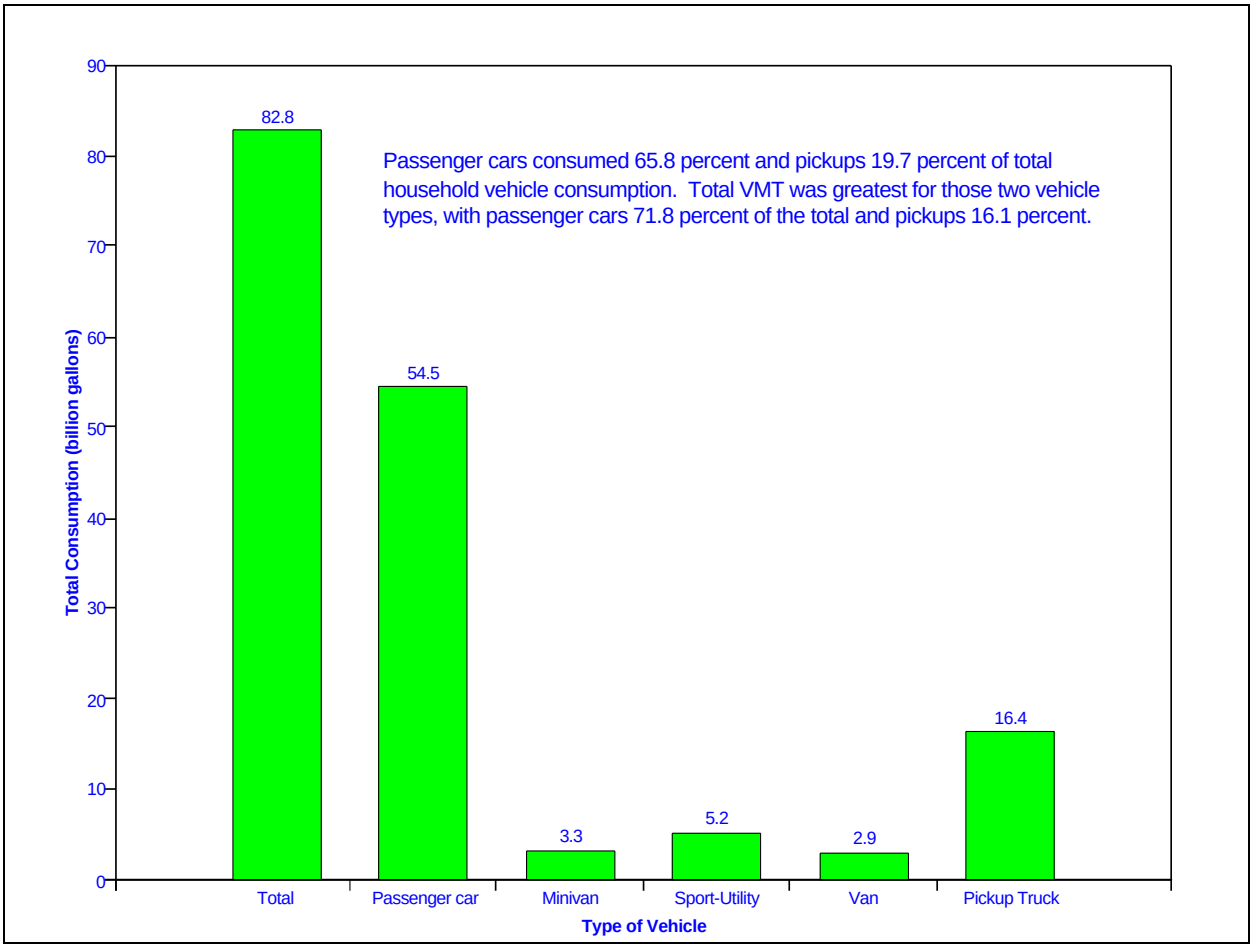
Source: Energy Information Administration, Office of Energy Markets and End Use, 1991 Residential Transportation Energy Consumption Survey.

Average annual fuel consumption per vehicle did not vary much by household composition. All but one of the household subcategory groups consumed in the range of 466-613 gallons/year, on average. Households with a single adult 60 years or older and no children, however, consumed significantly less fuel per vehicle (347 gallons) primarily because their VMT per vehicle was lower than for any other group.

Type of Vehicle

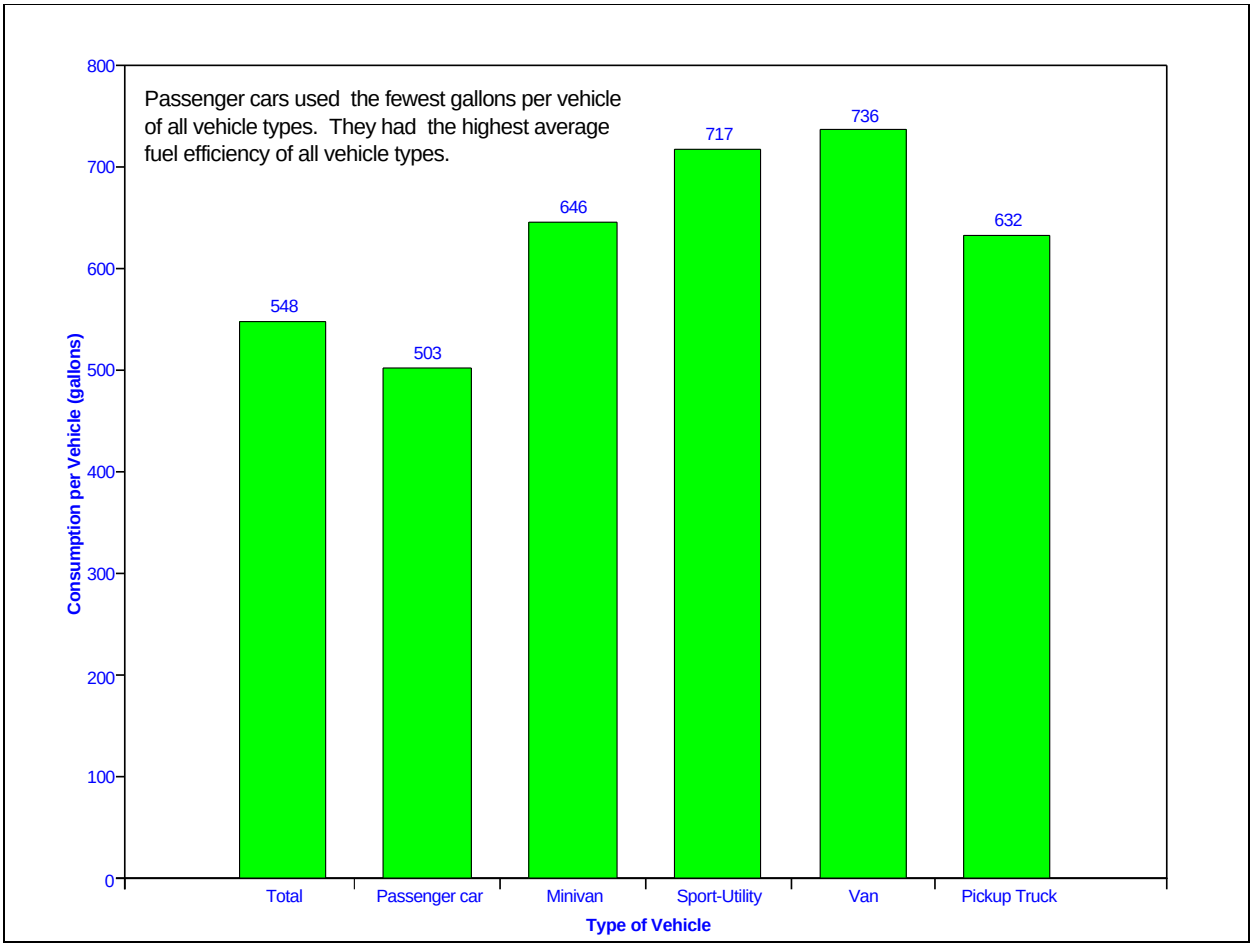
The 1991 RTECS data by type of vehicle reveal different patterns for total and average annual vehicle fuel consumption (Figures 21 and 22). For example, passenger cars consumed the most fuel in total (54.5 billion gallons) but the least fuel per vehicle (503 gallons). Total consumption for the different types of vehicles is the product of average fuel efficiency and total VMT. For passenger cars, the high consumption was mainly the result of the high total VMT, which is a function of the greater number of these vehicles.

Figure 21. Total Annual Vehicle Fuel Consumption, by Vehicle Type



Source: Energy Information Administration, Office of Energy Markets and End Use, 1991 Residential Transportation Energy Consumption Survey.

Figure 22. Average Annual Vehicle Fuel Consumption, by Vehicle Type



Source: Energy Information Administration, Office of Energy Markets and End Use, 1991 Residential Transportation Energy Consumption Survey.

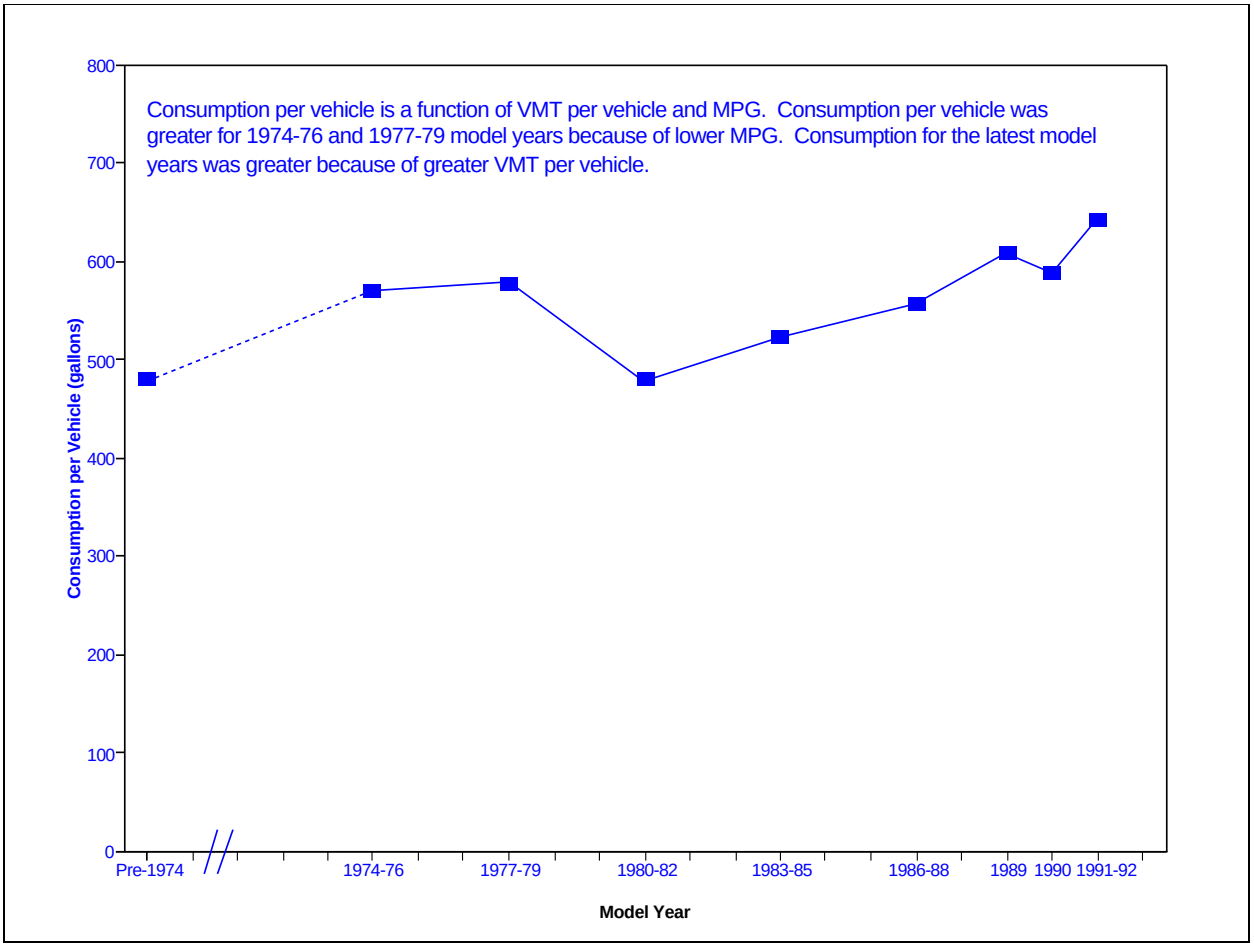
One trend which may affect future consumption patterns is the increasing popularity of minivans, which increased their market share from 1.5 percent of vehicles in 1988 to 3.4 percent in 1991. Minivans (which are classified as light trucks for CAFE purposes) are less fuel efficient on average than passenger cars. The percentage of new model passenger cars has already declined from 75 percent in the 1988 RTECS to 66 percent in 1991. If the recent trend continues, minivans will increasingly replace passenger cars in the vehicle stock. This change in vehicle mix will raise the overall average fuel consumption per vehicle above the comparable level if passenger cars had been purchased instead of minivans.

Model Year

Based on the 1991 RTECS, consumption per vehicle increased from pre-1974 models through 1979 models, then declined for the 1980-1982 model year category. The increase for the models of the 1970 decade reflects the higher VMT per vehicle for those models and relatively little increase in fuel efficiency. The decreases for the 1980-1982

models are due to major improvements in fuel efficiency (Figure 23). In the early 1980's, there was no significant change in VMT per vehicle. Since the 1982 model year, continuing increases in VMT per vehicle more than offset fuel savings due to improvements in fuel efficiency, increasing consumption per vehicle.

Figure 23. Average Annual Vehicle Fuel Consumption, by Vehicle Model Year



Source: Energy Information Administration, Office of Energy Markets and End Use, 1991 Residential Transportation Energy Consumption Survey.

Potential Fuel Savings from Replacing Old Vehicles

Using the RTECS data, it is possible to estimate energy savings that could occur if a portion of the existing vehicle stock were replaced with more fuel-efficient vehicles[10]. However, it is difficult to accurately estimate these savings because the new, replacement vehicles may be used differently. RTECS data indicate that newer vehicles are driven more on average, and the acquisition of a newer vehicle may cause households with more than one vehicle to alter the pattern of vehicle usage in ways that are difficult to characterize. Even though it is likely that the replacement vehicles will be driven more than the older vehicles they replace, a particular household may acquire a newer vehicle for a specific purpose that precludes it from becoming the household's primary, or high VMT, vehicle.

[10]A similar analysis was performed for household appliances and equipment in "Potential Efficiency Gains and Energy Savings from Replacing 1990 Stock with 1990 New Appliance Units," *Household Energy Consumption and Expenditures 1990*, DOE/EIA-0321(90), pp. 30-35. That analysis showed that significant savings are possible if older, less efficient household equipment is replaced with new energy-efficient equipment.

Given these difficulties, a simple, hypothetical example may better illustrate possible fuel savings. By starting with the simplifying assumption that the replacement vehicle is driven the same number of miles as the older vehicle it replaces, the required calculation can be made easily with the RTECS data.

First, assume all vehicles that are older than the 1980 model year are replaced with new (1991-92) models. By targeting only pre-1980 vehicles for replacement, it is possible to estimate the impact of replacing the least efficient model years in the stock with the most efficient. According to the RTECS, 35.1 million vehicles from the pre-1980 model year consumed a total of 19.1 billion gallons of fuel in 1991 (23 percent of all fuel consumed by household vehicles). These older vehicles traveled a total of 253 billion miles (16 percent of total VMT in 1991), for an average VMT per vehicle of 7,200 miles. Assuming the new model replacement vehicles also averaged 7,200 miles each, and their average fuel efficiency was 21.8 MPG (the average of the new 1991 vehicles), the replacement vehicles would use only 11.6 billion gallons of fuel--a fuel savings of 7.5 billion gallons. This is equivalent to 9.1 percent of the total 1991 fuel consumption.[11]

Even greater savings could be realized if the replacement vehicles were more fuel efficient than the average of new 1991 vehicles. For example, the fuel savings would increase to 10.7 billion gallons (13 percent of total fuel consumption in 1991) if the replacement vehicles averaged 30 MPG; 12.8 billion gallons (15 percent) for 40 MPG; and 14.0 billion gallons (17 percent) for 50 MPG.

Although these results are significant, the energy savings are not as impressive as those estimated in a similar analysis for replacement of older household appliances. The potential energy savings from the replacement of old household appliances are relatively larger because inefficient household appliances represent a relatively larger proportion of the household appliance stock. Fuel savings due to retirement of "gas guzzlers" are relatively smaller because a substantial number of these vehicles (i.e., pre-1980 vehicles) already have been taken off the road.

Fuel Consumption in Households Participating in Income Supplement Programs

The 1991 RTECS included data on vehicle use, fuel consumption, and fuel expenditures for households that participate in several income supplement programs (Table 6), ranging from Social Security and pension programs to food stamps and Aid to Families with Dependent Children (AFDC). Households may qualify for more than one program. With the exception of Social Security, pension programs, and unemployment benefits, these programs are targeted at low-income households.

On average, households in income supplement programs traveled fewer miles, consumed less fuel, and spent less money for motor fuels than the population of all households with vehicles. These findings were consistent with observations, noted earlier, for households with older drivers (such as retired persons) and for lower income households.

[11]The Office of Technology Assessment (OTA) estimated the impact of a program that would allow automobile companies to purchase and retire pre-1975 cars for the purpose of removing inefficient, polluting vehicles from the road. In return, the companies would be awarded credits toward meeting their CAFE standards. OTA estimated that 370-520 gallons per vehicle per year could be saved. The total savings would depend upon the number of vehicles scrapped. The 1991 RTECS estimated that there are approximately 13.5 million pre-1975 vehicles in the stock. If all were replaced, and the OTA estimate of savings per vehicle is used, between 5 and 7 billion gallons of fuel would be saved. Although OTA used a different set of assumptions and a different methodology, the range of savings is very close to the fuel savings of 7.5 billion gallons estimated here. U.S. Congress, Office of Technology Assessment, *Retiring Old Cars: Programs To Save Gasoline and Reduce Emissions*, OTA-E-536, July 1992.

Table 6. U.S. per Household Vehicle Miles Traveled, Vehicle Fuel Consumption and Expenditures for Income Supplement Programs, 1991

Income Supplement Program	Number of Households with Vehicles (million)	Average per Household			
		Number of Vehicles	Vehicle Miles Traveled (thousand)	Consumption (gallons)	Expenditures (dollars)
Total U.S.	84.6	1.8	18.9	979	1,161
Social Security[a]	21.4	1.6	12.9	718	852
Pension Funds[b]	15.3	1.7	14.1	756	898
Unemployment Benefits	2.7	1.9	21.1	1,087	1,292
Food Stamps	3.4	1.3	12.2	710	828
AFDC Income[c]	2.2	1.4	13.4	769	898
SSI Income[d]	1.7	1.4	11.3	649	758
Other Aid	1.5	1.4	11.2	644	753

[a]Includes social security and railroad retirement pension income.
[b]Pension income other than social security and railroad retirement.
[c]AFDC--Aid to Families with Dependent Children.
[d]Supplemental security income administered by the Social Security Administration.
Source: Energy Information Administration, Office of Energy Markets and End Use, 1991 Residential Transportation Energy Consumption Survey.

The only exception is households that received unemployment benefits. These households had more vehicles, traveled more miles, consumed more fuel, and spent more on motor fuels than the other groups that received income supplements. Inclusion in this category required only that at least one household member received unemployment benefits sometime during the year. These households were at or near national household averages for family income, numbers of drivers and numbers of vehicles, i.e., they were more typical of the national average than the other income supplement households.

The 1991 RTECS collected more detailed information from a small number of households that received, or were eligible to receive, public assistance such as food stamps, AFDC, and LIHEAP[12] (Table 7). Because the total number of cases in the RTECS sample with these characteristics was small, the relative standard errors were fairly large. As a result, some data in this table were withheld.

Low-income households receiving public assistance spent a larger proportion of their incomes to fuel their vehicles--typically twice as much as higher income households. For example, Midwest households receiving food stamps spent 13.1 percent of their income on motor fuel, compared with only 5.4 percent for all households in the Midwest Census region. Because of the large percentage of income spent on fuel, low-income households were affected relatively more than other households by any change in the price of fuel.

Low-income households receiving public assistance also had a greater percentage of older vehicles than average (Table 7). The average age of their vehicles was typically two or more years older than higher income households, so they did not benefit as much from the greater fuel efficiency of newer vehicles. In addition, many of the older vehicles required more expensive, higher grades of gasoline, which added to fuel expenditures.

[12]Low-Income Home Energy Assistance Program. Established by the Low-Income Home Energy Assistance Act of 1981, LIHEAP provides Federal funds to States to assist eligible low-income households with heating and cooling bills.

Within each vehicle vintage category, however, the vehicles belonging to low-income groups had similar to slightly better fuel efficiency than the overall average for each category. The lower fuel efficiency of vehicles belonging to low-income groups was therefore a reflection of the age of the vehicles, not the type of vehicle. Although low-income groups on average had older vehicles, the vehicle type in itself was not less efficient than higher income groups.

Table 7. Summary of Household and Vehicle Characteristics by Categories of Income Assistance, 1991

Household or Vehicle Characteristic	All Households with Vehicles	Households Receiving or Eligible for Assistance			
		Food Stamps	AFDC Income	Eligible for LIHEAP	Received LIHEAP
Number of Households with Vehicles (million)					
All Regions	84.6	3.4	2.2	20.8	2.9
Northeast	16.0	Q	Q	3.0	Q
Midwest	21.1	Q	Q	4.9	0.9
South	29.5	1.4	Q	8.5	0.7
West	18.0	Q	Q	4.3	0.7
Income Spent on Motor Fuel (percent of total income)					
All Regions	5.4	12.6	13.4	11.3	11.7
Northeast	3.9	Q	Q	8.2	13.2
Midwest	5.4	13.1	12.8	11.2	10.7
South	6.0	10.9	11.8	11.7	14.0
West	5.5	12.5	13.4	12.7	9.6
Average Age of Vehicles (years)					
All Regions	7.7	11.8	11.3	9.9	11.6
Northeast	6.1	Q	Q	6.8	8.9
Midwest	7.7	Q	8.9	9.7	12.2
South	7.7	10.7	11.5	9.9	10.9
West	8.9	15.2	Q	11.7	13.1
Number of Vehicles by Vintage (million)					
All Years	151.2	4.3	3.0	29.8	3.8
1989 to 1992	28.5	Q	Q	3.7	0.4
1983 to 1988	70.0	1.1	0.9	10.1	0.8
1977 to 1982	34.2	1.6	Q	10.1	1.5
1976 and Before	18.5	1.2	Q	6.0	1.0
Average Fuel Efficiency (miles per gallon)					
All Years	19.3	17.2	17.4	17.9	17.1
1989 to 1992	21.7	Q	Q	22.7	22.5
1983 to 1988	21.4	22.4	21.3	21.5	22.5
1977 to 1982	16.4	16.8	Q	16.2	16.0
1976 and Before	12.4	12.3	Q	12.1	12.8

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, 1991 Residential Transportation Energy Consumption Survey.