



# **Light-Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2003**

## **Executive Summary**

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### *NOTICE*

*This technical report does not necessarily represent final EPA decisions or positions.  
It is intended to present technical analysis of issues using data that are currently available.*

*The purpose in the release of such reports is to facilitate the exchange of  
technical information and to inform the public of technical developments which  
may form the basis for a final EPA decision, position, or regulatory action.*

## **Introduction**

This report summarizes key fuel economy and technology usage trends related to model year 1975 through 2003 light vehicles sold in the United States. Light vehicles are those vehicles that EPA classifies as cars or light-duty trucks (sport utility vehicles, vans, and pickup trucks with less than 8,500 pounds gross vehicle weight ratings).

Model year 2003 light vehicles average 20.8 miles per gallon (mpg). New vehicle fuel economy peaked in 1987 and 1988 at 22.1 mpg and has been on a general downward trend since 1988. The average fuel economy for all model year 2003 light vehicles is six percent lower than it was in 1988. These fuel economy values are based on ‘real world’ estimates provided by the Federal government to consumers and are about 15 percent lower than the fuel economy values used by manufacturers and DOT for compliance with the Corporate Average Fuel Economy (CAFE) program.

In order to estimate the average fleet fuel economy for each model year, the measured fuel economy for each model is weighted by its sales volume. For model year 2003, EPA has used projected sales data that the auto companies are required to submit to the Agency. When EPA publishes the 2004 Trends Report, it will provide revised data based on actual sales information available at that time.

EPA has analyzed the variation in average fleet fuel economy that would have occurred in previous years as a result of using projected rather than actual sales. The variation is very low—plus or minus two percent (about 0.5 mpg). Readers therefore are encouraged to keep in mind that the data presented in this report may change slightly when the figures are re-calculated after the end of the model year.

## **Importance of Fuel Economy**

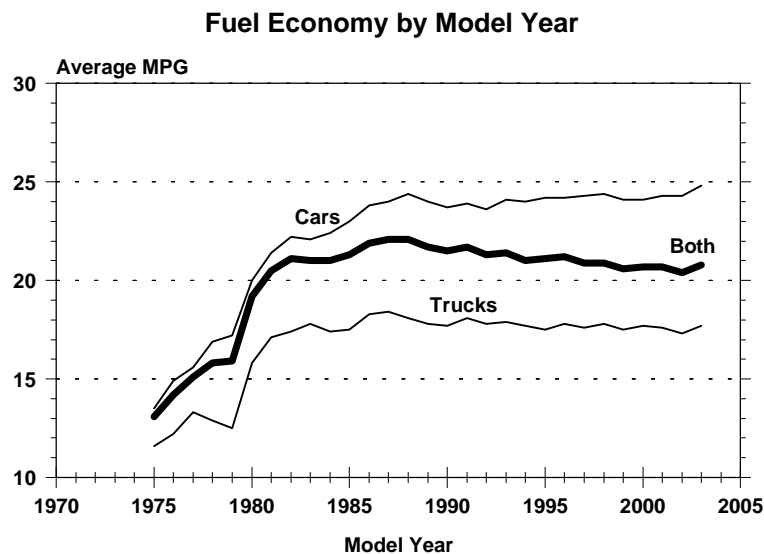
Fuel economy continues to be a major area of public and policy interest for several reasons, including:

1. Light vehicles account for approximately 40 percent of all U.S. oil consumption. Crude oil, from which nearly all light-vehicle fuels are made, is considered to be a finite natural resource.
2. Fuel economy is directly related to the cost of fueling a vehicle and is of great interest when oil and gasoline prices rise.
3. Fuel economy affects the level of the nation’s energy efficiency. Increases in energy efficiency can enhance energy security and reduce emissions of greenhouse gases. Fuel economy is directly related to carbon dioxide emissions, the most prevalent greenhouse gas. Light vehicles contribute about 20 percent of all U.S. carbon dioxide emissions.

## Highlight #1: Fuel Economy is 20.8 mpg for Model Year 2003

*There has been a general overall declining trend in new light-vehicle fuel economy since 1988. The average fuel economy for all model year 2003 light vehicles is 20.8 mpg – six percent lower than the peak value of 22.1 mpg achieved in 1987 and 1988. Average model year 2003 fuel economy is 24.8 mpg for cars and 17.7 mpg for light trucks.*

New light-vehicle fuel economy improved fleet-wide from the middle 1970s through the late 1980s, but it has been generally falling since then due primarily to the increase in the sales fraction of less efficient light-duty trucks. Viewed separately, the average fuel economy for new cars has changed very little since 1986, varying between 23.6 to 24.8 mpg. Similarly, the average fuel economy for new light trucks has been largely unchanged since 1986, ranging from 17.3 to 18.4 mpg.



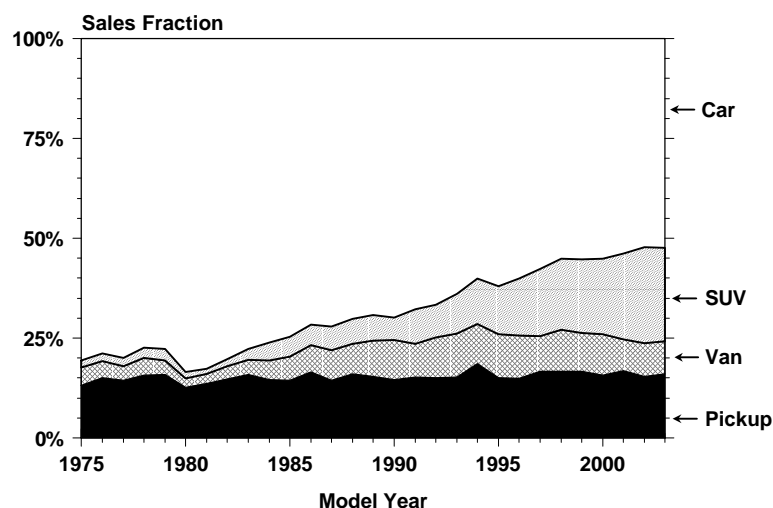
## Highlight #2: Trucks Represent Nearly Half of New Vehicle Sales

*Sales of light trucks, which include sport utility vehicles (SUVs), vans, and pickup trucks, have risen steadily for over 20 years and now make up 48 percent of the U.S. light vehicle market—more than twice their market share in 1983.*

Growth in the light truck market has been led recently by the increase in the market share of SUVs. The SUV market share increased by more than a factor of ten, from less than two percent of the overall new light vehicle market in 1975 to 24 percent of the market in 2003. Over the same period, the market share for vans increased by 80 percent, while that for pickups remained relatively constant. Between 1975 and 2003, market share for new passenger cars and station wagons decreased from 81 to 52 percent. For model year 2003, cars average 24.8 mpg, vans 19.6 mpg, SUVs 17.8 mpg, and pickups 16.8 mpg.

The increasing market share of light trucks, which in recent years has averaged more than six mpg less than cars, accounts for much of the decline in fuel economy of the overall new light vehicle fleet.

**Sales Fraction by Vehicle Type**

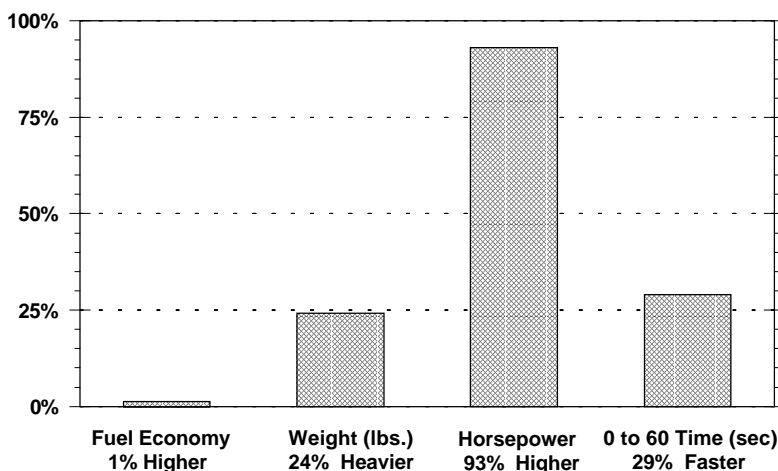


### Highlight #3: Over the Past Two Decades, Fuel Economy Has Been Relatively Constant, While Vehicle Weight and Power Have Been Increasing

*Technologies continue to enter the new light vehicle fleet and are being used, for example, to increase light vehicle acceleration performance, while fuel economy is not being increased. Based on accepted engineering relationships, however, had the new 2003 light vehicle fleet had the same average performance and same distribution of weight as in 1981, it could have achieved about 33 percent higher fuel economy.*

Technologies—such as engines with more valves and more sophisticated fuel injection systems, and transmissions with lockup torque convertors and extra gears—continue to penetrate the new light vehicle fleet. The trend has clearly been to apply these new technologies to accommodate increases in average new vehicle weight, power, and performance while maintaining a constant level of fuel economy. This is reflected by heavier average vehicle weight, rising average horsepower, and faster average 0 to 60 mile-per-hour acceleration time.

**Percent Change from 1981 to 2003  
in Average Vehicle Characteristics**



## Important Notes With Respect to the Data Used in This Report

Unless otherwise indicated, the fuel economy values in this report are based on laboratory data and have been adjusted downward by about 15 percent so that this data is equivalent to the real world estimates provided to consumers on new vehicle labels, in the EPA/DOE *Fuel Economy Guide*, and in EPA's *Green Vehicle Guide*. These adjusted fuel economy values are significantly lower than those used by the U.S. Department of Transportation (DOT) for compliance with Corporate Average Fuel Economy (CAFE) standards as, in addition to the 15-percent downward adjustment for real world driving, they also exclude credits for alternative fuel capability and test procedure changes that are included in the CAFE data reported by the U.S. DOT.

When comparing data in this report with those in previous reports in this series, please note that revisions are made in the data for some recent model years for which more complete and accurate sales and fuel economy data have become available.

Sales data for recent model years are based on confidential information provided to the government by the manufacturers. The sales data for model years 2002 and 2003 used in this report have been adjusted to take into account data available at the time the data base was frozen in September 2002.

## For More Information

*Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2003* (EPA420-R-03-006) is available electronically on the Office of Transportation and Air Quality's (OTAQ) Web site at:

[www.epa.gov/otaq/fetrends.htm](http://www.epa.gov/otaq/fetrends.htm)

You can also contact the OTAQ library for document information at:

U.S. Environmental Protection Agency  
Office of Transportation and Air Quality Library  
2000 Traverwood Drive  
Ann Arbor, MI 48105  
(734) 214-4311

The U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) have a fuel economy Web site that provides city and highway fuel economy data for individual models. You can also print the guide from the Web site:

[www.fueleconomy.gov](http://www.fueleconomy.gov)

A printed copy of the *Fuel Economy Guide* is available by calling DOE's National Alternative Fuels Hotline at (800) 423-1363.

EPA's Green Vehicle Guide Web site provides information about the air pollution emissions and fuel economy performance of vehicles:

[www.epa.gov/greenvehicles/](http://www.epa.gov/greenvehicles/)