



Light-Duty Automotive Technology and Fuel Economy Trends 1975 Through 2000

Executive Summary

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Introduction

This report summarizes key fuel economy and technology usage trends related to model year 1975 through 2000 light vehicles sold in the United States. Light vehicles include those vehicles that EPA and the U.S. Department of Transportation (DOT) classify as cars or light-duty trucks (sport utility vehicles, vans, and pickup trucks with less than 8,500 pounds gross vehicle weight ratings). The report finds that since 1988 average new light vehicle fuel economy has declined 1.9 miles per gallon (mpg), i.e., more than seven percent, primarily because light truck market share has increased and because fuel economy has been traded off for increased vehicle weight and performance.

The fuel economy values in this report are laboratory data and are significantly higher than the real world estimates used on new vehicle labels and in the *Fuel Economy Guide*. The fuel economy values in this report are similar to those used by the DOT for compliance with fuel economy standards, but because the values in this report exclude correction factors for alternative fuel capability and test procedure adjustments, they are always lower than those reported by DOT.

Importance of Fuel Economy

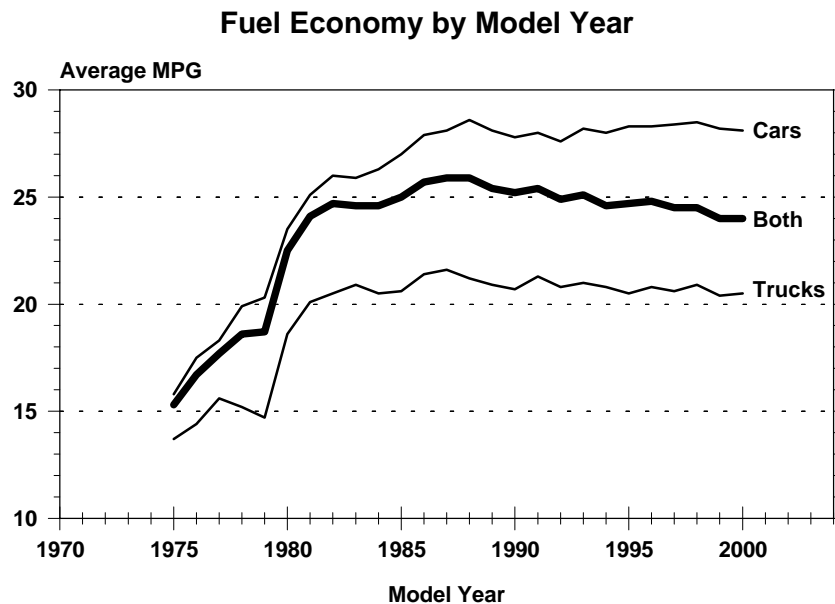
Since the early 1970s, EPA has issued reports that summarize new light vehicle fuel economy data. Fuel economy continues to be a major area of public and policy interest for several reasons, including:

- (1) Fuel economy is directly related to carbon dioxide emissions, the most prevalent pollutant associated with global warming. Light vehicles contribute about 20% of all U.S. carbon dioxide emissions.
- (2) Light vehicles account for approximately 40% 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.
- (3) Fuel economy is directly related to the cost of fueling a vehicle and is of greater interest when oil and gasoline prices rise, as has happened recently.

Highlight #1: Fuel Economy Remains at a 20 Year Low

There has been an overall declining trend in light vehicle fuel economy since 1988. The average fuel economy for all model year 2000 light vehicles is now 24.0 mpg, the same as in 1999, and is as low as it has been at any time since 1980. This value is more than 1.9 mpg (about seven percent) lower than the peak value of 25.9 mpg achieved in 1987 and 1988. Within the light vehicle category for model year 2000, average fuel economy is 28.1 mpg for passenger cars and 20.5 mpg for light trucks.*

All of the fleet-wide improvement in new light vehicle fuel economy occurred from the middle 1970s through the late 1980s, but it has been consistently falling since then. Viewed separately, the average fuel economy for new cars has been essentially flat over the last 15 years, varying only from 27.6 mpg to 28.6 mpg. Similarly, the average fuel economy for new light trucks has been largely unchanged for the past 20 years, ranging from 20.1 mpg to 21.6 mpg. The increasing market share of light trucks, which have lower average fuel economy than cars, accounts for much of the decline in fuel economy of the overall new light vehicle fleet.



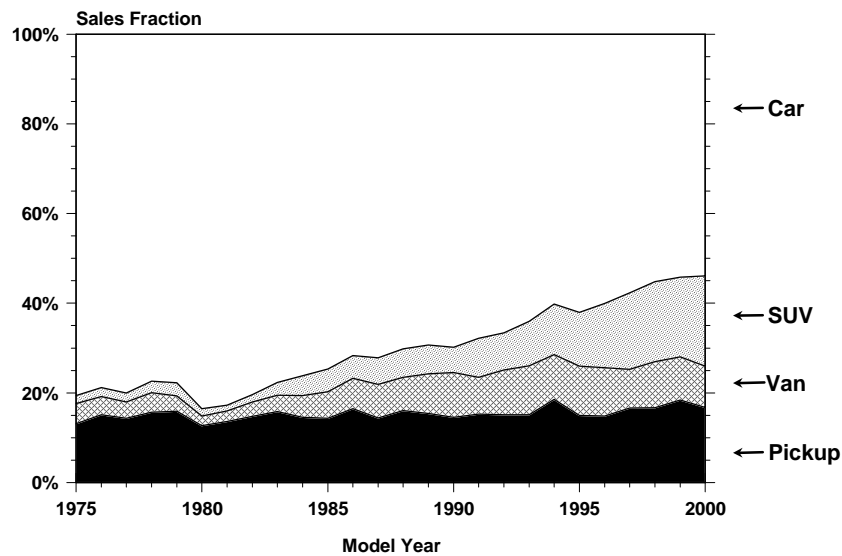
* Note the data for model years 1998 and 1999 in this report have been revised since the previous paper in this series was issued.

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 46% of the U.S. light vehicle market—more than twice their market share as recently as 1983.

Growth in the light truck market has been led recently by the explosive popularity of SUVs. SUV sales have increased by more than a factor of ten from less than 190,000 in 1975 (less than 2% of the overall new light vehicle market) to over 3.2 million in 2000 (20% of the market). Over the same period, the market share for vans doubled from 4.5 to 9%, and for pickup trucks, grew from 13 to 17%. Between 1975 and 2000, market share for new passenger cars and wagons decreased from 81 to 54%. EPA estimates that the new light trucks sold in 2000 will consume, over their lifetimes, about 56% of the fuel used by all of the new light vehicles sold in 2000. For model year 2000, cars average 28.1 mpg, vans 22.5, pickups 20.1 and SUVs 20.0.

Sales Fraction by Vehicle Type

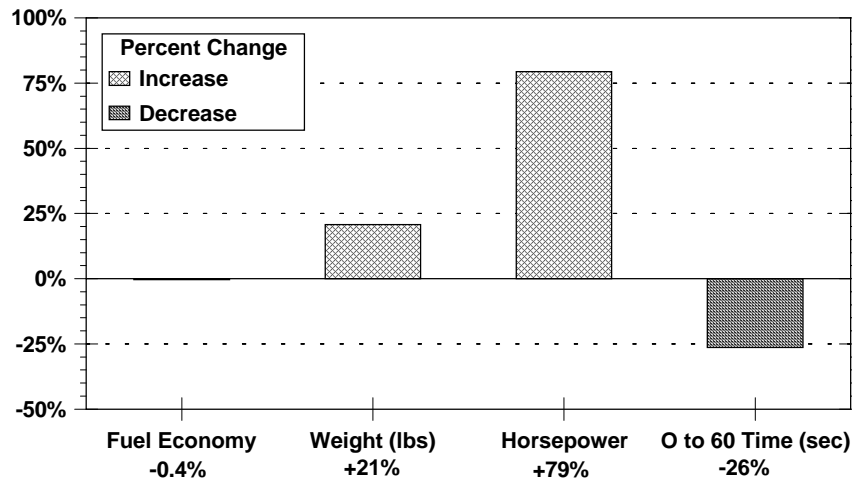


Highlight #3: Fuel Economy is Being Traded for Weight and Power

More efficient technologies continue to enter the new light vehicle fleet and are being used to increase light vehicle weight and acceleration rather than fuel economy. This year's light vehicles will have about the same average fuel economy as those built in model year 1981. Based on accepted engineering relationships, however, had the new 2000 light vehicle fleet had the same average weight and performance as in 1981, it could have achieved 25% higher fuel economy.

More efficient 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 increase average new vehicle weight, power, and performance while maintaining fuel economy constant. This is reflected by heavier average vehicle weight (up 21% since 1981, up 1% since 1999), rising average horsepower (up 79% since 1981, up 3% since 1999), and lower 0 to 60 mile-per-hour acceleration time (26% faster since 1981, 2% faster since 1999.)

**Percent Change from 1981 to 2000
in Average Vehicle Characteristics**

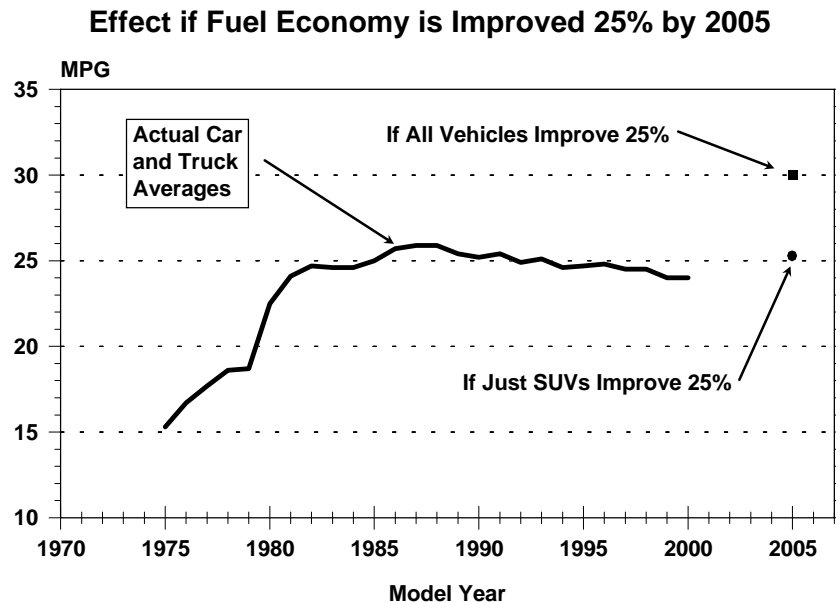


Highlight #4: Ford and General Motors are Pledging to Increase Fuel Economy

Ford Motor Company recently pledged to increase the fuel economy of its entire line of sport utility vehicle sales by 25 percent by the 2005 model year. General Motors pledged to remain the truck fuel economy leader. If all manufacturers were to voluntarily increase the average fuel economy of their entire light vehicle fleets by 25 percent by 2005, average new light vehicle fuel economy would increase from 24 mpg to 30 mpg.

Ford's pledge would result in an increase in the laboratory fuel economy of Ford's SUVs from about 18 mpg to about 23 mpg. General Motors, whose SUVs average around 19 mpg, pledged to remain the truck fuel economy leader.

If all manufacturers chose to match Ford's commitment to increase SUV fuel economy by 25 percent by 2005, then average SUV fuel economy would increase from 20.0 mpg to 25.0 mpg, and overall light vehicle fuel economy would increase from 24.0 mpg to 25.2 mpg. Further, if all manufacturers chose to voluntarily increase the average fuel economy of all of their light vehicles by 25 percent, then the average fleetwide fuel economy would rise from 24.0 mpg to 30.0 mpg.



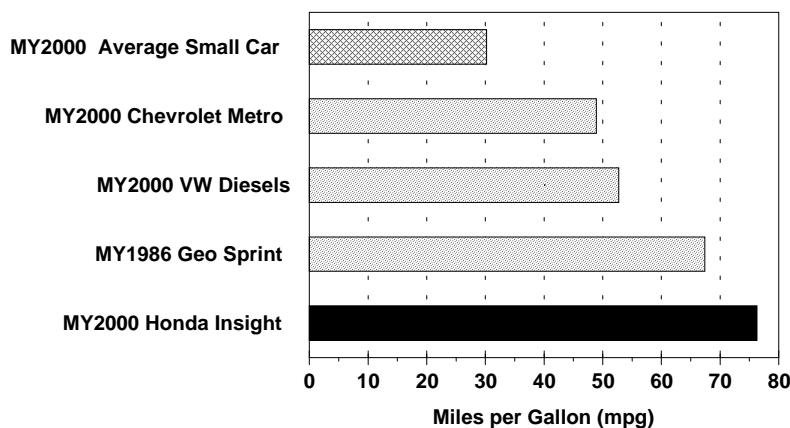
Highlight #5: The Honda Insight Hybrid is the Most Fuel Efficient U.S. Vehicle Since 1975

The model year 2000 Honda Insight two-seater is the most fuel efficient vehicle sold in the United States since 1975 and likely the most fuel efficient vehicle ever sold in the U.S. market.

A major development in model year 2000 was the introduction of a gasoline/battery hybrid vehicle. The Honda Insight is the first hybrid car ever sold in the U.S. market. It has a manual transmission and its drivetrain includes a gasoline-fueled engine, a battery used for traction, a regenerative braking system, and an electric motor/generator. The two-seater Insight has a laboratory fuel economy rating of 76.3 mpg, and *Fuel Economy Guide*/label ratings of 61 mpg city and 70 mpg highway.

The Insight's laboratory fuel economy value is about 9 mpg higher than the second most fuel efficient vehicle sold in the United States since 1975, a 1986 Geo Sprint mini-compact. The Insight's fuel economy is also about 25 mpg higher than that for the next most efficient model year 2000 vehicles, the Volkswagen Beetle/Golf/Jetta diesels and a gasoline-powered Chevrolet Metro. Like the Insight, all of these values are for models equipped with manual transmissions. The introduction of the Insight may be the start of a trend towards increasing use of hybrid vehicle technology. For model year 2001, Toyota is introducing in the U.S. market a hybrid vehicle, the Prius. This compact car has a laboratory fuel economy rating of 57.6 mpg, and *Fuel Economy Guide*/label ratings of 52 mpg city and 45 mpg highway.

Comparison of the Honda Insight with Other High Fuel Economy Vehicles



For More Information

Light-Duty Automotive Technology and Fuel Economy Trends: 1975-2000 (EPA420-R-00-008) is available electronically on the Office of Transportation and Air Quality's (OTAQ) Web site at:

<http://www.epa.gov/otaq/fetrends.htm>

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A copy of the *Fuel Economy Guide* giving city and highway fuel economy data for individual models is available at <http://www.fueleconomy.gov> or by calling the U.S. Department of Energy's National Alternative Fuels Hotline at (800) 423-1363.