

EPA's Fuel Economy Programs

Fuel economy, or gas mileage, continues to be a major area of public and policy interest for several reasons. Passenger vehicles account for approximately 40 percent of all U.S. oil consumption, so increasing energy efficiency helps reduce our dependence on imported oil and enhances the nation's energy security. Likewise, it helps conserve our fossil resources for future generations. Passenger vehicles also contribute about 20 percent of all U.S. carbon dioxide emissions, so increasing fuel efficiency helps reduce greenhouse gas emissions. Finally, the more miles a car gets per gallon of gasoline, the more money the owner saves on fuel costs. Given the importance of fuel economy, the federal government administers three programs to provide information to consumers about fuel economy and to encourage the production of fuel efficient vehicles.

Fuel Economy Labels and Fuel Economy Guide

Once a year, EPA and DOE publish the Fuel Economy Guide listing the fuel economy estimates (expressed in miles per gallon) of new passenger vehicles. The Fuel Economy Guide is based on EPA's data and is published and distributed by DOE. The fuel economy estimates listed in the guide are based on laboratory testing performed by the auto manufacturers and EPA. EPA and the National Highway Traffic Safety Administration are revising the fuel economy label that appears on new vehicles beginning with 2012 models. The updated label will provide new information to consumers about the fuel economy and consumption, fuel costs, and environmental impacts (tailpipe emissions) associated with the operation of new cars and light-duty trucks. The updated label will also be applicable to advanced technology vehicles, including electric vehicles and plug-in hybrid electric vehicles, poised to enter the U.S. market. For more information on the proposed labels, visit:

www.epa.gov/fueleconomy/label.htm.

What Vehicles Are Tested?

Not every vehicle is tested for fuel economy. Instead, manufacturers are required to split each model into smaller groups, based upon the various options available that can impact fuel economy (such as vehicle weight, transmission type and engine size). A vehicle from each of these groups with the highest projected sales must be tested. Fuel economy requirements apply to all passenger cars and light trucks with a gross vehicle weight rating (GVWR) less than 8,500 pounds, and also to sport-utility vehicles and some passenger vans from 8,500 to 10,000 pounds gross vehicle weight starting with the 2011 model year. Pickup trucks, cargo vans, and large passenger vans above 8,500 pounds gross vehicle weight continue to be excluded from the fuel economy requirements.

Manufacturers test all the vehicles at their laboratories. EPA confirms about 10-15 percent of the vehicles at its National Vehicles and Fuel Emission Laboratory in Ann Arbor, Michigan.

How are Vehicles Tested?

Vehicles are driven over identical driving patterns by professional drivers in controlled laboratory conditions on a dynamometer, which is like a treadmill for cars. The conditions that occur during driving, such as wind drag and inertia are accounted for on the dynamometer. Prior to 2008 model year vehicles, there were two types of tests that were conducted to determine the city and highway estimates: The city test and the highway test. Beginning with 2008 model year vehicles, data from five different tests are used to determine these estimates: FTP test, Highway test, High Speed test, Air Conditioning test and Cold Temperature test. A description of the details of these five tests is in the table below. The key elements of each test is shown in bold:

Driving Schedule Attributes	Test Schedule				
	City	Highway	High Speed	AC	Cold Temp
Trip Type	Low speeds in stop-and-go urban traffic	Free-flow traffic at highway speeds	Higher speeds; harder acceleration & braking	AC use under hot ambient conditions	City test w/ colder outside temperature
Top Speed	56 mph	60 mph	80 mph	54.8 mph	56 mph
Average Speed	20 mph	48 mph	48 mph	22 mph	20 mph
Max. Acceleration	3.3 mph/sec	3.2 mph/sec	8.46 mph/sec	5.1 mph/sec	3.3 mph/sec
Simulated Distance	11 mi.	10 mi.	8 mi.	3.6 mi.	11 mi.
Time	31 min.	12.5 min.	10 min.	9.9 min.	31 min.
Stops	23	None	4	5	23
Idling time	18% of time	None	7% of time	19% of time	18% of time
Engine Startup*	Cold	Warm	Warm	Warm	Cold
Lab temperature	68-86°F			95°F	20°F
Vehicle air conditioning	Off	Off	Off	On	Off
* A vehicle's engine doesn't reach maximum fuel efficiency until it is warm.					

How Are the Label Estimates Calculated?

Fuel economy estimates are calculated from the emissions generated during the tests using a carbon balance equation. We know how much carbon is in the fuel, so by precisely measuring the carbon compounds expelled in the exhaust we can calculate the fuel economy.

For pre-2008 model year vehicles, the city and highway tests were used to determine city and highway fuel economy, respectively. The results of the tests were adjusted downward to account for typical road conditions that can affect fuel economy, such as higher speeds, cold temperature, and use of air conditioning. The city results were adjusted downward by 10 percent, and the highway results by 22 percent.

For 2008 and later model year vehicles, the fuel economy label estimates are determined by either performing the entire set of five tests on the test vehicle, and using that data to calculate city and highway estimates, or by applying mathematical equations to the basic data from the city and highway tests to derive estimates that simulate the effects of all five test cycles. Use of this latter streamlined option is allowed in cases where both methods are shown to yield substantially identical results.

Combined fuel economy is determined by weighting the city fuel economy at 55 percent and the highway fuel economy at 45 percent using the following equation:

$$FE_{combined} = 1 / ((.55 / \text{city FE}) + (.45 / \text{hwy FE}))$$

What Information Is in The Fuel Economy Guide and on The Fuel Economy Label?

The city and highway fuel economy estimates are printed in the Fuel Economy Guide and posted on the window sticker labels of all new cars and light trucks. Also included on the labels and in the Guide are the estimated annual fuel costs as determined from the combined city and highway fuel economy, assuming 15,000 miles traveled per year and using fuel price projections obtained from the Department of Energy.

The fuel prices are determined in advance of each model year to allow time for printing labels and the Fuel Economy Guide. For more recent annual fuel cost estimates using current fuel prices, visit: www.fueleconomy.gov. The Fuel Economy Guide is published and distributed to dealerships across the United States. New car dealers are required to have copies of the Guide available to consumers. The Guide is also available online at: www.fueleconomy.gov.

Beginning with 2008 model year vehicles, EPA has redesigned the fuel economy label to better present the fuel economy information to consumers who are shopping at dealers' lots. Improved features include more details about how annual fuel costs are estimated, an easy-to-understand graph showing how the fuel economy for that vehicle compares to all others within its class, and a web link to go to for further information.

Corporate Average Fuel Economy (CAFE)

Corporate Average Fuel Economy (CAFE) is the required average fuel economy for a vehicle manufacturer's entire fleet of passenger cars and light trucks manufactured for sale in the United States for each model year. There are separate average fuel economy standards for passenger cars and light trucks. Light trucks include those with a gross vehicle weight rating (GVWR) of 8,500 pounds or less. CAFE values are obtained using the same test data generated by the fuel economy tests used to determine the fuel economy estimates for the Guide and labels, but the test results are not adjusted to account for real-world conditions. Instead, the results from the city and highway tests are combined. EPA administers the testing program which generates the fuel economy data and determines the procedures for calculating the fuel economy values for CAFE. The National Highway Traffic and Safety Administration (NHTSA), which is part of DOT, is responsible for establishing and amending the CAFE standards for cars and light trucks. EPA reports the CAFE results for each manufacturer to NHTSA annually, and NHTSA determines if the manufacturers comply with the CAFE standards and assesses penalties as required. View more information about CAFE standards on NHTSA's Web site at: www.nhtsa.gov/fuel-economy.

EPA and NHTSA recently announced the next steps towards reducing greenhouse gas emissions and fuel use from cars and light trucks following the successful rulemaking for the first phase of the National Program for GHG emissions and fuel economy standards for model years 2012-2016 vehicles. The proposal would establish new more stringent standards for the 2017 through 2025 model years. View more information about the new standards on EPA's Web site at: www.epa.gov/otaq/climate/regulations.htm.

Green Vehicle Guide

Every year since 2000, EPA publishes emissions information for the new model year cars and light trucks on its Green Vehicle Guide Web site at: www.epa.gov/greenvehicles. This user-friendly site is designed to help consumers identify the cleanest, most efficient vehicle that meets their needs. It provides consumers with the opportunity to compare the relative emissions performance of vehicles by means of the 0-10 emissions rating assigned to each vehicle. Vehicles rated higher than others are designed to emit fewer pollutants such as carbon monoxide, nitrogen oxides, hydrocarbons and particulate matter. Vehicles can be viewed individually or by class, such as SUVs, sedans, or pickups.

The emissions ratings are based on the EPA emission standards the vehicle was certified to meet. Because manufacturers can choose from a complex set of emission standards, it is not always easy to understand them. The Green Vehicle Guide "demystifies" these standards, and allows consumers to see that they may have a choice to buy a cleaner, more efficient vehicle, regardless of the size, type or style they are interested in.

The Green Vehicle Guide also identifies the cleanest, most fuel efficient vehicles with a "SmartWay" logo. View more information about SmartWay vehicles at: epa.gov/greenvehicles/aboutratings.do#aboutsmartway.

Gas Guzzler Tax

The Gas Guzzler Tax is imposed on manufacturers of new model year cars (not minivans, sport utility vehicles or pick-up trucks) that fail to meet the minimum fuel economy level of 22.5 mpg. The tax is intended to discourage the production and purchase of fuel inefficient vehicles. The fuel economy figures used to determine the tax are based on combined city and highway fuel economy that is unadjusted for real-world conditions, and thus is different from the fuel economy estimates provided in the Fuel Economy Guide. The tax is collected by the Internal Revenue Service and normally paid by the manufacturer or importer after production has ended for the model year and is based on the total number of gas guzzler vehicles which were introduced into commerce in the United States. The amount of the tax paid is displayed on the vehicle's fuel economy label (the window sticker on new cars). View more information about the Gas Guzzler Tax at: epa.gov/fueleconomy/guzzler/index.htm.

For More Information

You can access additional information about these programs at the following:

- Information on EPA's Fuel Economy Program, including regulations, test data, and consumer tips at:
www.epa.gov/fueleconomy/index.htm
- Information on vehicle fuel economy, advanced technology, and possible tax incentives, including a downloadable version of the Fuel Economy Guide at:
www.fueleconomy.gov
- Information on CAFE, including CAFE standards, NHTSA's annual report summarizing the fuel economy performance of the current fleet, rulemaking activities, and fines collected at:
www.nhtsa.dot.gov
- The IRS's Gas Guzzler Tax form (IRS Form 6197) at:
www.irs.gov/pub/irs-pdf/f6197.pdf