

EPA and NHTSA Propose Changes to the Motor Vehicle Fuel Economy Label

The U.S. Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA) are redesigning the fuel economy label consumers see on the window of every new vehicle in dealer showrooms. The agencies are proposing two different label designs and are asking for input from all Americans on which redesigned label is the most informative to them as they make purchasing decisions.

Regardless of whether EPA and DOT select one of the two labels proposed today or adopts a modified version following the public comment process, the goal of the new label will be the same: to provide consumers with simple, straightforward comparisons across all vehicles types, including electric vehicles (EV), plug-in hybrid electric vehicles (PHEV), and conventional gasoline and diesel vehicles.

These proposed changes represent the most significant overhaul of the federal government's fuel economy label since its inception over 30 years ago. Beginning with model year 2012 cars and trucks, the redesigned label will provide American consumers with new information on fuel economy, energy consumption, fuel costs, and environmental impacts associated with their new vehicles. The agencies will also develop new labels for certain advanced technology vehicles that will soon be mass-marketed, such as plug-in hybrid electric vehicles (PHEVs) and electric vehicles (EVs).

NHTSA and EPA are proposing these changes because

- the Energy Independence and Security Act of 2007 specifically calls on EPA and DOT to rate available vehicles according to fuel economy, ghgs and smog forming pollutants.

- advanced technology vehicles, which will be widely available soon, need labels that tell consumers what they need to know about their fuel/energy use; and
- improved information content and display can help consumers make more informed decisions when purchasing vehicles.

Label Design Options and New Information

EPA and NHTSA are co-proposing two label designs. Both labels meet legal requirements and rely on the same underlying data; they differ in how the data is used and presented. The agencies encourage public feedback on which label design would provide better information to help consumers more easily assess the energy use, costs, and emissions of different vehicles and make fully-informed decisions when purchasing a new vehicle.

Label 1: This label design prominently features a letter grade (A⁺ to D) to communicate the overall fuel economy and greenhouse gas emissions, and the 5 year-fuel-cost savings compared to an average vehicle (see figure 1).

Label 2: This label design is more traditional and retains the current label's focus on fuel economy and annual fuel cost projections, with a layout similar to the current label (see figure 2).

Both options add to the content found on the current label and include the following information for gasoline and diesel vehicles:

- **Fuel Economy:** City and highway miles per gallon (mpg) and a slider bar comparing vehicle's fuel economy to that of all other vehicles
- **Fuel Consumption:** Combined city/highway gallons per 100 miles
- **Greenhouse Gases:** Tailpipe carbon dioxide (CO₂) emissions in grams per mile and a slider bar comparing the vehicle's CO₂ emissions to those of all other vehicles
- **Other Emissions:** A slider bar comparing a vehicle's smog-related emissions to those of all other vehicles
- **Fuel Cost:** Estimated annual costs of fueling the vehicle
- **Comparable Fuel Economy:** A comparison of the vehicle's fuel economy to that of comparable vehicles
- **Smart phone interactive tool:** A symbol that smart phones can read for additional consumer information (also known as a QR[®] code)

The advanced technology vehicle labels contain additional information tailored to these technologies (see figures 3 and 4), including:

- **Driving Range:** Identifies how many miles electric vehicles (EVs), plug-in hybrid electric vehicles (PHEVs), and compressed natural gas (CNG) vehicles can go before recharging or refueling.
- **Different Modes:** Some vehicles, such as plug-in hybrid-electric vehicles, have different operating modes -- all-electric, blended, and gasoline-only. The labels provide fuel economy information for each distinct operating mode.

- Energy Consumption Measurement:** For EVs, the label shows energy use via both a miles per gallon of gasoline-equivalent (mpg-e) and kilowatt-hours per 100 miles metric; PHEV labels show only the mpg-e metric. Mpg-e converts kilowatt-hours of electricity to gallons of gasoline based on energy equivalency.



Figure 1. Label Option 1 – Gasoline and Diesel Vehicles

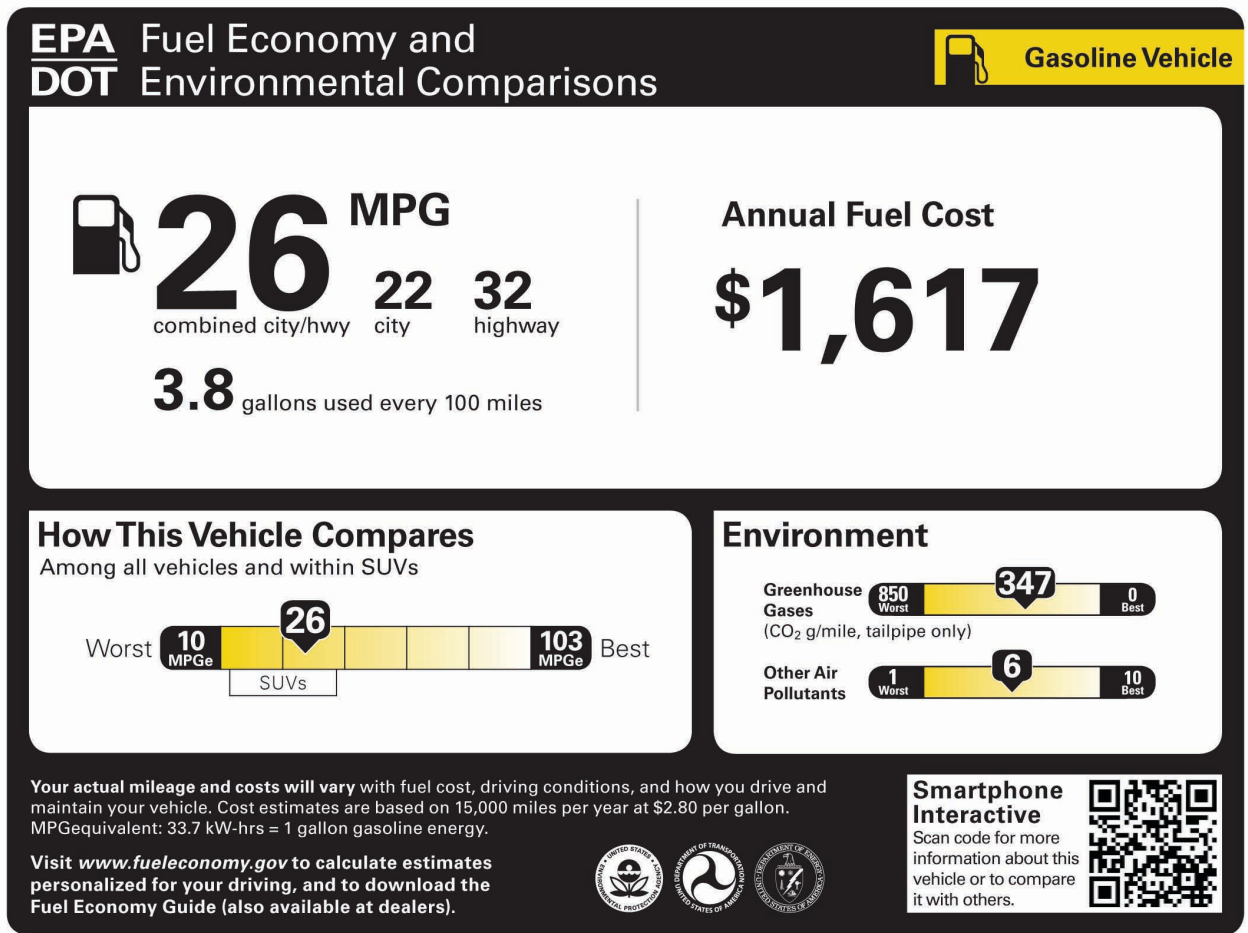


Figure 2. Label Option 2 – Gasoline and Diesel Vehicles

To view the proposed label designs for electric and plug-in electric vehicles, please visit our website at: www.epa.gov/fueleconomy/label.htm

Advanced Technology Vehicles

In the past, over 99 percent of all new vehicles have operated on petroleum fuels (e.g., gasoline, diesel, or a mostly-petroleum-based fuel blend) and the current fuel economy labels were designed for these gasoline and diesel vehicles. Labels for vehicles not fueled by petroleum currently are addressed on an individual basis.

The future automotive market will most likely offer consumers vehicles that are run on alternate energy sources, and many of these new technologies raise new issues in terms of consumer information and vehicle labels. Electric vehicles and plug-in hybrids will soon enter the marketplace in significant numbers. Because these vehicles will use electricity from the grid, the familiar metric of miles per gallon of gasoline no longer applies. The agencies' goal was to design simple, objective labels that allow consumers to easily compare all types of vehicles. The agencies are proposing various label options and are requesting that the public weigh in on their clarity and usefulness.

Electric Vehicles (EVs)

For electric vehicles (EVs), which operate solely on electricity, the agencies are proposing to include both kilowatt-hours per 100 miles and miles per gallon of gasoline-equivalent (electricity consumption translated into mpg). The use of kilowatt-hours would reflect the way in which electricity is sold, similar to the information given on a utility bill. In this case, a lower number is better. Miles per gallon of gasoline-equivalent converts kilowatt-hours of electricity into gallons of gasoline (based on 33.7 kilowatt-hours per gallon), and reflects the more familiar mpg-type approach for a fuel that is very different from gasoline. In this case, a higher number is better.

The agencies are also proposing to show how far EVs can travel on a full battery charge. For EV CO₂ emissions, the agencies propose to show tailpipe-only emissions, which means that EV label CO₂ emissions will be zero, given that all of the CO₂ emissions associated with EV operation occur at the power plant and other upstream sources.

The agencies also plan to develop a web-based tool that will allow consumers to determine the total upstream CO₂ emissions from electricity (production and distribution) that results from charging an EV's battery. The agencies also ask for comments on whether to include upstream CO₂ emissions, battery charging time and driving range of EVs on the label. To view the proposed label designs for electric vehicles, please visit our website at: www.epa.gov/fueleconomy/label.htm

Plug-in Hybrid Electric Vehicles (PHEVs)

PHEVs can run on:

1. batteries and electric motors that are plugged in to charge;
2. a combination of both gasoline and plug-in electric operation; and
3. gasoline only, like a conventional hybrid vehicle.

Depending on how they are designed, PHEVs can operate in two or three of these operating modes. Because of these design choices, PHEVs are the most complex technology for a vehicle label.

For PHEVs, the agencies propose to provide as much information as possible about each operating mode (all electric, blended, and gasoline-hybrid only). This allows consumers to tailor the information about each operating mode to their own driving habits. Because there are up to three PHEV operating modes, the agencies had to make choices on how much information to display on a PHEV label.

For example, the agencies propose to display energy consumption only in terms of miles per gallon of gasoline-equivalent (mpg-e). The mpg-e converts kw-hr of electricity to gallons of gasoline based on energy equivalency (33.7 kilowatt-hours per gallon). On some of the proposed PHEV labels, average nationwide driving profiles are used to determine the relative electricity versus gasoline consumption in order to calculate a single overall value for parameters, such as CO₂ emissions and annual fuel cost. The agencies seek comment on alternative metrics for PHEVs. To view the proposed label designs for plug-in electric vehicles, please visit our website at: www.epa.gov/fueleconomy/label.htm

Other Technologies

The labels proposed for other technologies now on the market, such as ethanol flexible fuel vehicles and compressed natural gas vehicles, are based on refinements to gasoline and diesel vehicle labels.

Fuel Savings or Costs

Label 1 shows the calculated fuel cost savings over a 5-year period for a specified vehicle compared to the average vehicle for that model year. (EPA will use current model year data to estimate the fuel economy for the subsequent model year's average vehicle, not sales-weighted.) If the labeled vehicle would save the consumer money over the average vehicle, the labeled vehicle would state, "Over five years, this vehicle saves xxx in fuel costs compared to the average vehicle." If the labeled vehicle would be more expensive to operate than the average vehicle, the label would state, "Over five years, you will spend xxx more in fuel costs compared to the average vehicle."

Both Label 1 and 2 show the associated annual fuel cost for the specific vehicle as required under the Energy Policy and Conservation Act. This estimated cost is based on 15,000 miles per year and gasoline price of \$2.80 per gallon.

Fuel Consumption Information

While a miles per gallon estimate is required for fuel economy labels and has appeared on the label for several decades, the agencies have some concern that it can be potentially misleading for comparing fuel economy improvements, particularly when it is used in place of fuel costs. The following chart shows the non-linear relationship between gallons used over a given distance and miles per gallon. The fuel savings, in gallons, for a vehicle that gets 10 mpg versus a vehicle that gets 15 mpg is about 33 gallons (assuming 1000 miles). On the other hand, the fuel savings in gallons, for the same 5 mpg fuel economy jump, for a 30 mpg versus a 35 mpg vehicle is only about 5 gallons (see figure 3).

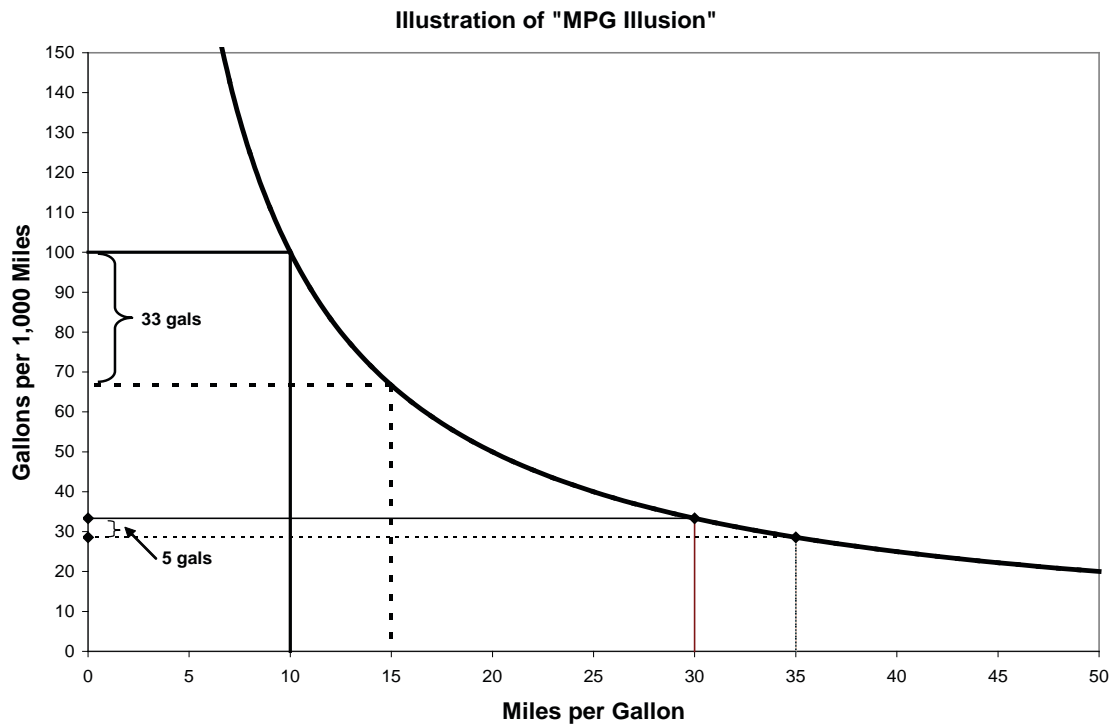


Figure 3. Demonstration of the “mpg illusion.”

This “mpg illusion” demonstrates why it may be more meaningful to express fuel efficiency in terms of consumption (e.g., gallons per mile or per 100 miles) rather than in terms of economy (miles per gallon). A consumption metric would allow for more accurate energy usage comparisons among vehicles.

Rating for Fuel Economy and Greenhouse Gases

The co-proposed labels show different ways to provide comparison ratings for fuel economy and greenhouse gases. One approach shows a rating for fuel economy and separate rating for greenhouse gases (see figure 4). This ratings system is displayed at the bottom of Labels 1 and 2 and uses a comparison slider bar. The bar is anchored at each end with the lowest and highest values expected for all vehicles in the model year, and uses a pointer to display the specific vehicle model’s location on the scale.

The alternative approach uses a rating that combines fuel economy and greenhouse gases into a letter grade (see figure 4). This approach consolidates information for consumers and provides an easy-to-understand metric that purchasers can quickly use to compare the fuel economy and greenhouse gas values across all vehicles.

Both ratings are not mutually exclusive, and a label could contain one or both.

Letter Grade Rating (Combined Rating)	CO ₂ Range (grams per mile) (Separate Rating)	Gasoline MPG Equivalent (Separate Rating)
A+	0-76	117 and higher
A	77-152	59-116
A-	153-229	40-58
B+	230-305	30-39
B	306-382	24-29
B-	383-458	20-23
C+	459-535	18-19
C	536-611	16-17
C-	612-688	14-15
D+	689-764	13
D	765-842 and higher	12 and lower

Figure 4. Examples of ratings systems.

The proposed letter grade scale would range from A+ to D, including plus and minus designations. The agencies base this rating system approach on the range of CO₂ emissions for the projected fleet, first determining the middle point (or median) for all model types, then generating five equal increments of CO₂ above and below this middle point. Each increment is assigned a grade or rating.

For those vehicles that run on electricity, the tailpipe emissions are zero. Of course, these vehicles do cause emissions at the electric generation facility, with amounts varying greatly based on the source of electricity (such as coal, nuclear, natural gas, hydro, or wind). The agencies intend to make this information available on the web, with calculators that people can use to determine their upstream emissions (from the production and distribution of electricity) based on where they live and the vehicle they are considering.

Most vehicle classes are expected to span multiple ratings. For example, using the letter grade system and MY2010 data, the agencies project the ratings distribution by vehicle class shown in figure 5. The majority of vehicles are expected to fall into the middle of the grade, as shown in figure 6.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
small car	1	2	8	71	215	306	79	57	30	2	
midsize car			6	5	79	92	43	6	8		2
large car					11	31	41	10	13	6	
minivan					2	9	18		2		
pickup					2	30	56	52	9		
station wagon				12	75	65	12				
SUV				8	68	167	166	68	45	4	
van							4	2	10		

Figure 5. Distribution of vehicle types across the rating system (number of models in each category).

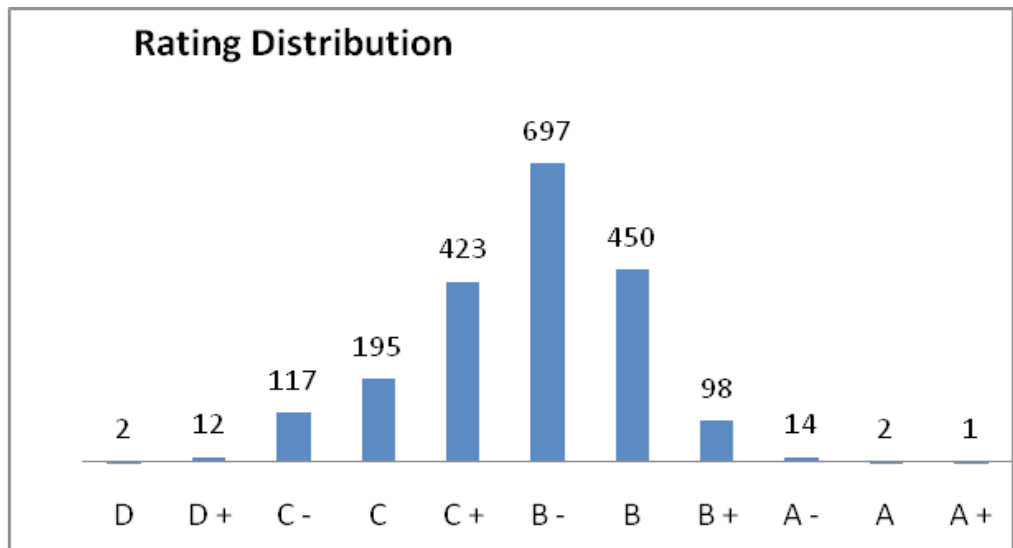


Figure 6. Distribution of the current fleet across the rating system (number of models).

Rating for Other Emissions

The labels also include a rating for those pollutants that cause smog and other local air pollution. This information, listed as “Other Air Pollutants” on the labels, will be displayed using a slider bar with a scale of 1 (worst) to 10 (best). The scale is based on Federal Tier 2 emissions standards and Bin system, which incorporates specific standards for nitrogen oxide (NO_x), non-methane organic gas (NMOG), carbon monoxide (CO), particulate matter (PM), and formaldehyde (HCHO). The scale mirrors the current Air Pollution scoring system on EPA’s Green Vehicle Guide (www.epa.gov/greenvehicles/Aboutratings.do#aboutairpollution).

Public Participation Opportunities

We welcome your comments on this rule. Comments will be accepted for 60 days beginning when this proposal is published in the Federal Register. All comments should be identified by Docket ID No. EPA-HQ-OAR-2009-0865 and submitted by one of the following methods:

Internet: www.regulations.gov

E-mail: newlabels@epa.gov

Mail:

Environmental Protection Agency
Air and Radiation Docket and Information Center (6102T)
1200 Pennsylvania Avenue NW
Washington, DC 20460

Hand Delivery:

EPA West building
EPA Docket Center (Room 3340)
1301 Constitution Avenue NW
Washington, DC

You should consult the *Federal Register* notice for this proposal for more information about how to submit comments, when the comment period will close, and about where and when public hearings will be held. A copy of *Federal Register* notice can be found on our websites listed below.

For More Information

You can access the rule and related documents on EPA's Office of Transportation and Air Quality (OTAQ) website at:

www.epa.gov/fueleconomy/regulations.htm

To view all the proposed label designs, please visit our website at:

www.epa.gov/fueleconomy/label/label-designs.pdf

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