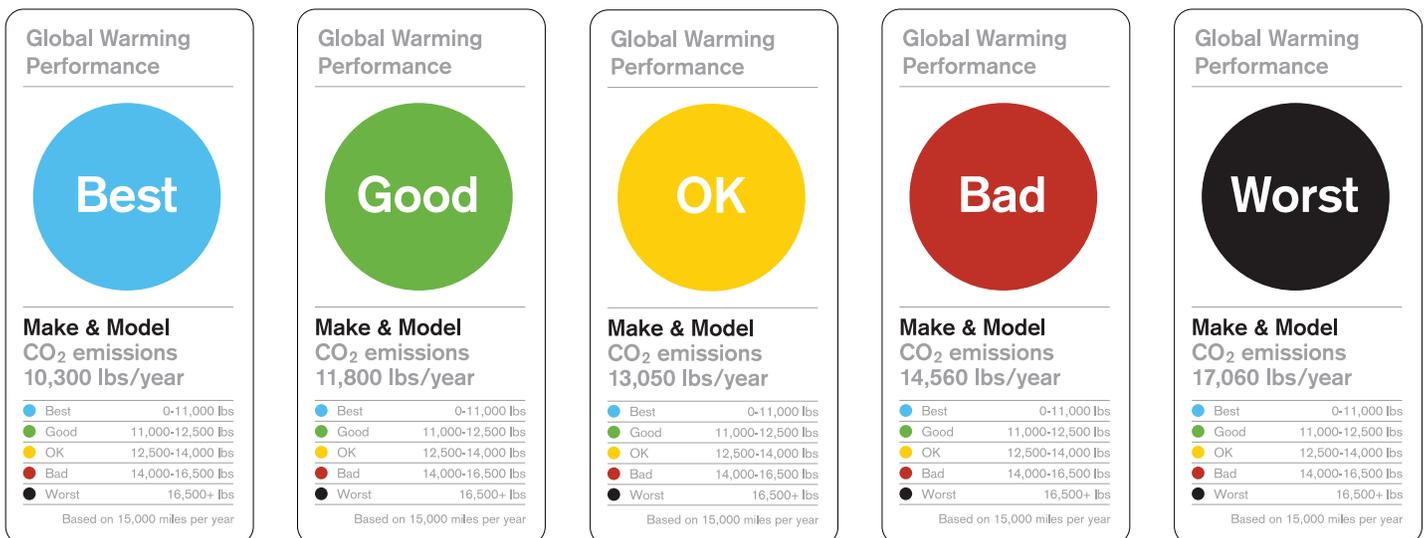


Combating Global Warming One Car at a Time

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CO₂ Emissions Labels for New Motor Vehicles

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What's Needed: A CO₂ Label for Cars and Light Trucks

As Americans become increasingly concerned about global warming, carbon dioxide (CO₂) emissions labels on new cars could be an effective and relatively painless way to inform them that the cars they drive are a major source of CO₂ and contribute to the buildup of greenhouse gases in the atmosphere. Putting a CO₂ emissions label on all new cars and light trucks would make this clear for all to see.

Each new car and truck sold in the United States is required to bear a label on its window that indicates the vehicle's fuel economy, in terms of miles per gallon (mpg) for city and highway driving. Every word and every inch of this sticker is determined by federal regulation.

On January 10, 2006, U.S. Environmental Protection Agency (EPA) Administrator Stephen Johnson announced the agency's proposed new approach for calculating these fuel economy estimates, along with four proposed designs for the required window label. What is most notable about the proposed label designs is the information that is *not* included: estimated annual CO₂ emissions.

For every gallon of gas burned, a car produces roughly 20 pounds of CO₂. The average car (in terms of fuel economy) driven the average number of miles per year (15,000) produces approximately 13,000 pounds of CO₂ annually.

Few consumers are likely to think about their impact on global warming

when deciding which new car or truck to buy. Prominently displaying a "global warming performance" label on the window of each new vehicle could help educate consumers about the fact that fuel economy relates not just to the cost of operating their vehicle, but also to the environment.

The global warming performance label we have designed includes the estimated amount of CO₂ (in pounds) produced annually for each vehicle make and model and also places cars and light trucks into five distinct groupings based on different categories of estimated annual CO₂ emissions — from "best" to "worst." This would allow a prospective purchaser to view information about CO₂ emissions for each vehicle and easily make comparisons among alternatives.

The goal of requiring a CO₂ emissions label is twofold: First, a label would help consumers make the link between their cars and increased CO₂ in the atmosphere. Second, a label would make it easier for those consumers who are already concerned about global warming to identify cars with lower emissions.

Behind the Curve

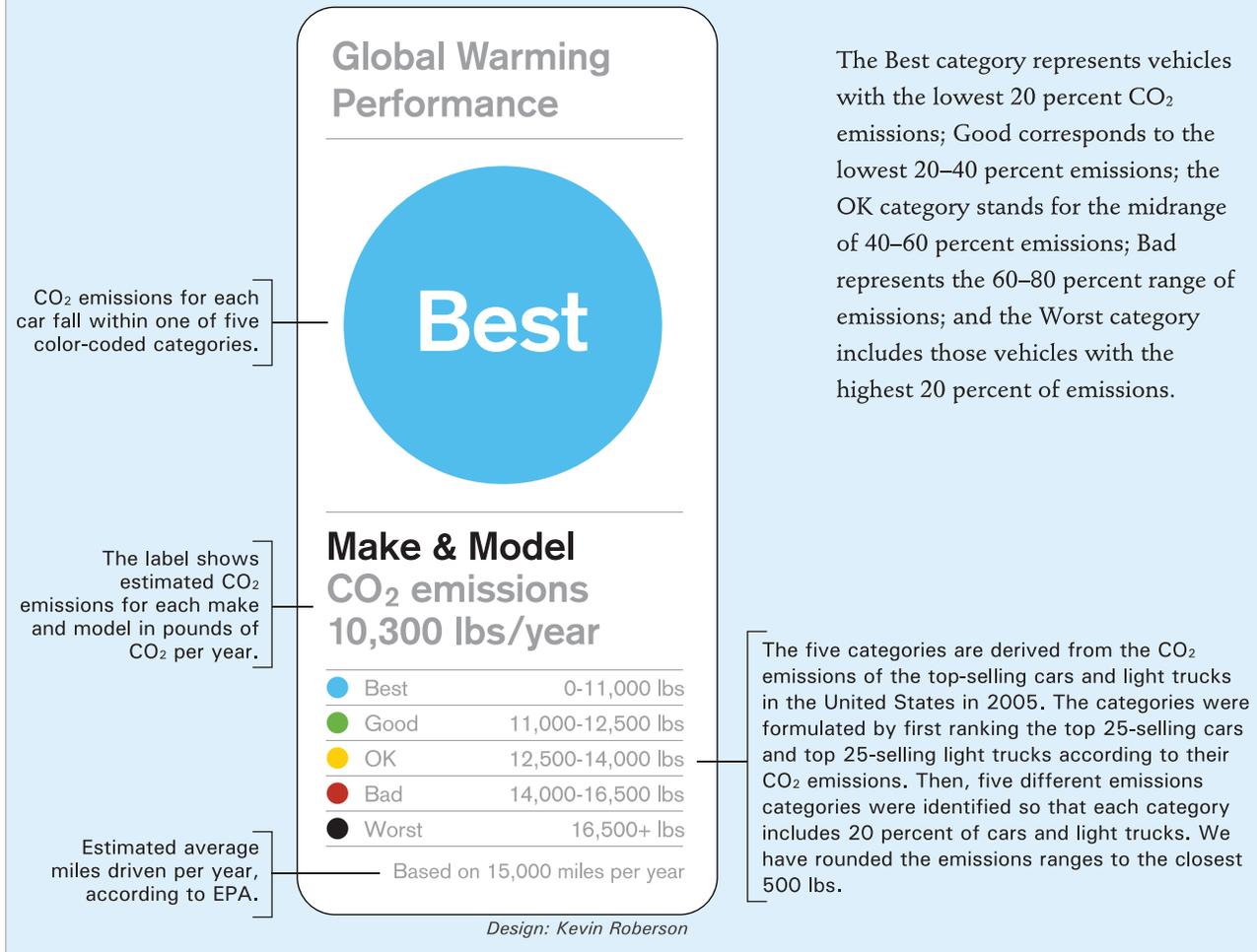
Sharing CO₂ information with consumers is not a new idea. Beginning in January 2001, countries in the European Union (EU) were required to display information on estimated CO₂ emissions on all new cars. The EU directive also required that member states subsequently evaluate the effectiveness of the directive. In the United Kingdom, the initial approach was deemed ineffective. The way the information

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ANATOMY OF A LABEL



was presented was too complicated for consumers to understand. As a result, car manufacturers in the United Kingdom voluntarily agreed to put a more “consumer-friendly,” color-coded label displaying CO₂ emissions on all new cars beginning in September 2005. The goal of the new “green label” is to give consumers clear information about the environmental performance of different vehicles. Other EU member countries are also in the process of introducing consumer-friendly labels.

Within the United States, a California law enacted in October

2005 requires that similar information (along with smog emissions) be displayed beginning with 2009 model-year cars sold in the state. The law mandates that the new car label include a global warming index that contains quantitative information in an easy-to-read scale, such as the one on our proposed label.

EPA could get ahead of the curve by requiring a uniform CO₂ emissions label on all cars and light trucks sold in the United States. Or, automobile manufacturers could decide to voluntarily display this information.

Cars and Global Warming

Carbon dioxide is the most ubiquitous of the six greenhouse gases. It is produced by burning fossil fuels — coal, petroleum, and natural gas. The rising concentration of CO₂ in the atmosphere contributes to climate change. As a result, reducing CO₂ emissions is the major focus of most countries seeking to combat climate change and stave off possible global warming.

The United States is the world's largest emitter of greenhouse gases in general, and of CO₂ in particular. We are responsible for a whopping 23 percent of all CO₂ emissions worldwide, even though the United States is home to less than 5 percent of the world's total population.

A third of national CO₂ emissions comes from the transportation sector. Within the transportation

sector, passenger cars and light trucks (a category that includes pickups, minivans, and sport utility vehicles) account for almost two-thirds of CO₂ emissions.

The choice of a new motor vehicle is one of the few opportunities Americans have to make a personal decision that can reduce CO₂ emissions. For every 100 gallons of gas saved, one less ton of CO₂ is emitted.

If you are an intrepid consumer, you *can* find information on CO₂ emissions on a car-by-car basis on two government web sites, one maintained by EPA (www.epa.gov/greenvehicles) and the other maintained by EPA and the U.S. Department of Energy (www.fueleconomy.gov). However, few people probably even know that this information is available.

Why not make it easier for consumers to understand the link between the cars they drive and global warming? The cost of implementing

GLOBAL WARMING PERFORMANCE CATEGORIES FOR THE TOP 25-SELLING CARS AND TOP 25-

Cars are identified in bold; the remainder are light trucks. Cars and light trucks are listed alphabetically by make and model within each category.

Best (0–11,000)		Good (11,000–12,500)		OK (12,500–14,000)	
Chevrolet	MALIBU	Chevrolet	COBALT	Chrysler	CHR. 300 SERIES
Dodge	NEON	Chevrolet	IMPALA	Chrysler	PT CRUISER
Ford	FOCUS	Honda	HONDA CRV	Chrysler	TOWN & COUNTRY
Honda	ACCORD	Hyundai	ELANTRA	Dodge	CARAVAN
Honda	CIVIC	Hyundai	SONATA	Ford	ESCAPE
Mazda	MAZDA3	Nissan	ALTIMA	Ford	FIVE HUNDRED
Nissan	SENTRA	Saturn	ION	Ford	RANGER
Toyota	CAMRY	Toyota	AVALON	Ford	TAURUS
Toyota	COROLLA	Toyota	HIGHLANDER	Pontiac	PONTIAC G6
Toyota	PRIUS HYBRID	Volkswagen	JETTA	Toyota	SIENNA
				Toyota	TACOMA

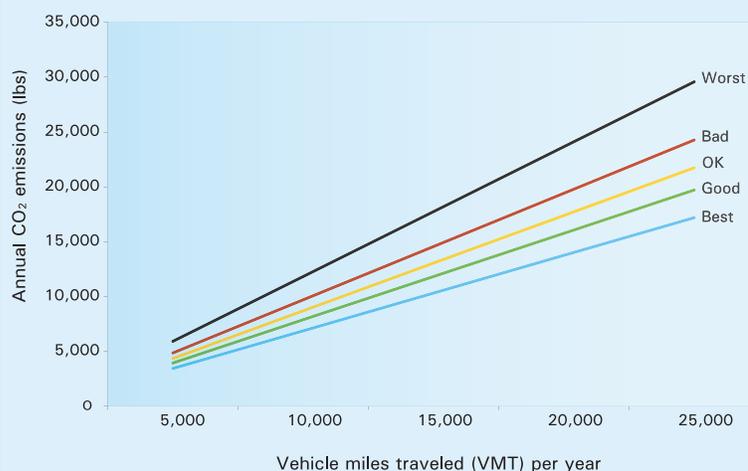
Source: WardsAuto.com

this approach is minimal. Calculating annual CO₂ emissions for new cars only requires information that is already available to EPA: the estimated fuel economy of each car make and model, and the average number of miles traveled annually.

For maximum scope and impact, this information needs to be clearly displayed directly on the vehicle where hundreds of thousands of people choose their new cars each year: in the showroom. In 2005 alone, more than 16 million new cars and light trucks were sold in America. If a label is implemented, as in the EU directive, follow-up evaluation to assess whether it is effective — and how it could be improved — should be required.

What is the downside to providing consumers with this kind of information? Some argue that people don't care, that information on CO₂ emissions will not change buying habits. Others argue that

CO₂ EMISSIONS RELATIVE TO VEHICLE MILES TRAVELED FROM SAMPLE CAR IN EACH CATEGORY



labels are inefficient as a mechanism for educating consumers.

Yet in recent years, consumer labels have become more popular as an important means for educating the public and helping them make

ACTUAL CO₂ EMISSIONS
DEPEND NOT ONLY ON
A CAR'S FUEL ECONOMY,
BUT ALSO ON THE TOTAL
NUMBER OF MILES DRIVEN.

SELLING LIGHT TRUCKS IN THE UNITED STATES IN 2005

emitted per year

Bad (14,000–16,500)		Worst (16,500+)	
BMW	BMW 3 SERIES	Chevrolet	EXPRESS
Chevrolet	COLORADO	Chevrolet	SILVERADO
Chevrolet	EQUINOX	Chevrolet	TAHOE
Ford	MUSTANG	Chevrolet	TRAILBLAZER
Honda	ODYSSEY	Dodge	RAM PICKUP
Honda	PILOT	Ford	ECONOLINE
Jeep	GRAND CHEROKEE	Ford	EXPLORER
Jeep	LIBERTY	Ford	FORD F SERIES
Pontiac	GRAND PRIX	GMC	SIERRA
Toyota	TUNDRA		

Notes:

In 2005, total sales for the top 25-selling cars and the top 25-selling light trucks were 10,004,106, representing 60 percent of all cars and light trucks sold in the United States that year (16,647,754).

There are multiple models for each of the cars and light trucks listed at left. Differences in the type of transmission (standard versus automatic) and in the drive type (two-wheel versus four-wheel drive) affect a vehicle's fuel economy. To categorize each make and model to determine a category for illustrative purposes, we had to select one specific model. For each make and model listed, we estimated CO₂ emissions for the first two-wheel drive, automatic transmission, gasoline-powered vehicle that is sold in most of the United States, as listed in the 2005 EPA *Green Vehicle Guide*. For four-wheel drive-only models, we used the first automatic transmission model listed.

CALCULATING CO₂ EMISSIONS

To calculate CO₂ emissions in pounds for a gasoline or hybrid car, two pieces of information are needed for each make and model: the estimated fuel economy for city and for highway driving — that is, the estimated city and highway miles per gallon (mpg).

As shown in the EPA formula, these two pieces of information are used to determine the combined fuel economy, also referred to as combined mpg. We assumed that each vehicle is driven 15,000 miles annually, the number EPA uses in all of its proposed new label designs. These two numbers — the combined mpg and annual vehicle miles traveled — are used to determine the total number of gallons required. According to EPA, burning a gallon of gasoline produces about 20 lbs of CO₂. Thus, the final step is to multiply the total number of gallons for each vehicle by 20 lbs to calculate estimated annual CO₂ emissions.

Sources

- Formula for combined fuel economy and information on CO₂ emissions per gallon of gasoline: www.epa.gov/greenvehicles/about.htm.
- Fuel economy (mpg) data on specific vehicles: www.epa.gov/greenvehicles/select.htm.

EPA's combined fuel economy (mpg) formula

$$\text{Combined mpg} = \frac{1}{\frac{0.55}{\text{city mpg}} + \frac{0.45}{\text{highway mpg}}}$$

Calculating CO₂ emissions for a vehicle with an estimated fuel economy of 21 mpg city and 26 mpg highway

1. Determine the combined fuel economy, or mpg:

$$\frac{1}{\frac{0.55}{21} + \frac{0.45}{26}} = 23 \text{ combined mpg}$$

2. Estimate the number of gallons of gas needed to drive 15,000 miles:

$$15,000 \text{ miles} / 23 \text{ miles per gallon} = 652 \text{ gallons}$$

3. Determine annual CO₂ emissions by multiplying the total number of gallons by 20:

$$652 \text{ gallons} \times 20 \text{ lbs CO}_2 = 13,040 \text{ lbs of CO}_2$$

Note: Totals do not add due to rounding.

informed choices. In February 2006, the National Highway Traffic Safety Administration announced a proposal to require a safety-rating information label on all new cars beginning with the 2008 model year. The Honda Motor Company is already voluntarily displaying the results of its crash ratings on 2006-model window stickers.

Certainly, requiring CO₂ labels on every new car will not change consumer behavior tomorrow. The goal of the label is to educate American consumers about the link between the cars they drive and global warming — with an eye toward ultimately encouraging them to drive more

fuel-efficient cars and to drive them less. A global warming performance label is only one component of what must be a multipronged approach. Still, it is a place to start.



Requiring a global warming performance label on all new cars and light trucks sold in the United States is an inexpensive and important first step in educating the public about something they can do to combat global warming. The information is already available online from two government agencies. Why not make it visible to all car buyers?

FOR MORE INFORMATION

Fuel economy for cars and light trucks sold in the United States

EPA's *Green Vehicle Guide* provides information on the environmental performance of cars and light trucks:

www.epa.gov/greenvehicles

EPA and DOE's annual *Fuel Economy Guide* includes information on fuel costs, hybrid vehicles, and alternative-fuel vehicles:

www.fueleconomy.gov

Proposed EPA regulation

Proposed EPA test methods for calculating fuel economy estimates for new cars and light trucks:

www.epa.gov/fueleconomy/regulations.htm

EPA's four proposed mpg window label designs:

www.epa.gov/fueleconomy/labels.htm

California Assembly Bill 1229

Background information on the status and history of Assembly Bill 1229, which calls for a new CO₂ emissions label, and a full copy of the bill:

<http://info.sen.ca.gov>

Click on "Legislation" and search for Bill 1229.

Information on the United Kingdom's Green Label

www.vcacrufueldata.org.uk/green-label/index.asp and
www.lowcvp.org.uk/newsandevents/news.cfm?news_id=160

European Union directive requiring CO₂ emissions information for all new cars

<http://europa.eu.int/comm/environment/co2/9994/en.pdf>

Additional information

Raymond J. Kopp, Resources for the Future, *Recent Trends in U.S. Greenhouse Gas Emissions*, Backgrounder, February 2006.

www.weathervane.rff.org/RecentTrendsInUSGreenhouseGasEmissions

John M. DeCicco, Environmental Defense, *Considerations for Improving Environmental Information for U.S. Cars and Light Trucks*, TRB Paper No. 06-2438, January 2006.

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