

**Bureau of Waste Prevention
Division of Consumer and Transportation Programs**

**310 CMR 7.40:
THE MASSACHUSETTS
LOW EMISSION VEHICLE PROGRAM**

**Background Document and Technical Support for
Public Hearings on
The Proposed Amendments to the Smog Index Vehicle
Emissions Label**

**Regulatory Authority: Massachusetts General Law, Chapter 111,
Section 142A through 142M**

November 2008

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Background Document and Technical Support for Public Hearing:

To Consider Amendments to Adopt the California Smog Index Vehicle Emissions Label for 2009 and Subsequent Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.

310 CMR 7.40: Massachusetts Low Emission Vehicle Program

November 2008

I. EXECUTIVE SUMMARY

Massachusetts General Law (M.G.L.) c.111, Sections 142B and 142K mandate that the Massachusetts Department of Environmental Protection (MassDEP) adopt and implement California's motor vehicle emissions if such standards are more stringent than the federal regulations. In 2005, California Assembly Bill 1229 was signed into law and required the California Air Resources Board (ARB) to redesign the Smog Index Label to include information about emissions of global warming gases. As a result, ARB proposed to amend the existing Smog Index Label requirements to add the global warming Smog Index. In June 2008, ARB finalized the Smog Index Label requirements, which includes changes to the specific requirements of the labeling information and the enhancement of the label appearance. In addition, the labeling requirements require one label size to be used by all automobile manufacturers.

MassDEP is proposing to adopt the California Smog Index Label revisions under the Low Emission Vehicle (LEV) Program regulations, 310 CMR 7.40. The requirements apply to all passenger cars (PCs), light-duty trucks (LDTs), and medium-duty passenger vehicles (MDPVs) manufactured on or after October 1, 2008.¹ MassDEP anticipates that the smog index vehicle emissions label will encourage consumers to purchase new vehicles with lower emissions, ultimately resulting in reduced air pollution and GHG emissions that contribute to global warming.

II. INTRODUCTION

Under Massachusetts law, MGL c.111, Sections 142B and 142K, MassDEP is required to adopt California's standards as long as the standards achieve greater emissions reductions than the federal standards. The proposed Massachusetts Smog Index Label standards directly cite and/or incorporate by reference the applicable sections within Title 13 of the California Code of Regulations (CCR).

According to data submitted by the automobile manufacturers pursuant to the LEV Program regulation, about 330,000 new vehicles are delivered for sale in Massachusetts

¹ The Smog Index Label revisions will be applicable as of October 1, 2008 or on the effective date of the regulation, whichever occurs later.

each year.² In addition, there are 4.6 million registered on-road vehicles³ that travel approximately 189 million miles each day (based on an average of 15,000 miles travel per year per vehicle)⁴. This is equivalent to 8.2 million gallons of gasoline per day (based on an average of 23 MPG)⁵, resulting in about 72 thousand tons of CO₂ global warming gas emissions per day.⁶ In 1999, Massachusetts adopted the Emission Control and Smog Index Labeling requirement. In 2005, Massachusetts adopted the California GHG Exhaust Emission Standards and Test Procedures that will be in effect for MY 2009 and newer vehicles. The GHG Exhaust Emission standards would reduce CO₂ emissions by at least 18% in 2020 and 24% in 2030.⁷ Recently, California amended its Smog Index Vehicle Emissions Label to include the global warming index. The new labeling requirements will be in effect for all PCs, LDTs, and MDPVs manufactured on or after October 1, 2008. It is important for Massachusetts to adopt the new Smog Index Vehicle Emissions Label to help consumers choose the cleanest vehicles so that emissions will ultimately decrease.

III. BACKGROUND

In 1967, the federal Clean Air Act (CAA) established the framework for controlling mobile source emissions in the United States. Although state emissions standards were preempted by the federal emissions standards under CAA Section 209, California was granted a special exemption to the federal preemption because of the state's unique air quality problems. This exemption gave California the authority to set its own standards as long as they are at least as protective as the federal standards.⁸ A subsequent amendment to the CAA added Section 177 that allows other states to adopt the California standards.⁹

Sections 142B and 142K of MGL Chapter 111 require MassDEP to adopt California's standards as long as they achieve greater emissions reductions than the federal standards. In 1991, Massachusetts promulgated 310 CMR 7.40, the LEV Program regulation. Massachusetts was one of the first states to adopt California's LEV standards. Over the years, the LEV regulation has been amended to adopt the fleet average non-methane organic gas (NMOG) requirements, LEV II emission standards for MDPVs, and the Zero Emission Vehicle (ZEV) requirements.

The most recent amendment to the Massachusetts Low Emission Vehicle (LEV) regulations, in 2005, included the fleet average GHG Exhaust Mass Emissions requirements for PCs, LDTs, and MDPVs. The standards are divided into two groups based on gross vehicle weight ratings (GVWR). One group of standards is for PCs and

² Massachusetts LEV Program, 2000-2006 NMOG data, March 2007

³ Massachusetts RMV Bi-monthly Registration Reports, December 2007

⁴ U.S.EPA www.fueleconomy.gov

⁵ U.S.EPA www.fueleconomy.gov/feg/bestworst.shtml, 2008 Most and Least Fuel Efficient Vehicles

⁶ U.S.EPA Emission Facts: GHG Emissions for a Typical Passenger Vehicle

⁷ NESCAUM, Northeast State GHG Emission Reduction Potential from Adoption of the California Motor Vehicle GHG Standards, Summary of NESCAUM Analysis, October 2005

⁸ U.S.EPA, Title II – Emission Standards for Moving Sources, Part A – Section 209, 42 U.S.C. §7543

⁹ U.S.EPA, Title I – Air Pollution Prevention and Control, Part D – Section 177, 42 U.S.C. §7507

LDTs up to 3,750 pounds GVWR. The other group of standards is for LDT2 from 3,751 to 8,500 pounds GVWR and MDPVs between 8,500 to 10,000 pounds GVWR. In addition, the standards have phase-in requirements from 2009 through 2012 and from 2013 through 2016.¹⁰ The adoption of the California GHG standards will result in a substantial reduction in CO₂ emissions in Massachusetts.

IV. NEED FOR REGULATORY AMENDMENTS TO 310 CMR 7.40

Since the adoption of the California LEV program, MassDEP has revised its LEV regulations numerous times to remain consistent with California's requirements to ensure the environmental benefits for the Commonwealth above and beyond the federal regulations. Adoption of the GHG smog index label will help consumers purchase lower emitting vehicles, which is essential to meet air quality goals, reduce GHG emissions that contribute to global warming, and protect public health.

The proposed amendments include making changes to the existing Smog Index Label and adding the global warming Smog Index Emissions for all PCs, LDTs, and MDPVs manufactured on or after October 1, 2008.

The proposed Massachusetts Smog Index Vehicle Emissions Label requirements will be the same as California's amended Smog Index Emissions label requirements (see Appendix - Smog Index Label). The new label will be affixed to the driver's side window and shall apply to all PCs, LDTs, and MDPVs. The "Environmental Performance" label consists of two scores: a Smog Score and a Global Warming score.

- The Smog Score indicates the smog emission information for a vehicle based on NMOG, NO_x, and evaporative HC emissions. The average new vehicle is assigned a ULEV certification with a Smog Score of 5 (see Appendix - Smog Index Label for a more complete discussion). The new Smog Index Vehicle Emissions label will replace the existing Smog Index Label beginning on October 1, 2008.
- The Global Warming Score is the global warming emissions value as determined by the CO₂ Equivalent value for a vehicle (see Appendix - Smog Index Label for a more complete description). The average new vehicle CO₂ Equivalent combined value is estimated to be 360 g/mi and is assigned a score of 5.

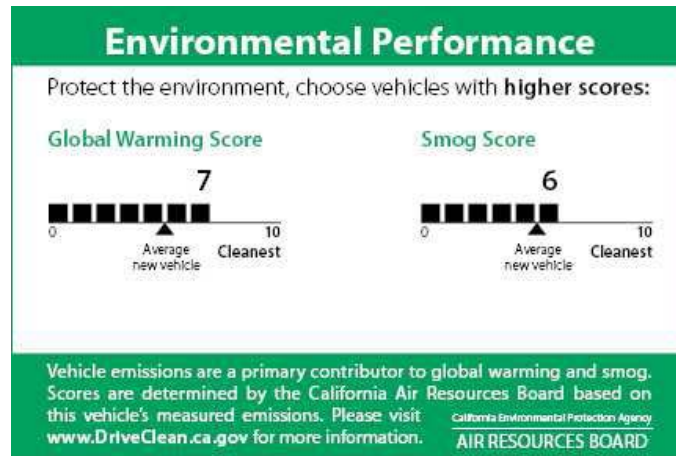
The new label requirements create a uniform label for all manufacturers to follow (Figure 1). Massachusetts proposes to include all of California's labeling requirements in 310 CMR 7.40. The label must:

- a) Be a rectangular shape and 6 × 4 inches and have two sections of green at the top and bottom.
- b) Have a title "Environmental Performance."
- c) Have phrase "Protect the Environment, choose vehicles with **higher scores**" under the title.

¹⁰ Title 13, CCR §1961.1 GHG Exhaust Emission Standards and Test Procedures, 2007

- d) Have the Global Warming Score and the Smog Score on each side with green print and the “average new vehicle” must appear under both scales at the center point.
- e) Have the statement “Vehicle emissions are a primary contributor to global warming and smog. Scores are determined by the California Air Resources Board based on this vehicle’s measured emissions. Please visit www.DriveClean.ca.gov for more information” in the lower green section.

Figure 1: Sample California Environmental Performance Label



Attached is the proposed regulation change to 310 CMR 7.40 in red-line/strike-out.

V. AIR QUALITY IMPACTS

Climate change is a national problem and has major economic impacts globally. Locally, the New England Regional Assessment (NERA) predicted that by the end of the century the weather patterns in Boston would be similar to Richmond, Virginia, or Atlanta, Georgia. The changes in weather patterns are projected to disrupt many Massachusetts’ residents, such as travel delays, overburdened septic systems, downed power lines, loss of beach front caused by rising sea levels and coastal storms, drier conditions which alter coastal and marine ecosystems, severe heat waves posing a health risk, and harmful outdoor air quality. Moreover, climate change will impact Massachusetts’ industries such as tourism and agriculture.¹¹ According to the United Nations Intergovernmental Panel on Climate Change (IPCC) and climate scientists around the world, pollutants that cause global warming are a real and documented environmental threat. This is clearly an environmental issue that needs to be addressed and Massachusetts is committed to improving air quality in the Commonwealth.

Although the public is concerned about the seriousness of global warming, it may not have a clear understanding of the environmental consequences of their car choices. Consumers have relied on the government or industry to make their purchases simpler

¹¹ New England Regional Assessment, *Barrett Rock*
<http://www.necci.sr.unh.edu/necci-report/NERAch1.pdf>

and more understandable. The smog index vehicle emissions label will encourage consumers to choose new vehicles with the lowest emissions and help them make environmentally sustainable choices that will have major benefits for the environment.

VI. ECONOMIC IMPACTS

Changing the Smog Index Vehicle Emissions Label will require the automobile manufacturers to produce a new label size and include a new color (green) on the label. Most automobile manufacturers currently use black ink laser jet printers for the federal and California sticker requirements. Adding the green color to the label requires the manufacturers to either obtain pre-printed color labels or replace their existing printers with laser jet color printers. California analyzed the costs and the economic impact to the automobile industry. It should be noted that the costs that will be incurred by the automobile manufacturers to comply in Massachusetts with the vehicle labeling requirement include potential costs for obtaining pre-printed labels and/or for producing a larger label. The automobile manufacturers will also incur costs to upgrade printers to color printers (replacing an existing printer with a color printer would cost approximately \$6,000 compared to \$5,000 for a black ink printer). However, for the purposes of this analysis, MassDEP assumed these costs already will have been incurred by the automobile manufacturers to comply with the labeling requirement in California.

Pre-printed color labels cost 5 cents more per label than uncolored labels. Based on the number of vehicles sold in Massachusetts in 2006, the total annual operating cost would be \$14,772.10 or an average of \$642 per manufacturer per year. Individual manufacturer costs may vary depending on its actual production volume.

The amount of labels produced can either bring the cost up or down. For example, smaller manufacturer would be required to absorb the high capital and operational costs of using color printers for fewer cars. On the other hand, the large manufacturers would spread the costs over a much larger number of production vehicles, which would decrease the cost for each vehicle.

Requiring the existing label to increase from 2.5×4 inches to 4×6 inches will add about 1 cent per label (the cost will decrease if quantities increase). Based on the number of vehicles sold in Massachusetts in 2006 (295,442 PCs, LDTs and MDPVs¹²), the additional cost for the larger labels would add \$2,954.42 to the auto industry's cost. Currently in Massachusetts, there are 23 manufacturers certifying their vehicles to meet the California standards.¹³ The increased label cost would be an average of \$128 per manufacturer per year. Individual manufacturer costs may vary depending on its actual production volume.

The costs of producing the new label seem minimal when compared to the environmental benefits. It is anticipated that the label will affect the purchasing choices of many buyers. As more consumers understand and are aware of the benefits of purchasing a vehicle with

¹² Massachusetts LEV Program, 2006 NMOG data, March 2007

¹³ Massachusetts LEV Program, 2006 NMOG data, March 2007

low GHG emissions, demand for low emission vehicles will help increase the pressure on manufacturers to produce more of these vehicles. The increased awareness of GHG emissions may also encourage consumers to purchase other green products.

VII. OTHER PROGRAM IMPACTS and PUBLIC PARTICIPATION

The change to the Smog Index Label does not have any negative impact on agencies on the local, state or federal level. It standardizes the label to size, scale, and color and makes it easier for the consumers to make informed choices for purchasing more fuel-efficient vehicles.

The Massachusetts LEV Program is required under M.G.L.c. 111, Section 142K to give notice to the public and provides the opportunity to review the background and technical support document at least 21 days prior to the Program proposing the regulation amendments. A formal notice will be issued before the public hearing. The hearing will be held in Boston.

VIII. REFERENCES

California Air Resources Board, Proposed Amendments to the Smog Index Vehicle Emissions Label, June 2007.

California Air Resources Board, Resolution 07-26, June 2007.

Title 13, CCR §1961.1 GHG Exhaust Emission Standards and Test Procedures, 2007.

The Commonwealth of Massachusetts, Executive Order, Governor Patrick Set Ambitious New Energy Standards for State Buildings, April 18, 2007.

The Commonwealth of Massachusetts, Massachusetts Climate Protection Plan, 2004.

Massachusetts LEV Program, Manufacturers Total Deliveries for Sale in Massachusetts (NMOG data), March 2007.

Massachusetts Registry of Motor Vehicle, Bi-monthly Registration Reports, December 2007.

National Research Council, State and Federal Standards for Mobile-Source Emissions, 2006.

NESCAUM, Northeast State GHG Emission Reduction Potential from Adoption of the California Motor Vehicle GHG Standards, Summary of NESCAUM Analysis, October 2005.

New England Regional Assessment an Introduction, *Barrett Rock*,
www.necci.sr.unh.edu/necci-report/NERAch1.pdf.

U.S.EPA Emission Facts: Greenhouse Gas Emissions for a Typical Passenger Vehicle, EPA 420-F-05-004, February 2005.

U.S. EPA: www.epa.gov/greenvehicles, Green Vehicle Guide.

U.S.EPA Energy Efficiency & Renewable Energy: www.fueleconomy.gov, February 13, 2008.

U.S.EPA, Title I – Air Pollution Prevention and Control, Part D – Section 177, 42 U.S.C. §7543.

U.S.EPA, Title II – Emission Standards for Moving Sources, Part A – Section 209, 42 U.S.C. §7507.

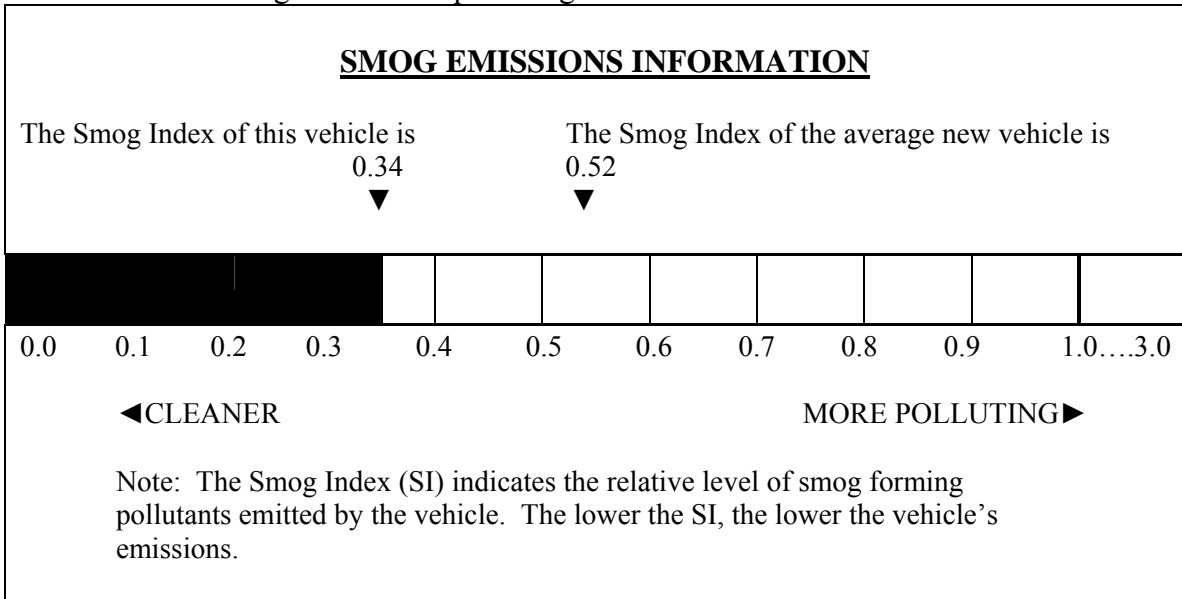
Appendix – Smog Index Label

California Assembly Bill 1229 required the ARB to revise the Smog Index Label and to develop a global warming Index Label. The existing Smog Index Label provides smog information based on exhaust NMOG, NO_x and evaporative HC emissions. The existing Smog Index Label uses a ratio to compare the vehicle being labeled to a base vehicle (determined by ARB), which can be calculated by using the smog index equation¹⁴.

$$SmogIndex = \frac{[NMOG + NO_x + HC]_{Vehicle\ to\ be\ Certified}}{[NMOG + NO_x + HC]_{Base\ Vehicle}}$$

The smog index ratio is then displayed graphically on the label along with the smog index of the average new vehicle for the same model year being sold. The Figure A-1 shows a typical smog index label.

Figure A-1 Sample Smog Emission Information Label



The existing smog index label allows auto manufacturers to create their own label size and graphics. Some labels show a Smog Index on a scale of 0.0 to 1.0 while others on a scale of 0.0 to 3.0. Each manufacturer has its own graphical representation of the scale. Because of the variability in labels, vehicle comparisons from one manufacturer to another are difficult. In 2007, ARB proposed modifying the label to require a simple scale from 1 to 10 (where 1 is dirtiest and 10 is cleanest). California focus group research found that consumers associate 10 as well performing and 1 as poor performing. The

¹⁴ ARB, Proposed Amendments to the Smog Index Vehicle Emissions Label, June 2007

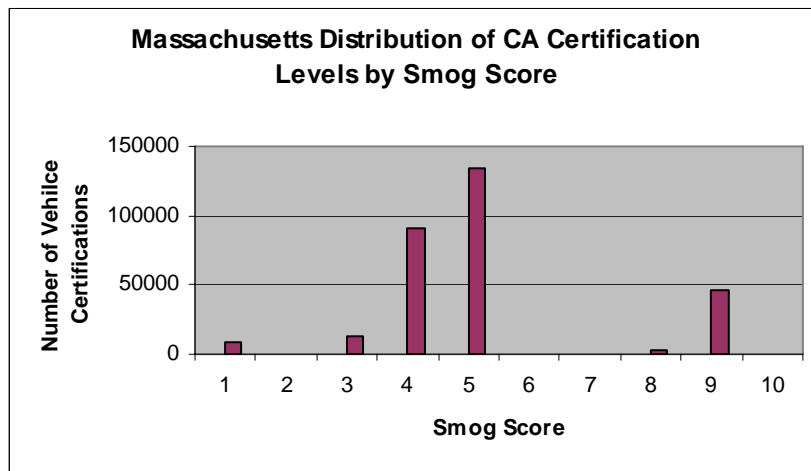
EPA also uses a scale of 1-10 for smog and GHG ratings¹⁵. Table A-1 shows the ranking for the new scores by certification (California and federal).¹⁶

Table A-1 Smog Scores by Vehicle Certification

California Emissions Certification – Federal Bins	NMOG + NO _x (g/mi)	2009 Smog Score
ZEV or Bin 1	0.0	10
PZEV	0.030	9
SULEV or Bin 2	0.030	8
Bin 3	0.085	7
Bin 4	0.110	6
ULEV	0.125	5
LEV Bin 5	0.160	4
LEV (option 1) or Bin 6 and SULEV MDPVs	0.190 – 0.200	3
Bin 7	0.240	2
ULEV (MDPVs) or Bin 8	0.325	1

Applying the above smog scale to the 2006 MY Massachusetts data yields a model-based distribution of certification levels by smog scores. Figure A-2 shows the average vehicle score to be closest to 5, which is the ULEV certification. Therefore, the smog score is set at 5 to represent the average vehicle.

Figure A-2 Smog Scores for Massachusetts Vehicles



Because the federal government does not have standards for the global warming Smog Index Label, ARB proposed a scoring system that is based on its GHG emissions regulation for PCs and LDTs, Title 13, CCR §1961.1. The GHG regulation controls different sources of pollutants, including

¹⁵ U.S. EPA: www.epa.gov/greenvehicles, Green Vehicle Guide

¹⁶ State of California AIR RESOURCES BOARD, Resolution 07-26, June 2007

1. Emissions resulting directly from the vehicle (carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O));
2. Exhaust CO₂ emissions from operating the air conditioning (A/C) system (indirect A/C emissions);
3. Refrigerant emissions from A/C system due to leakage or accidents (direct A/C emissions); and
4. Upstream emissions from the production of the fuel used by the vehicle.

The CO₂ equivalent value is calculated using the equation below:¹⁷

$$\text{CO}_2 \text{ Equivalent Value} = \text{CO}_2 + 296 \times \text{N}_2\text{O} + 23 \times \text{CH}_4 - \text{A/C Direct Emissions Allowance} - \text{A/C Indirect Emissions Allowance}$$

California received some CO₂ data from the auto manufacturers and compared them to the federal certification data. The result provides an average of 360 grams per mile (g/mi) CO₂ and is set at 5 on the scale. Table A-2 shows the scoring system based on CO₂ Equivalent emissions.¹⁸

Table A-2 Global Warming Scores based on CO₂Equivalent

Global warming Score	CO ₂ Equivalent combined (g/mi)
10	Less than 200
9	200 - 239
8	240 - 279
7	280 - 319
6	320 - 359
5	360 - 399
4	400 - 439
3	440 - 479
2	480-519
1	520 and up

¹⁷ Title 13, CCR §1961.1 GHG Exhaust Emission Standards and Test Procedures, 2007

¹⁸ State of California AIR RESOURCES BOARD, Resolution 07-26, June 2007