



September 21, 2004

Rulemaking on the Proposed Regulations to Control Greenhouse Gas Emissions from Motor Vehicles

California Air Resources Board
PO Box 2815
Sacramento, CA 95812
Attention: Chuck Shulock.

Dear Mr. Shulock,

On behalf of the Competitive Enterprise Institute (CEI), a non-profit public policy organization headquartered in Washington, D.C., we are pleased to submit this comment on the Air Resource Board's (ARB) Final Staff Report on AB 1493, a law requiring ARB to adopt regulations achieving "maximum feasible and cost-effective" reductions of greenhouse gas emissions from motor vehicles.

This comment has five sections:

- Section I challenges the scientific basis of AB 1493 and ARB's regulatory proposal. The balance of evidence lies against the belief in an impending climate catastrophe. Global warming alarmism is based on hyperbole and fear, not science.
- Section II challenges the legal basis of AB 1493 and ARB's regulatory proposal. "Maximum feasible" greenhouse gas (GHG) reductions cannot be achieved without mandatory engineering and design modifications to increase new-car fuel economy. However, the federal Energy and Conservation Act of 1975 prohibits States from adopting laws "related to" fuel economy.
- Section III challenges the economic basis of AB 1493 and ARB's regulatory proposal. AB 1493 fails a reasonable cost-effectiveness test in two ways. First, even if the theory of catastrophic global warming were true, the emissions reductions achieved by AB 1493 would make no detectable difference in global temperature trends over the next 50 years. As environmental policy, AB 1493 is all cost for no benefit. Second, AB 1493 will raise the sticker price of new cars more than it will lower operating expenses for most consumers.
- Section IV sounds a cautionary note. Downsizing and down-weighting of cars is the least-costly means of increasing fuel economy and decreasing GHG emissions per vehicle mile traveled. Lighter, smaller vehicles are less crashworthy. Federal fuel economy mandates killed between 1,300 and 2,600 motorists in 1993, according to the National Research Council. To the extent that AB 1493 constrains vehicle size and weight, it will adversely affect auto safety.

- Section V states our conclusion. ARB cannot achieve “maximum feasible” greenhouse gas reductions from automobiles without poaching on federally preempted policy terrain. It cannot achieve “cost effective” reductions with any set of regulatory tools. ARB should brief Governor Schwarzenegger and the California legislature on the practical and legal impossibility of accomplishing the law’s objectives, and about the adverse safety effects of CO₂ emission standards.

I. Science Does Not Support the Theory of Catastrophic Warming

AB 1493 responds to the opinion that industrial emissions of greenhouse gases, chiefly carbon dioxide (CO₂) from fossil fuel combustion, will dramatically warm the planet, with potentially catastrophic impacts on people, economies, and eco-systems. However, evidence continues to build that any increase in average global temperatures from man-made greenhouse gases will likely be close to the low end (1.4°C, 2.5°F) of the Intergovernmental Panel on Climate Change’s (IPCC) global warming projections for the next 100 years.

Forecasts of significantly greater warming, such as the IPCC’s high-end (5.8°C, 10.4°F) projection, are based on questionable climate history, misleading surface temperature records, the pretence that scientists know enough about natural climate variability to attribute all or most recent warming to greenhouse gas emissions, errant climate models, implausible emission scenarios, and unconfirmed feedback effects. Moreover, predictions of rapidly rising seas, “super-storms,” mass extinctions, and other eco-disasters are based on speculation and fear, not science.

Questionable Climate History

The IPCC and ARB promote a particular reconstruction of climate history, popularly known as the “hockey stick,”¹ as their chief exhibit in support of regulatory climate policy.² When plotted as a graph, the data in this reconstruction form a relatively flat line from 1000 A.D. to 1900 A.D. (the handle of the hockey stick) and a sharply upward-curving line during the past 100 years (the blade of the hockey stick). The reconstruction allegedly proves that the 20th Century was the warmest century of the past millennium and the 1990s the warmest decade on record.

However, the most comprehensive review of climate reconstruction literature found 79 studies that show “periods of at least 50 years which were warmer than any 50 year period in the 20th century.”³ Another study finds that the hockey stick “contains collation

¹ Mann, M. E. et al. 1999. Northern Hemisphere Temperatures During the Past Millennium: Inferences, Uncertainties, and Limitations. *Geophys. Res. Lett.* 26: 759-762.

² Intergovernmental Panel on Climate Change, *Climate Change 2001: The Scientific Basis*, p. 134. California Air Resources Board, *Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Public Hearing to Consider Adoption of Regulations to Control Greenhouse Gas Emissions from Motor Vehicles* (hereafter, *Staff Report*), August 6, 2004, p. 6.

³ Soon, W., and Baliunas, S. 2003. *Lessons & Limits of Climate History: Was the 20th Century Climate Unusual?* Marshall Institute, p. 13, adapted from Soon, W. et al. 2003. Reconstructing climatic and environmental changes of the past 1,000 years: A Reappraisal. *Energy & Environment* 14: 233-396.

errors, unjustifiable truncation or extrapolation of source data, obsolete data, geographical location errors, incorrect calculation of principal components and other quality control defects.”⁴ Temperature data going back 420,000 years, derived from the Vostok ice core in East Antarctica, indicate that all four interglacial periods prior to the one in which we now live were warmer than the present one by 2°C or more.⁵ Claims that the late 20th Century warming was unprecedented, outside the range of natural variability, and therefore cause for alarm, are controversial, not “settled” science.

Misleading Surface Records

A satellite study of the Houston, Texas, urban heat island (UHI) finds that, in just 12 years, a 30 percent increase in population added 0.82°C to Houston’s UHI⁶ — more than the IPCC calculates global temperatures rose over the entire past century, when the earth’s population grew by some 280 percent.⁷ Another study estimates that urbanization and land-use changes account for 0.27°C or about one-third of average U.S. surface warming during the past century — at least twice as high as previous estimates.⁸ Still another finds “strong observational evidence that the degree of industrialization is correlated with surface temperature,” leading the authors to conclude that “the observed surface temperature changes might be a result of local surface heating processes and not related to radiative greenhouse gas forcing.”⁹ The heat effects from urbanization and land-use changes are larger than the IPCC assumed, and have not been adequately corrected in 20th Century surface temperature records.¹⁰

The ARB *Staff Report* acknowledges that “In California the less populated and rural areas have shown the lowest average rate of temperature increase.”¹¹ ARB should also have noted that several weather stations in less populated and rural areas show a *cooling trend* in the 1990s, allegedly the warmest decade of the past millennium. Stations where cooling occurred include Berkeley, Chico, Colfax, Death Valley, Fort Bragg, Fresno, Lake Spalding, Lemon Cove, Lodi, Mount Shasta, Ojai, Orland, Paso Robles, Quincy,

⁴ McIntyre, S. and McKittrick, R. 2003. Corrections to the Mann et al. 1998 (Proxy) Database and Northern Hemisphere Average Temperature Series. *Energy & Environment* 14: 751-771.

⁵ Petit, J.R. et al. 1999. Climate and atmospheric history of the past 420,000 years from the Vostok ice core, Antarctica. *Nature* 399: 429-436.

⁶ Streuker, D.R. 2003. Satellite-measured growth of the urban heat island of Houston, Texas. *Remote Sensing of Environment* 85: 282-289.

⁷ Idso, C., and Idso, K. 2003. The Urban Heat Island of Houston, Texas, *Journal Reviews*, <http://www.co2science.org/journal/2003/v6n15c1.htm>.

⁸ Kalnay, E., and Cai, M. 2003. Impact of urbanization and land-use change on climate. *Nature* 423: 528-531.

⁹ De Laat, A.T.J. and Maurellis, A.N. 2004. Industrial CO₂ emissions as a proxy for anthropogenic influence on lower tropospheric temperature trends. *Geophysical Research Letters* 31:10.1029/2003GL019024.

¹⁰ McKittrick, R. and Michaels, P.J. 2004. A test of corrections for extraneous signals in gridded surface temperature data. *Climate Research* 26: 159-173.

¹¹ ARB, *Staff Report*, p. 17.

Redding, Redlands, San Luis Obispo, Santa Cruz, Tahoe City, Ukiah, Wasco, and Yosemite Park.¹²

Natural Variability—Still an Unknown Quantity

As much as half the surface warming of the past 50 years may be due to the Pacific Decadal Oscillation, a natural event that alternately warms and cools the Pacific Ocean at 20- to 30-year intervals. In just two years (1976-1977), global average surface air temperatures increased by 0.2°C, and remained elevated through the end of the 20th century. No current climate model can explain this step-like increase. If greenhouse warming were the driving force, the 1976-shift in atmospheric temperatures should have preceded any corresponding change in ocean temperatures. Instead, increases in tropical sea surface and subsurface temperatures preceded the atmospheric warming by 4 years and 11 years, respectively.¹³

The sun was a significant source of 20th Century warming. There were two distinct warming periods during the past 100 years: from 1910 to 1945 (+0.50°C, +0.90°F), and from 1976 to the present (+0.46°C, +0.82°F).¹⁴ The sun probably caused most of 1910-1945 warming, because more than two-thirds of the buildup in greenhouse gas emissions over pre-industrial levels occurred after 1945.¹⁵ The sun also contributed to the later warming. A reconstruction of solar magnetic field fluctuations from beryllium-10 isotope concentrations in ice cores drilled in Greenland and Antarctica shows that the last 60 years were a “period of high solar activity ... unique throughout the past 1150 years.”¹⁶

No real scientist will claim the ability to quantify the relative contributions of greenhouse gases, the Pacific Decadal Oscillation, solar radiation, and urban heat islands to the warming trend of recent decades.

Errant Climate Models

The models on which climate alarmists rely project 50-100 percent more warming in the troposphere, the layer of air from roughly two to eight kilometers up, than at the surface.¹⁷ Observations show the opposite is occurring. The surface appears to be

¹² U.S. Historical Climatology Network Data Set, Trend Calculations—California, <http://www.co2science.org/ushcn/ca/ca.htm>.

¹³ Bratcher, A.T., and Giese, B.S. 2002. Tropical Pacific decadal variability and global warming, *Geophysical Research Letters* 29: 10.1029/2002GL015191.

¹⁴ Climatic Research Unit, University of East Anglia, <http://www.cru.uea.ac.uk/cru/data/temperature/>, using the dataset taveg12v.dat.

¹⁵ CO2 levels rose from 280ppm in pre-industrial times to 307ppm in 1943, to 319ppm in 1959, to 376 in 2003. References: IPCC, *Climate Change 2001: The Scientific Basis*, p. 203 (for pre-industrial); <http://cdiac.esd.ornl.gov/ftp/trends/co2/siple2.013> (for 1943); and <http://cdiac.esd.ornl.gov/ftp/trends/co2/maunaloa.Co2> (for 1959 and 2003).

¹⁶ Solanki et al. 2002. Millennium-Scale Sunspot Number Reconstruction: Evidence for an Unusually Active Sun since the 1940s. *Physical Review Letters* vol. 91, no. 21, 1-4.

¹⁷ Douglass et al. 2004. Altitude dependence of atmospheric temperature trends: Climate models versus observation. *Geophysical Research Letters* vol. 31, L13208.

warming at a rate of 0.17°C per decade since 1976.¹⁸ However, the troposphere is warming at less than half that rate — by 0.08°C per decade since 1979 according to both satellite¹⁹ and weather balloon measurements.²⁰ Either the climate models get the basic physics wrong, or something other than the greenhouse effect is driving much of the surface warming — or both.

Most models also assume significant net cooling effects from aerosol emissions. For example, the IPCC produced larger warming projections in its 2001 (Third Assessment) report than in its 1995 (Second Assessment) report chiefly because IPCC modelers assumed more aggressive efforts worldwide to reduce aerosol emissions.²¹ However, subsequent research finds that one type of aerosol — black carbon (“soot”) — is a strong warming agent and may “nearly balance” the cooling effects of other aerosols.²² Indeed, NASA researchers James Hansen and Larissa Nazarenko find that black soot may be responsible for “25 percent of observed global warming over the past century.”²³ Future reductions in aerosols will likely cause less warming than the IPCC projects.

ARB cites the U.S. National Assessment’s projection of a 3-5°C (5-9°F) increase in average U.S. temperatures in the next 100 years.²⁴ However, the National Assessment’s scary climate scenarios have no scientific credibility. The National Assessment relied on two outlier climate models — the “hottest” and “wettest” out of some 26 models available to the Clinton team. Worse, as University of Virginia climatologist Patrick Michaels discovered, and National Oceanic and Atmospheric Administration scientist Thomas Karl confirmed, the two underlying models — British and Canadian — were incapable of replicating past U.S. temperature trends regardless of the averaging period used (five-year, ten-year, or 25-year).²⁵ Models that cannot hind-cast past climate cannot be trusted to forecast future climate.

Unconfirmed Feedback Effects

¹⁸ IPCC, *Climate Change 2001: The Scientific Basis*, p. 115.

¹⁹ Christy, J.R., and Spencer, R. W. *Global Temperature Report*: April 2003. UAH Earth System Science Center, May 9, 2003, vol. 12, no. 12.

²⁰ Angell, J.K. 2003. Global, hemispheric, and zonal temperature deviations derived from radiosonde records. *Trends Online: A Compendium of Data on Global Change*. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A.

²¹ Wigley, T.M., and Raper, S.B.C. 2002. Reasons for Larger Warming Projections in the IPCC Third Assessment Report. *Journal of Climate* 15: 2945-2952.

²² Jacobson, M. 2001. Strong radiative heating due to the mixing state of black carbon in atmospheric aerosols. *Nature* 409: 695-697; Sato, M. et al. 2003. Global atmospheric black carbon inferred from AERONET. *PNAS* vol. 100, no. 11: 6319-6324.

²³ Black Soot and Snow: A Warmer Combination, NASA News, Release: 03-420, December 22, 2003; Hansen, J. and Nazarenko, L. 2004. Soot climate forcing via snow and ice albedos. *PNAS* vol. 101, no. 2: 423-428.

²⁴ ARB, *Staff Report*, p. 7.

²⁵ Testimony of Patrick Michaels, *The U.S. National Climate Change Assessment: Do the Climate Models Project a Useful Picture of Regional Climate?* House Energy and Commerce Subcommittee on Oversight and Investigations, July 25, 2002.

The theory of catastrophic warming assumes the existence of strong positive water vapor feedback effects. In most models, the direct warming from a doubling of CO₂ concentrations over pre-industrial levels is 1.24°C (2.2°F).²⁶ Greater warming supposedly occurs when the initial CO₂-induced warming accelerates evaporation and, thus, increases concentrations of water vapor, the atmosphere's main greenhouse gas.

However, a NASA satellite study found that “some climate models might be overestimating the amount of water vapor entering the atmosphere as the Earth warms.”²⁷ Another satellite study discovered a negative water vapor feedback effect in the tropical troposphere — a thermostatic mechanism strong enough to cancel out most positive feedbacks in most models. As temperatures rise at the ocean's surface, infrared-absorbing cirrus cloud cover diminishes relative to sunlight-reflecting cumulous cloud cover. Those changes allow more heat to escape into space, cooling the surface back down.²⁸

Implausible Emission Scenarios

The IPCC and other alarmists, such as the authors of a recent study predicting an 8.3°C (14.1°F) summertime warming in California,²⁹ assume implausible rates of economic growth.

In the IPCC scenario with the lowest cumulative emissions and lowest temperature increase, per capita GDP in 2100 is more than 70 times 1990 levels in Asian developing countries and nearly 30 times 1990 levels in the rest of the developing world. These growth assumptions would be unrealistic even in a high-emissions scenario. “No significant country has ever achieved a 20-fold increase in output per head in a century, let alone the 30-fold or 70-fold increases projected by the IPCC for most of the world's population.”³⁰ Similarly, whereas the International Energy Agency projects electricity generation in developing countries to increase to 3.2 times the 2000 level by 2030, the IPCC low-emissions scenario projects a 5.5-fold increase in consumption during that period.³¹ Incredibly, the same “low-case” scenario implicitly projects that in 2100, average income levels in Russia, North Korea, South Africa, Malaysia, Libya, Algeria,

²⁶ Hansen, J. et al. 1997. Radiative forcing and climate response. *Journal of Geophysical Research* 102: 6831-6864.

²⁷ NASA, Top Story: Satellite Finds Warming “Relative” to Humidity, March 15, 2004, discussing Minschwaner, K. and Dessler, A. E. 2004. Water Vapor Feedback in the Tropical Upper Troposphere: Model Results and Observations. *Journal of Climate* 17: 1272-1282.

²⁸ Lindzen et al. 2001. Does the Earth Have an Adaptive Infrared Iris? *Bulletin of the American Meteorological Society* 82: 417-32.

²⁹ Hayhoe, K., et al. 2004. Emissions pathways, climate change, and impacts on California. *PNAS* vol. 101, no. 34: 12422-12427. The authors also rely on the UK model that repeatedly failed to replicate past U.S. temperature trends. See note 25, above.

³⁰ Ian Castles, “Greenhouse emissions calculations quite wrong,” Canberra Times, August 29, 2002, available in Castles, I. and Henderson, D. 2003: The IPCC Emission Scenarios: An Economic-Statistical Critique, *Energy & Environment* Nos. 2 & 3: 166-168.

³¹ Ian Castles, *Forecasting Global Output and Emissions*, IPA Climate Conference, p. 8, <http://www.ipa.org.au/pubs/special/climate/castlepaper.html>.

Tunisia, Saudi Arabia, Israel, Turkey, and Argentina exceed average income in the United States.³²

Inflated growth projections lead to overblown emission scenarios, which in turn lead to overheated warming projections.

Reality-Based Projection

When the IPCC's main climate model is run with more realistic inputs — the finding that the net cooling effect of aerosols is small, the discovery of a tropical cloud thermostat, and the assumption (based on the past 25 years of history) that greenhouse gas concentrations will increase at a constant rather than exponential rate — the projected 21st century warming drops from 2.0-4.5°C to 1.0-1.6°C.³³ Similarly, in the “alternative” emissions scenario developed by James Hansen, the NASA scientist whose 1988 congressional testimony put global warming on the public policy map, the world in the next 50 years warms $0.75 \pm 0.25^\circ\text{C}$, a warming rate of $0.15 \pm 0.05^\circ\text{C}$ per decade.³⁴

The mathematical form of most climate models also supports the conclusion that any anthropogenic global warming during the 21st century is likely to be small. Nearly all models predict that, once anthropogenic warming starts, the atmosphere warms at a constant rather than an accelerating rate.³⁵ As noted earlier, the troposphere has warmed 0.08°C per decade since 1979 while the surface appears to have warmed 0.17°C per decade since 1976. Even under the questionable assumption that all recent warming is due to man-made greenhouse gases, with no help from urban heat islands, solar variability, or the Pacific Decadal Oscillation, the linear form of model projections implies that the world will warm 0.8°C to 1.7°C over the next 100 years.

A 21st century warming in the range of 1.0 - 2.5°C , especially when combined with the boost in crop and forest productivity from an atmosphere richer in plant food (i.e., carbon dioxide), would likely have a small but beneficial impact on the U.S. economy.³⁶

Unfounded Climate Scares

In the popular imagination, global warming is associated with a parade of horrors: floods, extreme weather, mass extinctions, “killer” heat waves, deteriorating air quality, even a new ice age. Such scares do not survive scrutiny.

Floods: According to the IPCC, “It is now widely agreed that major loss of grounded ice [in the West Antarctic ice sheet] and accelerated sea level rise are very unlikely during

³² Castles & Henderson, 2003, p. 179.

³³ Michaels et al. 2002. Revised 21st-century temperature projections, *Climate Research*, 23:1-9.

³⁴ Hansen, J. E. and Sato, M. 2001. Trends of measured forcing agents, *PNAS*, vol. 98, no. 26: 14778-14783.

³⁵ Michaels, et al., 2002.

³⁶ Mendelsohn, R. and Neumann, J.E., *The Impact of Climate Change on the United States Economy* (Cambridge, MA: Cambridge University Press, 1999).

the 21st century.”³⁷ Indeed, the West Antarctic ice sheet is thickening rather than thinning,³⁸ and large areas of Antarctica are cooling,³⁹ as are the coastal regions of the Greenland ice sheet.⁴⁰ Satellite altimetry indicates no net change in sea-level in the past decade, leading the scientist conducting the study to eschew “fear of any massive future flooding as claimed in most global warming scenarios,” and to reject the IPCC’s projection of an 8-86 centimeter (3-34 inch) sea-level rise in the 21st Century as “untenable, not to say impossible.”⁴¹

Extreme Weather: The IPCC finds “no compelling evidence to indicate that the characteristics of tropical and extra-tropical storms have changed” during the 20th century.⁴² The frequency and intensity of Atlantic tropical storms decreased during the five decades from 1944 through 1995 — a period of net global warming and rapidly rising CO₂ concentrations.⁴³ More than a dozen recent studies find no increase in the frequency or severity of extreme weather events in North America or the world generally.⁴⁴

“Killer” Heat Waves: Predications of sharp increases in U.S. mortality from more frequent and severe heat waves overlook people’s proven capacity to adapt to and protect themselves from climate-related stresses. During the past several decades, the sensitivity of the American population to extremes of heat and humidity has declined significantly in most major U.S. cities notwithstanding an overall rise in urban temperatures, whether due to climate change or the growth of urban heat islands. The decline in heat-related mortality results from a combination of factors: improved medical care, increased availability and use of air conditioning, greater public awareness of the potential dangers of heat stress, and both human biophysical and infrastructural adaptations. Southern cities, where summer heat and humidity are common and adaptation to climatic warmth is widespread, exhibit little or no evidence of increased mortality on hot and humid days. Global warming will likely have minimal impacts on total heat-related mortality in the United States.⁴⁵

³⁷IPCC, *Climate Change 2001: The Scientific Basis*, p. 642.

³⁸ Joughin, I. and Tulaczyk, S. 2002. Positive Mass Balance of the Ross Ice Streams, West Antarctica. *Science*, 295: 451-452.

³⁹ Doran, P.T. et al. 2002. Antarctic climate cooling and terrestrial ecosystem response. *Nature* 415: 517-520.

⁴⁰ Chylek, P. et al. 2004. Global warming and the Greenland ice sheet. *Climatic Change* 63: 201-221.

⁴¹ Mörner, N-A. 2003. Estimating future sea level changes from past records. *Global and Planetary Change* 40: 49-54.

⁴² IPCC, *Climate Change 2001: The Scientific Basis*, p. 33.

⁴³ Landsea, C. et al. 1996. Downward trends in the frequency of intense Atlantic tropical storms during the past five decades. *Geophysical Research Letters* 23: 1697-1700.

⁴⁴ For a literature review, see Storms (North America) – Summary, <http://www.co2science.org/subject/s/summaries/stormsna.htm>.

⁴⁵ Davis, R. et al. 2004. Seasonality of climate-human mortality relationships in US cities and impacts of climate change. *Climate Research* 26:61-76; Davis et al. 2003. Decadal changes in summer mortality in U.S. cities. *International Journal of Biometeorology* 47: 166-175; Davis et al. 2002. Decadal changes in heat-related human mortality in the eastern United States. *Climate Research* 22: 175-184.

Air Pollution Episodes: Predictions of more frequent and severe air pollution episodes in U.S. cities, although intuitively plausible because heat promotes ozone formation, ignore the history of dramatic air quality improvements over the past 30 years and the panoply of regulatory requirements that ensure continuing reductions in air pollution over the next two decades. Notes air quality analyst Joel Schwartz: “Since 1975, a period during which climate alarmists argue that the climate has already significantly warmed, the national-average number of exceedances of the 1-hour ozone standard declined 95 percent (from 10 to 0.5 days per year), while the number of 8-hour ozone exceedances declined about 60 percent (from 14 to 6 per year).”⁴⁶

Hefty reductions in smog-forming emissions were the key to this progress. Nitrogen oxide (NO_x) emissions decreased approximately 27 percent since 1980 and 22 percent since 1990. Volatile organic compound (VOC) emissions decreased approximately 48 percent since 1980 and 32 percent since 1990.⁴⁷

Regulations already on the books ensure that most smog-forming pollution will be eliminated over the next 20 years. Such policies include EPA’s NO_x SIP Call regulation (requiring a 60 percent reduction in NO_x emissions from power plants and industrial boilers during the May-September ozone season), EPA’s Tier II emission standards for cars (under which the average vehicle on the road in 15 to 20 years will be 90 percent cleaner than today’s average vehicle), EPA’s diesel truck rule (requiring a 90 percent reduction in NO_x and soot emissions from trucks beginning in 2007), and EPA’s non-road diesel rule (requiring similar reductions in emissions from construction equipment, farm machinery, and marine engines).⁴⁸ U.S. air quality will improve substantially over the next two decades, whether global warming occurs or not.

Malaria: Predictions of malaria outbreaks in Europe and the United States, although intuitively plausible because mosquitoes breed faster in warmer and wetter weather, ignore the fact that malaria is primarily a disease of poverty, not of climate. Malaria outbreaks were common in such northerly climes as Minnesota, Canada, Britain, Scandinavia, and Russia during the 19th Century, when average global temperatures were cooler than today.⁴⁹ The resurgence of malaria in some developing countries is due to decreased spraying of homes with DDT,⁵⁰ anti-malarial drug resistance, and incompetent public health programs, not to any ascertainable changes in climate.⁵¹ Even if certain U.S. regions become warmer and wetter, malaria will not make a comeback as long as

⁴⁶ Joel Schwartz, “Desperately Seeking Climate Change Impacts,” *Tech Central Station*, August 4, 2004.

⁴⁷ U.S. EPA, *The Ozone Report: Measuring Progress through 2003*, p. 10.

⁴⁸ Joel Schwartz, *No Way Back: Why Air Pollution Will Continue to Decline* (Washington, D.C.: AEI Press, 2003).

⁴⁹ Reiter, P. 2001. Climate change and mosquito-borne disease. *Environmental Health Perspectives* 109: 141-161.

⁵⁰ Roberts, D.R. et al. 1997. DDT, Global Strategies, and a Malaria Control Crisis in South America. *Emerging Infectious Diseases* vol. 3, no. 3.

⁵¹ Hay, S.L., et al. 2002. Climate Change and the resurgence of malaria in the East African Highlands. *Nature* 21: 905-909; Shanks, D.G. et al. 2002. Meteorological Influences on Plasmodium Falciparum Malaria in the Highland Tea Estates of Kericho, Western Kenya. *Emerging Infectious Diseases* vol. 8, no. 12: 1404-1408.

misguided policies do not cripple wealth creation or impede the use of proven vector-control measures.

Species Loss: Predictions of mass extinctions due to global warming overlook the ecological benefits of rising CO₂ levels and the observed expansion of habitat ranges. CO₂ enrichment of the atmosphere raises the optimum temperature for plant growth. For example, an extra 300 parts per million (ppm) of CO₂ would increase optimum temperature for most plants by about 4 to 8°C — exceeding global warming projections in all but the most lurid scenarios. As atmospheric temperature and CO₂ levels have risen, the range of plant habitats has expanded pole-ward in latitude and upward in elevation, with no loss of habitat at lower latitudes and elevations. Animals that depend on those plants for sustenance have similarly been able to extend their ranges. Thus, during the past century, “individual animal species, like individual plant species, have measurably increased the areas of the planet’s surface that they occupy, creating more overlapping of ranges, greater local species richness, and an improved ability to *avoid* extinction.”⁵²

Ice Age: Fears of a global warming-induced ice age are a hobgoblin. In a popular disaster scenario, ice melt and increased rainfall from global warming reduce the salinity and density of ocean surface water to the point where it no longer sinks as it cools. This supposedly shuts down the Atlantic Meridional Overturning (AMO), a convective system that pulls warm water from the tropics to the higher latitudes. A massive infusion of fresh water may have disrupted the AMO and caused a regional cooling 8,200 years ago, when a huge ice dam burst, allowing lakes Agassiz and Ojibway to drain swiftly through the Hudson Strait to the Labrador Sea.⁵³ However, there are no comparable fresh water bodies that could pour into the ocean at a similar rate today.⁵⁴ Moreover, a weakened or even inactive AMO would not shut down the Gulf Stream, a wind-driven system that transports warmth to Northern Europe.⁵⁵ Even in climate models that project a weakening of the AMO during the 21st Century, Europe continues to warm, albeit “more slowly than the rest of the world.”⁵⁶

Unappreciated Benefits of CO₂

ARB describes CO₂ as a “climate change pollutant,”⁵⁷ but that assumes the validity of the catastrophic warming theory. It would be more accurate to describe CO₂ as a biosphere fertilizer or nutrient.

⁵² Idso, S. et al. 2003. *The Specter of Species Extinction: Will Global Warming Decimate Earth’s Biosphere?* George C. Marhsall Institute & Center for the Study of Carbon Dioxide and Global Change.

⁵³ Barber, D.C., et al. 1999. Forcing of the cold event of 8,200 years ago by catastrophic drainage of Laurentide lakes. *Nature* 400: 344-348.

⁵⁴ Weaver, A. J. and Hillaire-Marcel, C. 2004. Global Warming and the Next Ice Age. *Science* 304: 400-402.

⁵⁵ Wunsch, C. 2004. Gulf Stream safe if wind blows and Earth turns. *Nature* 428: 8.

⁵⁶ Pew Center on Global Climate Change, *The Day After Tomorrow: Could It Really Happen?* <http://www.pewclimate.org/dayaftertomorrow.cfm#6>.

⁵⁷ ARB, *Staff Report*, p. 8.

Scores of laboratory and field studies show that higher CO₂ concentrations help most plants grow faster, stronger, and more profusely, utilize water more efficiently, and resist pollution and other environmental stresses;⁵⁸ and all animals directly or indirectly depend on plants as a food source. Based on empirical studies, the 100ppm increase in atmospheric CO₂ content over the past 150 years has increased mean crop yields by the following amounts: wheat, 60 percent; other C3 cereals, 70 percent; C4 cereals, 28 percent; fruits and melons, 33 percent; legumes, 62 percent; root and tuber crops, 67 percent; and vegetables, 51 percent.⁵⁹ Were it not for the extra CO₂ put into the atmosphere by fossil fuel combustion, either many people now living would not exist, or many forests now standing have been cleared and turned into farmland — or both.

CO₂ emissions are literally greening the planet, enhancing biodiversity and global food security. Continuing CO₂ enrichment of the atmosphere may be necessary to feed a global population expected to increase by 3.3 billion over the next 50 years — and limit pressures to convert forests and wetlands into cropland.⁶⁰

Conclusion

The IPCC and other alarmists offer no convincing evidence that CO₂ emissions pose a significant threat to people or the planet. AB 1493 lacks a compelling scientific rationale.

II. AB 1493 Is Backdoor Fuel Economy Regulation

The main greenhouse gas emitted by motor vehicles is carbon dioxide, an inescapable byproduct of the combustion of gasoline and other carbonaceous fuels. Because commercially proven technologies to filter out or capture CO₂ emissions from gasoline-powered vehicles do not exist, the most feasible way to implement AB 1493 is by means of regulations that decrease the amount of fuel consumed per vehicle miles traveled — in other words, via fuel economy regulations.

However, as ARB is surely aware, the federal Energy Policy Conservation Act of 1975 preempts State action in the field of automobile fuel economy regulation. The relevant provision states:

When an average fuel economy standard prescribed under this chapter is in effect, a State or a political subdivision of a State may not adopt or enforce a law or regulation *related to* fuel economy standards or average fuel economy standards for automobiles covered by an average fuel economy standard under this chapter [emphasis added]. U.S.C. 49, Sec. 32919 (a)

⁵⁸ Idso, K.E. and Idso, S.B. 1994. Plant responses to atmospheric CO₂ enrichment in the face of environmental constraints: A review of the past 10 years' research. *Agricultural and Forest Meteorology* 69: 153-203.

⁵⁹ Population – Summary, <http://www.co2science.org/subject/p/summaries/population.htm>.

⁶⁰ Editorial Commentary, “Two Crises of Unbelievable Magnitude: Can We Prevent One Without Exacerbating the Other?” June 13, 2001, http://www.co2science.org/edit/v4_edit/v4n24edit.htm.

Proponents of AB 1493 deny that California’s adoption of greenhouse gas emission standards for cars would establish de facto fuel economy standards. However, ARB’s proposals regarding “Engine, Drivetrain, and Other Vehicle Modification,” on pages 49-61 of its report, are identical in substance, and very nearly in detail, to a set of fuel economy proposals offered by the National Research Council (NRC) in its 2002 report, *Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards*. Like the NRC, ARB touts camless valve actuation and other modifications in engine valve trains, variable compression ratios, gasoline direct injection, continuously variable transmission, 42-volt electrical systems, hybridization, aerodynamic drag and rolling resistance reduction, and vehicle weight reduction, among other design and engineering changes. A side-by-side comparison appears at the end of this Section.

The text of AB 1493 clearly implies that ARB is to regulate fuel economy. AB 1493 requires ARB to achieve “maximum feasible” greenhouse gas emission reductions that are also “cost-effective,” defined as “Economical to an owner or operator of a vehicle, taking into account the full life-cycle costs of a vehicle.” ARB rightly interprets this directive to mean that the reduction in “operating expenses” over the average life of a vehicle (assumed to be 16 years) must exceed the “expected increases in vehicle cost [purchase price] resulting from the technology improvements needed to meet the standards in the proposed regulation.”⁶¹ But the vast majority of “operating expenses” to be reduced are expenditures for fuel.⁶² In the context of AB 1493, reduced “operating expenses” chiefly means increased *fuel economy*.

An old joke has it that the *Iliad* was not written by Homer; rather, it was written by another Greek with the same name. A law that effectively and significantly requires automakers to increase fuel economy is a fuel economy mandate, however named. It seems likely that courts will find in favor of plaintiffs challenging AB 1493 as an illicit foray into the field of fuel economy regulation.

Fuel Economy by another Name Comparison of ARB’s and NRC’s Proposals

ARB GHG Reduction Technologies, 2004	NRC Fuel Economy Technologies, 2001
Near Term 2009-2012	
Intake Cam Phasing	Intake Valve Throttling
Exhaust Cam Phasing	Variable valve timing
Duel Cam Phasing	Multi-valve, Overhead Camshaft
Coupled Cam Phasing	
Discrete Variable Valve Lift	Variable valve lift
Continuous Variable Valve Lift	
Turbocharging	Turbocharger or Mechanical Supercharger
Electrically Assisted Turbocharging	
Cylinder Deactivation	Cylinder Deactivation

⁶¹ ARB, *Staff Report*, p. 148.

⁶² There might also be some reduction in air conditioner operating costs from “use of low-permeability hoses and improved elastomer seals and connections” to reduce direct emissions of refrigerants with high global warming potential. ARB, *Staff Report*, p. 70.

Variable Charge Motion	
Variable Compression Ratio	Variable Compression Ratio
Gasoline Direct Injection	Direct Injection Gasoline Engine
5-Speed Automatic Transmission	5-Speed Automatic Transmission
6-Speed Automatic Transmission	6-Speed Automatic Transmission
6-Speed Automated Manual	Automatic Shift Manual Transmission
Continuously Variable Transmission	Continuously Variable Transmission
Engine Friction Reduction	Engine Friction Reduction
Advanced Multi-Viscosity Lubricants	Low Friction Lubricants
Electric Power Steering	Electric Power Steering
Electric-Hydraulic Power Steering	
Improved Alternator	
Electrification of Engine Accessory Subsystems	Engine Accessory Improvement
Aggressive Transmission Shift-Logic	Automatic Transmission Aggressive Shift Logic
Early Torque Converter Lock-up	
Variable Displacement AC Compressor	
Aerodynamic Drag Coefficient	Aero Drag Reduction
Improved Tire Rolling Resistance	Improving Rolling Resistance
Mid-Term 2013-2015	
Electromagnetic Camless Valve Actuation	Electromagnetic Camless Valve Actuation
Electrohydraulic Camless Valve Actuation	Electrohydraulic Camless Valve Actuation
Gasoline Direct Injection - Lean-Burn Stratified	Direct Injection Gasoline Engines Lean-Burn
Gasoline Homogeneous Compression Ignition	
Electric Water Pump	
42-Volt 10 kW Integrated Starter-Generator ISG (Start Stop)	42-Volt Electrical Systems ISG
42-Volt 10 kW ISG (Motor Assist)	
Diesel - HSDI	Direct Injection Diesel Engines
Weight Reduction	Vehicle Weight Reduction
Long-Term 2015-	
Mild Hybrid Vehicle	Mild Hybrid Vehicle
Moderate Hybrid Vehicle	Moderate Hybrid Vehicle
Advanced Hybrid Vehicle	Parallel Hybrid Vehicle
Diesel – Advanced Multi-Mode	

Sources: ARB, *Staff Report*, pp. 49-61, especially Table 5.2-3; National Research Council, *Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards*, 2002, pp. 31-43, especially Tables 3-1 & 3-2, <http://www.nap.edu/books/0309076013/html/>.

III. ARB's Proposed Rule Is Not Cost-Effective

Costs without Benefits

The “maximum feasible” greenhouse gas reductions contemplated by AB 1493 are supposed to be “cost-effective.” However, as environmental policy, no regulation devised by ARB can be cost-effective, because no statewide program can effectively address the alleged problem of global warming from anthropogenic greenhouse gases.

Tom Wigley of the National Center for Atmospheric Research calculated that full implementation of the Kyoto Protocol by all industrialized countries, including the

United States, would avert only 7/100ths of a degree C of global warming by 2050 — too small an amount for scientists reliably to detect. Any greenhouse gas reductions from a single sector within a single State would have even less effect on atmospheric CO₂ concentrations and, hence, on global climate change. Therefore, ARB’s proposed rule can have no discernible benefit to people or the planet. Yet the program will have measurable costs.

According to ARB, when fully phased in, the regulation will increase the average price of category 1 passenger car/light duty trucks (PC/LDT1) by \$630 and that of category 2 light duty trucks (LTD2) by \$960.⁶³ However, depending on the package of technologies used to comply with the rule, the price of a small car could exceed the 2009 baseline price by \$812 in the near term (2009-2012), \$1,459 in the mid term (2013-2015), and \$5,752 in the long term (beyond 2015). Similarly, the price of a large car could exceed the 2009 baseline price by \$503 in the near term, \$1,575 in the mid term, and \$5,268 in the long term.⁶⁴

A program with substantial consumer costs and no detectable environmental benefit is not cost-effective.

Consumer Losses

A similar conclusion emerges if AB 1493 is viewed — as it should be viewed — as a sub-rosa fuel economy program. To help policymakers design “climate friendly” transportation systems, the Pew Center on Global Climate Change published a report, by David L. Greene of Oak Ridge National Laboratory and Andreas Schaefer of MIT, entitled *Reducing Greenhouse Gas Emissions from U.S. Transportation*. The Pew report openly calls for fuel economy measures to reduce greenhouse gas emissions. However, the authors reveal that fuel economy mandates tend to impair consumer welfare.

Citing the NRC fuel economy report and other relevant literature, Greene and Schaefer estimate that the “present value of fuel savings for a typical passenger car...increases to \$1,000 at \$34 mpg and \$2,000 at 44 mpg” over a “14-year vehicle life cycle.” However, fuel economy improvements also increase the sticker price of new cars, so much so that the “net value to the consumer (fuel savings minus vehicle price increase) is relatively modest, increasing to a maximum of about \$200 at 33 mpg and decreasing to zero at 39 mpg.”⁶⁵ But, that modest gain occurs only over the car’s full 14-year life cycle. Most people sell or trade in their cars before 14 years. ARB assumes an even longer life cycle of 16 years for purposes of calculating cost-effectiveness.

According to Greene and Schaefer, the survey literature suggests that most consumers will not invest in higher fuel economy unless they expect a payback in 2.8 years. Thus,

⁶³ ARB, *Staff Report*, p. 161.

⁶⁴ ARB, *Staff Report*, p. 88.

⁶⁵ David L. Greene & Andreas Schaefer, *Reducing Greenhouse Gas Emissions from U.S. Transportation*, Pew Center on Global Climate Change, May 2003, p. 15.
<http://www.pewclimate.org/docUploads/ustransp%2Epdf>.

for most consumers “no net savings are available from increasing fuel economy.” Indeed, Figure B on page 15 of the Pew report indicates that, as fuel economy increases to 37 mpg, *the typical consumer loses \$500 in net value.*

IV. ARB Has Failed to Consider the Adverse Safety Effects of Its Proposed Rule

ARB states that its “staff efforts do not rely on weight reductions in setting its proposed climate change emission standards ...” Nonetheless, it admits that “manufacturers would still have the option of lowering weight to improve CO₂ emission performance.”⁶⁶

In fact, it is highly likely that downsizing would be one of the major techniques that carmakers would use to comply with ARB’s rule. At a minimum, the rule would restrict the ability of carmakers to upsize their products. In either case, this would have a lethal impact on auto safety. ARB’s report, however, simply fails to address this issue.

Downsizing, Fuel Economy, and Safety

Downsizing has long been recognized as an important method for raising fuel economy. For example, the National Highway Traffic Safety Administration (NHTSA), which operates the federal fuel economy program (CAFE), long ago characterized weight reduction as the “most obvious method for improved fuel economy.”⁶⁷ A decade later, its opinion had not changed; it characterized weight reduction as “probably the most powerful technique for improving fuel economy,” and it estimated that “each 10 percent reduction in weight improves the fuel economy of a new vehicle design by approximately 8 percent.”⁶⁸ In its annual Automotive Fuel Economy Program reports to Congress, NHTSA repeatedly noted the weight-saving advantages of new materials and new vehicle designs. Thus, even these new technological approaches often involved weight reduction in their quest for higher fuel economy.

Downsizing, however, has a direct negative impact on vehicle crashworthiness. In general, there is a positive correlation between vehicle size and safety, and between vehicle weight and safety. Fuel economy, on the other hand, is negatively correlated with size and weight. For this reason, there is a clear tension between crashworthiness and efforts to improve fuel economy. Given the direct connection between fuel economy and CO₂ emissions, ARB’s proposed rule raises this very same safety problem.

The connection between vehicle mass or size and occupant protection applies to practically every collision mode, including both multiple-car and single-car collisions. In NHTSA’s words, “the increased risks for small car occupants who are in collisions with larger cars are easily recognized. But, it is also true that even in single vehicle crashes, there is increased risk of serious injury or death.”⁶⁹ There are two basic reasons for this:

⁶⁶ ARB, *Staff Report*, p. 57.

⁶⁷ 42 FR 33, 537 (1977).

⁶⁸ NHTSA, Model Year 1989 Final Regulatory Impact Analysis at IV-15.

⁶⁹ NHTSA, *Small Car Safety In The 1980’s* at 59 (1980).

smaller cars have less “survival space” for their occupants, and they have less physical structure to “absorb and manage crash energy and forces” in the event of a collision.⁷⁰

Assessing CAFE’s Impact on Safety

One of the first analyses of the connection between traffic deaths and fuel economy is contained in R.W. Crandall & J.D. Graham, *The Effect of Fuel Economy Standards on Automobile Safety*.⁷¹ Their study concluded that, as of that time, CAFE had had a downsizing effect of 500 pounds per car. This, in turn, was responsible for a 2,200 to 3,900 annual increase in passenger car deaths. On the basis of this study, CEI subsequently estimated that, in 1997, CAFE was responsible for between 2,600 and 4,500 traffic fatalities in passenger cars. Moreover, CEI estimated that under a 40 mpg CAFE standard, the death toll would have ranged from 3,800 to 5,700.⁷²

These findings were corroborated by the National Academy of Sciences in its 2002 report on CAFE. That report found that “past improvements in the overall fuel economy ... have entailed very real, albeit indirect, costs” — namely, contributing to an additional 1,300 to 2,600 traffic fatalities in 1993.⁷³

Most recently, a new NHTSA study indicates that the NRC report’s estimates of CAFE’s lethal impact may actually be too low. The study, *Vehicle Weight, Fatality Risk and Crash Compatibility of MY 1991-99 Passenger Cars and Light Trucks* (Oct. 2003), by NHTSA analyst Charles J. Kahane, was released for public comment last year.⁷⁴ The NRC estimate had been based on a 1997 NHTSA study, which had examined weight reductions in the period 1976 to 1993.⁷⁵ The year 1993, however, was not unique, but rather was representative of that time period. For this reason, this fatality estimate likely holds true, at least roughly, for much of the last two decades under CAFE. In short, the cumulative death toll attributable to CAFE is likely in the tens of thousands.

The new NHTSA report, however, indicates that this was an underestimate. It states: “This study estimates a substantially larger fatality increase per 100-pound weight reduction than NHTSA’s 1997 report.”⁷⁶ It finds that the earlier report had “flaws in the calibration procedure leading to a systematic underestimate of the size-safety effect in every crash mode, for both LTVs and cars.”⁷⁷ Contrary to the earlier report, the new data “shows fatality risk in car-to-car crashes increased as car weight decreased, consistent with intuition and most of the literature. The lighter cars had higher crash involvement

⁷⁰ Id. at 64.

⁷¹ 32 *J. Law & Econ.* 97 (1989).

⁷² J. DeFalco, *The Deadly Effects of Fuel Economy Standards* (1999), <http://www.cei.org/pdf/1631.pdf>; updated for the year 2000 at <http://www.cei.org/pdf/2407.pdf>.

⁷³ National Research Council, *Effectiveness and Impact of Corporate Average Fuel Economy*, Finding 2 (2002). Hereafter, NRC Report.

⁷⁴ 68 FR 66,153 (Nov. 25, 2003). Hereafter, Kahane.

⁷⁵ NRC Report, pp. 26-27.

⁷⁶ Kahane, p. xii.

⁷⁷ Id.

rates and higher fatality risk, given a crash, for their own occupants. That more than offset the reduction in fatality risk of occupants in the ‘other’ car.”⁷⁸

In short, CAFE has proven to be lethal, and is probably more lethal than previously recognized. This is true in both single and multi-car collisions, and there is no basis for believing that reducing vehicle weight somehow improves overall “social safety” in multi-vehicle crashes.

Why New Technologies Will Not Eliminate the Safety Trade-Off

Some proponents of higher CAFE standards, and of CO₂ emission limits, claim that new technologies can eliminate these lethal effects. This claim is simply false, even if such technologies do not themselves involve downsizing. Consider a hi-tech prototype car capable of meeting either a higher CAFE standard, or a stringent CO₂ emissions standard. Imagine that you then increase this car’s size and weight by adding several cubic feet of trunk space and occupant space. The result would be an even safer car. This larger car, however, would be less fuel-efficient, and it would therefore emit more CO₂. ARB’s proposed rule might well restrict, or prevent, its availability. In short, as long as we have a constraining standard, be it CAFE or CO₂, we will have less vehicle safety. This will be true regardless of what new technologies are utilized.

While NHTSA’s CAFE program was lethal, that agency failed to candidly assess this issue. In 1992, a federal appeals court ruled that the agency’s approach was so capricious as to be illegal.⁷⁹ The court concluded with these words:

When the government regulates in a way that prices many of its citizens out of access to large-car safety, it owes them reasonable candor. If it provides that, the affected citizens at least know that the government has faced up to the meaning of its choice. The requirement of reasoned decisionmaking ensures this result and prevents officials from cowering behind bureaucratic mumbo-jumbo.⁸⁰

ARB is proposing a rule that would have a very similar effect on auto safety. It should not repeat NHTSA’s attempt to evade this issue.

V. Conclusion: Don’t Make a Bad Law Worse

When the California legislature passed and Governor Davis signed AB 1493, they saddled ARB with an impossible task. ARB can achieve “maximum feasible” greenhouse gas reductions only by poaching on the federally preempted field of fuel economy regulation. ARB cannot achieve “cost effective” greenhouse gas reductions no matter what set of regulatory tools it employs. To the extent that AB 1493 constrains vehicle size and weight, it will adversely affect auto safety.

⁷⁸ Id.

⁷⁹ *CEI and Consumer Alert v. NHTSA*, 956 F.2d 321 (D.C. Cir. 1992).

⁸⁰ Id. at 327.

Before going any further to implement AB 1493, ARB should brief Governor Schwarzenegger and the California legislature on the practical and legal impossibility of accomplishing the law's objectives, and about the adverse safety effects of CO₂ emission standards.

Sincerely,

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