

Reason Public Policy Institute's Comments on
"Reducing California's Petroleum Dependence"
A Draft Report by the Staffs of the
California Energy Commission and the
California Air Resources Board,
Produced Pursuant to AB 2076

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A. Introduction and Summary

The CEC/CARB AB 2076 Report (hereafter “the Report”) recommends that California set goals of reducing petroleum consumption to 15% below the 2000 level by 2020, and increasing the market share of alternative fuels to 15% of demand by 2020. The Report recommends achieving these goals by mandating a doubling of average automobile fuel economy and requiring that a minimum percentage of on-road transportation fuel be derived from non-petroleum sources.

The Report asserts that reducing petroleum use is necessary to mitigate the following problems:

- High and volatile gasoline prices
- High security costs for protecting middle east oil supplies
- Inability to refine enough petroleum in California to meet California’s demand
- Mitigating environmental problems such as climate change and air pollution

The Report’s cost benefit analysis concludes that mandating substantial increases in vehicle fuel economy would result in billions to tens of billions of dollars in net benefits to California’s citizens over the next 30 years. On the other hand, the Report concludes that mandating alternative fuel use would result in billions of dollars in net costs to California’s citizens.

We have grave concerns over the Report’s assumptions about the nature of the problems, what problems are in need of policy solutions, the assumptions of the cost-benefit analyses, and the recommended solutions themselves. We summarize our concerns below and discuss them in greater detail in the rest of this comment letter.

Mandating fuel efficiency improvements will impose net costs on motorists.

About 70% of the benefits claimed for fuel efficiency improvements are direct benefits to motorists in the form of savings in gasoline costs. But motorists can already purchase any of a few dozen vehicle models that get more than 30 miles per gallon (mpg), and yet, on average, they choose vehicles that get a bit more than 20 miles per gallon. Motorists are aware of the level and volatility of gasoline prices and no doubt take this into account in their purchase decisions. This suggests that whatever costs and benefits the Report counts in its cost-benefit analysis, they have little to do with motorists’ actual valuation of greater fuel economy vis-à-vis other automobile amenities. When automakers can offer high-mileage vehicles with a palatable combination of price and other desired amenities, motorists will choose them without any external prodding. This suggests that mandating fuel efficiency increases will impose net costs on Americans. Therefore, rather than benefiting Californians, implementing the Report’s recommendations would likely make people worse off.

Reducing petroleum consumption would not reduce oil security costs. The level of U.S. expenditures to protect middle east oil supplies is a matter of debate in the research literature. But whatever the costs are, marginal reductions in petroleum use won’t reduce these costs. The level of military effort that policymakers judge to be necessary to protect the oil supply and meet other U.S. geopolitical interests is likely to

be independent of oil consumption over a wide range of oil consumption levels. A 15% reduction in California or even U.S. oil consumption would probably have no effect on such decisions. The estimated benefits due to decreased oil security costs should be removed from the Report's cost benefit analysis.

Implementing the Report's recommendations would worsen future air quality. Existing CARB LEV II requirements will eliminate more than 90% of current vehicle emissions during the next 20 years or so, leaving little marginal benefit to be had through additional measures. Yet by making new cars more expensive, implementing the Report's recommendations will slow the rate of new-car purchases, which would in turn slow progress on air pollution by slowing vehicle-fleet turnover.

Internalizing the environmental cost of CO2 emissions would not change motorist behavior. The Report estimates the harm from CO2 emissions to be \$15/ton, which is equivalent to about 15 ¢/gallon.¹ These costs could be internalized through a gasoline tax, but such a tax is probably too small to change motorists driving behavior or vehicle-purchase decisions. If internalizing the cost of CO2 emissions wouldn't appreciably change motorists' behavior, then requiring CO2 reductions is almost guaranteed to impose net costs on society.

The Report assumes a static petroleum market. The Report assumes no changes in the petroleum market between now and 2030. But the petroleum market is dynamic. New oil development in Russia, the Caspian Sea, and West Africa, along with ongoing reductions in oil exploration and recovery costs, are reducing OPEC's ability to control petroleum supplies. These trends will tend to reduce both the future cost and volatility of petroleum.

The Report ignores government-mandated balkanization of fuel markets as a source of gasoline-price volatility. Some and perhaps much of the volatility in gasoline prices is due to regulatory requirements on fuel composition that vary from place to place. Despite this factor being under the complete control of state and federal policymakers, the Report does not address reforming reformulated-fuel requirements as a means of reducing price volatility.

Importing gasoline from out-of-state refineries is not a problem. The Report notes that California doesn't have enough in-state refining capacity to meet its future fuel needs and dubs this a problem.² This is no more a problem than the fact that Los Angeles is a net importer of food. Gasoline producers will efficiently respond to consumer demand if allowed to do so.

¹ Burning a gallon of gasoline creates about 20 pounds of CO2.

² On a related note, Figure 1 in the Staff Draft Report is misleading because the vertical scale doesn't go down to zero. This makes it look like the future demand for petroleum is a far greater percentage of maximum refining capacity than it actually is. For example, the chart makes it look like in 2010, demand will be about 70% greater than in-state refining capacity, when in fact the forecast is that it will be about 15% greater. This chart, and all other versions of it in the report should be revised so that the vertical scale starts at zero.

Governments have a poor record in picking technology winners. The Report implicitly assumes that government can pick technology and alternative fuel “winners.” Political manipulation of funding choices, the need for decentralized experimentation to determine optimal approaches, the rapid evolution of technologies and processes, and the market discipline of prices and consumer preferences to drive determinations of what’s worth doing, all ensure that even the best intentioned central planners will do a poor job of picking the “right” approaches. The approaches that will bring net benefits to Californians are unknown and are most likely to be realized through a decentralized, market-based discovery process.

The Report recommends mandating alternative fuels even though its own analysis indicates this would impose billions in net costs. If after considering all costs and benefits of a policy one finds a net cost, then, by definition, implementing the policy will make people worse off. Rather than make California’s economy more resilient, implementing the Report’s recommendation would make the state’s economy more brittle by requiring consumers and businesses to adopt an energy portfolio that they would not choose on their own due to its great costs. The extra energy costs would draw resources away from other productive activities and investments, reducing the resilience of households and businesses.

Summary. Overall, the Report suffers from an errant definition of the problems that need to be solved, and claims benefits for its recommended policies that would not actually materialize. Indeed, implementing the Report’s recommendations would cause net harm to California’s citizens. The Report’s problem definitions and cost-benefit analyses require major rethinking and revision before the Report can be considered as a sound basis for fashioning energy policy in California.

B. The Report’s Cost-Benefit Analysis of Fuel-Efficiency Improvements Is Inconsistent with Motorists’ Actual Assessments of Costs and Benefits

In the energy efficiency scenarios, the Report estimates that cumulative net benefits from 2002-2030 of tens billions would result from implementing the Report’s recommendation for a mandated doubling of average vehicle fuel economy. But the Report’s analysis doesn’t appear to have real-world validity.

About 70% of the benefits claimed for reducing petroleum use come from direct savings to motorists, who would spend less to purchase fuel if their cars were more fuel efficient. But motorists already have the opportunity to purchase any of a few dozen models that get more than 30 miles per gallon (mpg), yet they choose not to do so. On average, motorists choose cars that get a little over 21 mpg. This “revealed preference” shows that, on balance, motorists value the additional amenities of low-mpg vehicles more than the extra cost of the gasoline they consume. Indeed, motorists have continued to purchase low-mpg vehicles even during the last few years of relatively high and volatile oil prices.

Motorists have told us through their purchasing decisions that, all things considered, low-mpg vehicles provide a better combination of price and amenities than high-mpg vehicles. This suggests that the Report’s analysis of the net benefits of raising fuel-efficiency requirements makes false assumptions about what motorists most value, and

that raising fuel efficiency requirements would actually result in net costs to California's citizens.

One might argue that technological advances will reduce the cost of improved fuel economy in the future, which will improve the cost-benefit picture. We agree that this is very likely. But that is still not an argument to *require* improved fuel economy. Motorists will buy high-mpg vehicles without any prompting as soon as automakers can deliver high fuel efficiency in combination with the other amenities that most motorists desire and at a palatable cost.

Indeed, the argument for *mandating* greater fuel efficiency rests on a logical fallacy. The call for a government mandate is predicated on the assumption that automakers are purposely withholding fuel-efficient technologies that consumers would buy if they were offered.³ Yet such a claim implicitly assumes that profit-seeking automakers are foolishly refusing to offer products that would help them sell more vehicles and thereby gain market share. To avoid a logical contradiction, we would have to assume that regulators and environmental activists know more about how to please motorists and make auto companies more profitable than the managers, board members, and shareholders of those companies—a highly dubious proposition.

Another argument for requiring greater fuel efficiency is based on the external costs of automobile use that are not included in the purchase price of the vehicle or the cost of gasoline. But to the extent these costs are real, the appropriate way to deal with them is by adding them to the price of fuel and/or vehicles. But this approach would probably do little to increase demand for more fuel efficient vehicles, because the marginal increase in the cost of driving would be small.

For example, using CEC's estimate of \$15/ton for the environmental costs imposed by CO₂ emissions, internalizing this cost would add 15 ¢/gallon to the cost of gasoline. Adding in the Report's assumption of 12 ¢/gallon for oil security costs would bring the total tax to 27 ¢/gallon.⁴ Assuming an average vehicle life of 120,000 miles, doubling average vehicle fuel economy from about 21 mpg to about 42 mpg would amount to an incremental savings in lifetime vehicle costs of only about \$700, or about \$60 per year.

³ For example, the Natural Resources Defense Council recently claimed that automakers are "withholding fuel-efficient technologies..." (NRDC, *Fueling the Future: A Plan to Reduce California's Oil Dependence* 2002).

⁴ We haven't included the cost of air pollution for several reasons. First, that cost is largely internalized by regulatory emission certification and durability standards for new vehicles, and in-use programs such as Smog Check. Second, the median vehicle emits very little air pollution, while most air pollution comes from a small percentage of vehicles that have very high emissions (see discussion below). Gasoline taxes would therefore be an inefficient and inequitable way of distributing air pollution costs. Third, due to a combination of technological advancements and recent regulatory standards, there is now virtually no difference between the emissions of large and small vehicles (in fact, CARB's LEV II standards require the same low emissions and durability for all light-duty vehicles). Vehicle emissions are therefore now essentially independent of vehicle fuel economy. Fourth, because technology has eliminated most auto air pollution, at least at levels high enough to cause exceedances of health-protective standards, air pollution is not due to driving per se, but to driving of high emitters. Thus, a policy geared toward cost effectively improving air quality would focus on repair and/or scrappage of the few high emitters, rather than on reducing driving in general (see discussion below).

While this isn't a trivial amount of money, it is probably too small to have much effect on vehicle purchasing decisions or driving behavior. This analysis amplifies the concern about whether mandated fuel economy increases confer net benefits. If internalizing external costs of fuel use wouldn't cause much of a change in motorist behavior, then the Report must be wrong in concluding that mandating large increases in fuel economy would confer net benefits.

Frequent, painful experience keeps motorists acutely aware of both the price and price volatility of gasoline. The average motorist's refusal to purchase high-mpg vehicles is not due to lack of knowledge of benefits. Rather, on balance, the claimed benefits of high-mpg vehicles simply don't exist yet. Motorists find low-mpg vehicles to be a better overall value. When the price-amenity equation changes, as it surely will, motorists will choose high-mpg vehicles of their own free will and the result will be net societal benefits. Mandating higher fuel efficiency would only make motorists worse off.

C. Fuel Regulations Balkanize Markets and Increase Price Volatility

Some and perhaps much of the volatility in gasoline prices is due to regulatory requirements on fuel composition that vary from place to place. In particular, California's reformulated gasoline limits flexibility in the gasoline market by making non-California gasoline less substitutable for California's reformulated gasoline. Likewise, the federal government requires the addition of oxygenates, a requirement which can now practically be met only with ethanol. This balkanization of fuel markets enables price spikes to occur and to persist. Despite these factors being under the complete control of state and federal policymakers, the Report does not address reforming reformulated-fuel requirements as a means of reducing price volatility.

CEC and CARB should commission an independent analysis of the effect of fuel regulations on gasoline-price volatility, and examine opportunities for more flexible regulations that would maintain air quality benefits while reducing the potential for supply disruptions and ensuing price spikes.

D. World Petroleum Markets Are Dynamic, but the Report Assumes A Static Market

The Report is founded on a static view of petroleum markets, one that assumes little or no change in the global oil industry over the decades covered in the analysis. In particular, likely changes in world oil markets over the next 20 years are assumed away. For example, the report ignores the development and capital investment in Russia, around the Caspian Sea, and in West Africa, as well as continually declining costs for oil exploration and recovery. As a result, almost all of the growth in oil production is occurring in non-OPEC countries. This growth reduces OPEC's market power, and threatens to reduce its market share, reducing its ability to control supply and prices.

Another important dynamic aspect of energy markets is the use of financial instruments and contracts to reduce risk and, consequently, to reduce price volatility beyond what it otherwise would have been. The report never addresses the role that financial markets (hedging, derivatives, etc.) play in reducing fuel price volatility, without the need for additional government action, regulation, or planning.

At the very least the Report should incorporate scenario analyses based on different world oil market contexts, as a test of how robust its conclusions are to the dynamics of the ever-changing global oil market.

E. Governments Have A Poor Record in Trying to Pick Technology “Winners”

In discussing the move away from petroleum-based fuels to fuel cells, the Report implicitly assumes that the government policymakers can pick technology winners, and that it can control both the rate and outcome of technology and process innovation. Governments (and corporate bureaucracies, for that matter) have a very poor track record of picking technology winners, and we have little reason to believe that the success rate in this case will be any different.

The most dramatic example of government subsidies to unsuccessful commercialization research is federal subsidies to solar thermal research during the late 1970s. In the wake of the energy crisis of the 1970s, Congress and the Carter Administration approved a large budget increase for research into thermal solar technology. Five years and massive amounts of research did not yield a commercially viable competing technology to the old photovoltaic solar cells, the technology of which had of course also advanced.

In the case of hydrogen generation, storage, and transport, fuel cells, fueling infrastructure, and so on, there are several competing technologies all innovating simultaneously. We do not know which one in each area is the most commercializable, and even if we could somehow generate a sound current ranking, a sudden discovery in one technology could upend that ranking in an instant. Technological developments in other areas could even reduce interest in fuel cells. Government-guided research runs the risk of choosing the wrong technologies.

If the government attempts to pick winners through targeted subsidies and picks wrong, then we are stuck with that bad, costly mistake. This mistake could become particularly costly once, for example, companies start building, hydrogen fueling stations, investing in a lot of fixed infrastructure in special purpose assets if it turns out that the most commercially viable way to deliver the hydrogen is not compatible with those specific assets. Such a costly policy error would lead to significant wasted investment, and if subsidized, a lot of wasted taxpayer money.

Private markets are a superior way to make decisions about technologies and funding levels. Investors use market processes to deal with such unknowns by holding diversified portfolios of venture capital. Venture capital firms do not typically sink all of their resources into one technology that they believe has the highest probability of winning – they hedge that investment by investing in other technologies, in other industries. They want to maximize their risk-adjusted profit, knowing full well that some research will result in new technologies that deliver new and/or improved benefits at lower costs to consumers, and some will not. Such a portfolio approach is a hedge against the pervasive inability to pick winners. Experience with government research suggests that its track record does not improve upon the private investment portfolio approach.

One of the arguments in favor of targeted government technology research subsidies is that such subsidies will reduce unnecessary duplication of research efforts. If there is duplication of research, that means that there is plenty of private-sector interest in the topic, so increasing government subsidies will only serve to crowd out that private investment in research that would have happened anyway. Why spend taxpayer money that way when private investors are willing to incur research costs?

One typical answer to that question is that duplicative research efforts are a wasteful dissipation of resources in the race to be “first to the finish line.” That argument ignores the benefits of duplicative research. If you try to channel these efforts and guide research with an objective of minimizing duplication, you are very likely to fail, because the duplication is never perfect—even if several people are working toward the same goal, such as smaller or cheaper fuel cells, the variations in their procedures, materials, ways of approaching the problem, and just sheer luck will all lead them down different paths. This decentralized discovery process maximizes the potential benefits from research. All of that seeming duplication is not duplication at all. Instead, it maximizes the probability that someone will come up with technologies and processes of greater benefit to society. And the fact that the search is decentralized and diverse means that society doesn’t have all its eggs in one basket.

Government research subsidies and those who argue for them also tend to overlook a very important part of the technology diffusion process: consumer demand. Technologies that do not meet consumer needs for practicality, convenience, carrying capacity, power, and aesthetics will fail, regardless of their scientific virtuosity or cost-effectiveness. Failure to take into account consumer demand further inhibits the ability of government to pick winners, and also points up another major difference between private investment processes and government subsidy processes.

The Report ignores the preferences of consumers, which is how it was able to manufacture benefits from mandated fuel-efficiency requirements. The costs used in the cost-benefit analysis do not include the changes to vehicles that would have to occur to make the increased fuel efficiency happen: decreased power, decreased torque, decreased size, and possibly decreased safety. These features matter to consumers, and government dictation of the features that peoples’ vehicles will have would likely make consumers worse off.

It is important to remember that technological change is incremental and evolutionary, and that important features, processes and technologies can be very different from what one might have expected at the beginning of a research program. Predicting what will succeed and what will be a dead end is difficult, so any policy decisions that steer research into bureaucratically determined paths could do more harm than good.

F. Mandating Alternative Fuels will Harm Californians

Despite finding that requiring alternative fuels would cause billions of dollars in net harm to Californians, the Report recommends a mandated minimum market share of 15% for alternative fuels. The Report’s rationale is that it will make California’s economy more resilient. But this is a non-sequitur. If after considering all costs and benefits of a

policy one finds a net cost, then, by definition, implementing the policy will make people worse off overall. Indeed, the Report's recommendation for an alternative fuels mandate is in effect an argument that we should shoot ourselves in the foot now in order to avoid the risk that we might get shot in the foot later.

Rather than make California's economy more resilient, implementing the Report's recommendation would make the state's economy more brittle by requiring consumers and businesses to adopt an energy portfolio that no one would choose on their own due to its great cost and risk. The extra energy costs would draw resources away from other productive activities and investments, reducing the resilience of households and businesses. The recommendation for an alternative fuels mandate should be removed from the report.

G. Environmental Problems

The Report identifies two major environmental problems—air pollution and global warming, which we take up in turn.⁵

1. Air Pollution

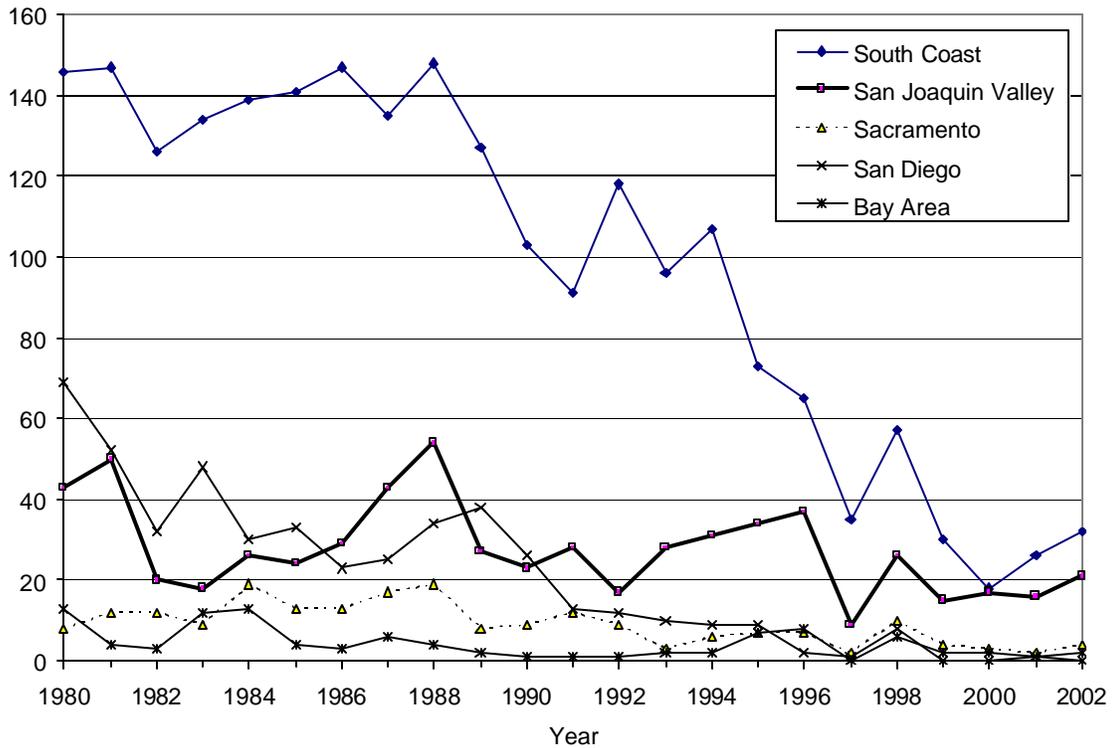
Increasing petroleum use is not an obstacle to improved air quality

The Report states “Increasing our reliance on petroleum would...be an obstacle to improved air quality.” This statement is simply false. According to the Report, gasoline consumption rose 50% in California between 1980 and 2002, yet this was a period of extraordinary improvement in California's air quality. During the 1980s, the San Bernardino area, with the worst ozone levels in the nation, exceeded the federal 1-hour ozone standard about 140 times per year. Today, Crestline—the worst location—is down to about 25 exceedances per year, while San Bernardino and Redlands average around 10 to 20. Half the population of South Coast now lives in areas that meet both the 1-hour and 8-hour ozone standards, while about 99 percent of people in the Bay Area and San Diego likewise live in areas meeting both ozone standards. Figure 1 displays the trend in 1-hour ozone exceedances at the worst monitoring location in each of California's major air basins.

Levels of all other pollutants have likewise declined substantially during the last 20 to 30 years. The vast majority of monitoring locations now comply with federal PM10 standards, and the entire state complies with standards for CO, NO_x and sulfur dioxide.

⁵ The Report also mentions other environmental problems, such as tanker spills, but attributes the vast majority of environmental damage to climate change and air pollution.

Figure 1. Trend in 1-hour Ozone Exceedances at Worst Location in Each Air Basin



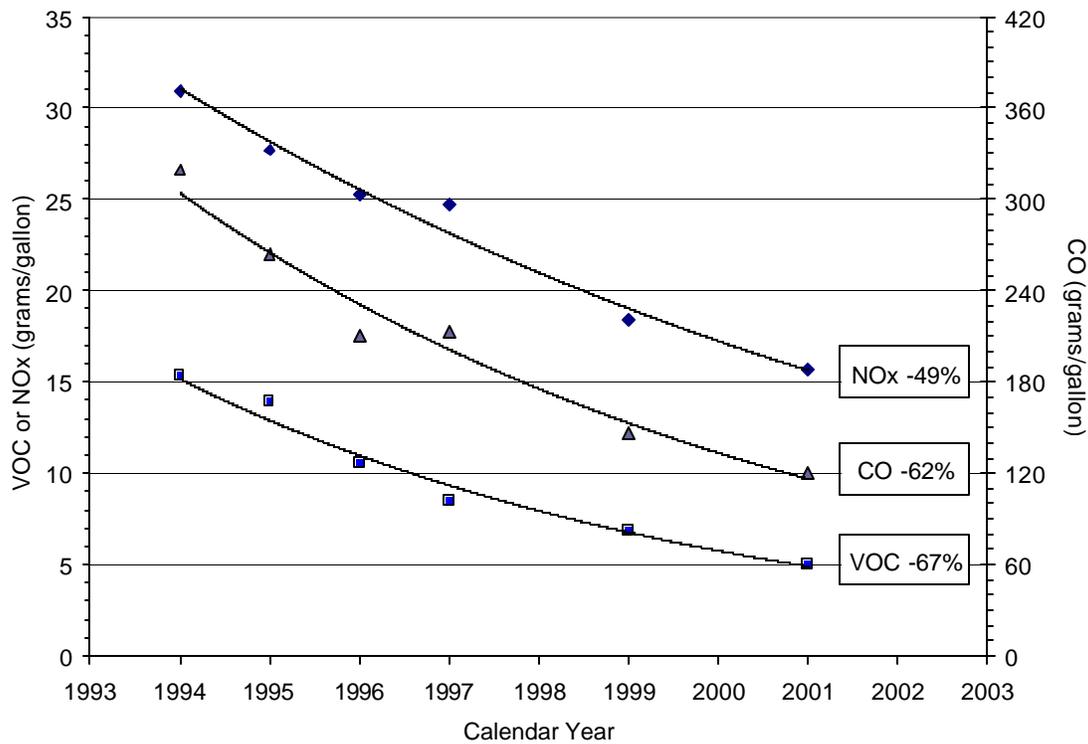
Source: CARB monitoring data

These declines will continue, regardless of VMT growth. Tunnel studies show that fleet-average light-duty-vehicle HC emissions in California are declining about 15% per year, while NOx is declining about 9% per year (see Figure 2). Given that VMT is increasing about 1.8% per year, this results in a net annual decline HC and NOx of 13% and 7% respectively. These trends will only continue. A fleet meeting CARB's LEV II requirements for gasoline vehicles would emit more than 90% less HC and NOx per mile of travel than the fleet currently on the road. The fleet will turn over to these vehicles during the next 20 years or so. VMT increases will have little effect on future emissions, given these large per-mile emission reductions. For example, if per-mile emissions decline 90% and VMT increases 50%, total emissions would still decline by 85%.

Thus, the long run problem of air pollution from automobiles has already been solved by existing requirements that will come to fruition during the next 20 years or so. But we still have a near-term air pollution problem. This problem would be most quickly and cheaply resolved through repair or scrappage of high-emitting vehicles. A small percentage of vehicles contributes most fleet emissions (see Figure 3). For example, remote sensing data collected in Riverside, California in 2001 show that the worst 5% of HC emitters account for more than 50% of tailpipe HC emissions. As the chart shows, the vast majority of vehicles have very low emissions, while a few have very high emissions and account for most pollution from the fleet.

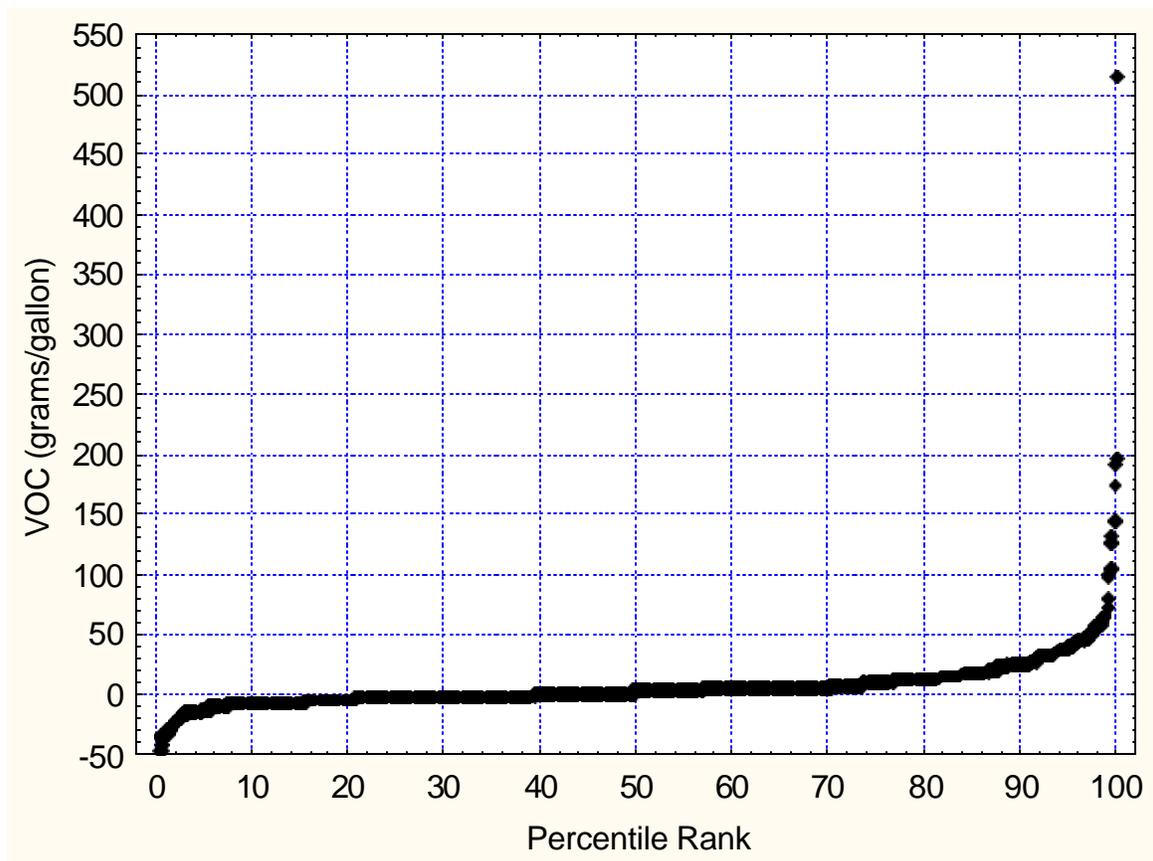
This means that most vehicle emissions are not due to petroleum consumption per se, but to the small percentage of vehicles with broken emission control systems. To solve this problem, we should focus on measures to identify and either repair or scrap these high emitters. This is also only a near-term problem, as these older high emitters are slowly but surely being replaced by more recent models that stay cleaner throughout their lives.

Figure 2. Trend in Fleet-Average Emissions of California Light-Duty Vehicles, 1994-2001



Source: A. J. Kean et al., "Trends in Exhaust Emissions from In-Use California Light-Duty Vehicles, 1994-2001," (Society of Automotive Engineers, 2002).

Figure 3. VOC Emissions Distribution of Vehicles Measured by Remote Sensing in Riverside, California in 2001



HC emissions from 1,207 vehicles with 2 or more measurements, ranked from cleanest to dirtiest. Emissions are in grams of VOC emitted per gallon of fuel burned. Negative HC readings represent “real” noise in the data. Data were collected in Riverside, California in 2001 by Gary Bishop of the University of Denver. Data were downloaded from www.feat.biochem.du.edu/light_duty_vehicles.html. These vehicles are 15 years old on average, and 75 percent are at least 12 years old.

Air Pollution Reductions Beyond Current Requirements would Result in Little or No Marginal Benefit

Because current air pollution problems are being solved by existing measures, there is little or no marginal benefit to additional pollution reductions over and above those that will occur due to existing LEV II and other vehicle emission requirements. The Report implicitly acknowledges this, as its estimated air quality benefits from reduced petroleum consumption amount to about 50 cents per person per year, or one percent of all estimated benefits.⁶ These presumed benefits are also due to pollution reductions from a

⁶ Table 4-1 in Appendix A attributes roughly \$400 million in air quality benefits due to air pollution improvements from 2002-2030. This is one percent of the cumulative \$38 billion in net benefits the report claims overall for reducing petroleum use in the “ARB mild hybrid” scenario—the scenario with the highest net benefit estimate. To estimate benefits per person per year, we assumed an average population of

baseline pollution level that is already below the limits set by federal and California health standards.

Implementing the Report's Recommendations would Make Future Air Quality Worse than it Would Otherwise Be

Implementing the Report's recommendations would make new cars more expensive. As a result, people would buy fewer new cars and would hold on to existing cars longer. Since fleet turnover is the most important factor for air quality improvements, implementing the Report's recommendations would make future air quality worse than it would otherwise be. Rather than counting air pollution benefits in its cost-benefit analysis, the Report should actually conclude that implementing its recommendations would impose air quality costs.

The Report Overestimates the Health Improvements from Air Pollution Reductions

Even the small amount of health benefits attributed to additional air pollution reductions are overstated. Most of the claimed benefits are due to projected reductions in mortality due to reductions in particulate matter (PM). The Report bases its PM mortality estimate on the Health Effects Institute's (HEI) Reanalysis of the American Cancer Society (ACS) study of PM and mortality.⁷ However, residual confounding in this study makes it likely that the results are spurious. For example, the HEI/ACS study reported that PM increased mortality for men, but not women; for those with no more than a high school degree, but not those with at least some college education; for those who said they were moderately active, but not those who said they were either sedentary or very active; and for former smokers, but not current or never smokers. These results are biologically implausible and suggest that residual confounding accounts for them. The report also found no increase in mortality due to respiratory causes specifically, which is surprising given that air pollution would be expected to exert its effects through the respiratory system.

At the very least, taking the HEI/ACS results at face value, only the 25% of the population that is male and has no more than a high school degree would be expected to suffer increased mortality. The Report also ignores the results of a recent epidemiologic cohort study of veterans with high blood pressure that found no relationship between PM levels and mortality, despite that this group was expected to be particularly susceptible to air pollution's effects.⁸ These results indicate that the Report's benefit estimates for air pollution reductions are greatly overstated.

40 million and spread the benefits over 20 years (2010-2030) on the assumption that the benefits wouldn't begin to appear for several years after policies were implemented.

⁷ D. Krewski et al., *Reanalysis of the Harvard Six Cities Study and the American Cancer Society Study of Particulate Air Pollution and Mortality* (Cambridge, MA: Health Effects Institute, 2000). These are only a few of many concerns with the validity of PM-mortality claims based on epidemiologic results. For a detailed review and references to the literature, see J. Schwartz, *Particulate Air Pollution: Weighing the Risks* (Washington, DC: Competitive Enterprise Institute, April 2003), www.cei.org/pdf/3452.pdf.

⁸ F. W. Lipfert et al., "The Washington University-EPRI Veterans' Cohort Mortality Study," *Inhalation Toxicology*, vol. 12 (suppl. 4) (2000), pp. 41-73.

Summary

Air quality in 10 or 20 years will be far better than it is today, regardless of California's policy on petroleum consumption. Furthermore, virtually none of the purported benefits of reduced petroleum consumption are due to air quality improvements. Thus, it is at best terribly misleading for the Report to either raise alarms about future air quality, or to suggest that reduced petroleum consumption is a sensible policy for air quality improvement, when other policies would provide greater and more rapid pollution reductions and would do so without the harm that would be caused by mandated fuel efficiency improvements or mandated alternative fuel usage.

Instead, the Report should state prominently that (1) air quality is improving and will continue to improve regardless of California's petroleum consumption trends, (2) mandating higher fuel economy would slow fleet turnover by making new vehicles more expensive, thereby making future air quality worse than it would otherwise be, (3) existing requirements will eliminate almost all remaining automobile air pollution during the next 20 years or so, and (4) near-term air pollution improvement would be most quickly and cheaply achieved through repair or scrapping of high-emitting vehicles.

2. Climate change

Climate change is an analytically complex issue, and forecasts of future climate change and attendant costs are fraught with uncertainties. A detailed discussion is beyond the scope of these comments. However, even taking the Report's damage estimates from CO₂ emissions at face value, eliminating the CO₂ emissions would cost more than the estimated harm caused by the emissions. This alone guarantees that CO₂ reductions will cause net harm. A simple analysis shows why this is the case.

The Report estimates the harm from CO₂ emissions to be \$15/ton, which is equivalent to about 15 ¢/gallon. These costs could be internalized through a gasoline tax, but such a tax is probably too small to change motorists driving behavior or vehicle-purchase decisions. For example, buying a 42 mpg vehicle instead of a 21 mpg vehicle would save only about \$35 per year in CO₂ taxes. This means that even charging motorists the full estimated cost of all of their CO₂ emissions would likely cause hardly any reduction in CO₂ emissions. If internalizing the cost of CO₂ emissions wouldn't appreciably change motorists' behavior, then requiring CO₂ reductions is almost guaranteed to impose net costs on society.

The Report also notes "Our estimate of \$15 per ton of CO₂ equivalent seems reasonable if cost of control or current market trades are any indication. \$15/ton is also consistent with the finding of Friedrich and Bickel that damage estimates currently are lower than cost of control or market trades." If the damage done by a ton of CO₂ emissions is less than the cost of reducing those emissions, then reducing the emissions will cause net harm.

H. Oil Supply Risk

Marginal Reductions in Petroleum Consumption will Not Reduce Military or other Expenditures to Protect Foreign Oil Supplies

The Report includes benefits from reduced oil security costs as part of the estimated benefits of reduced petroleum consumption. As the Report notes, there is little agreement in the research literature over just what those costs are. However, whatever the costs are, the reduction in oil security costs due to marginal reductions in petroleum consumption is likely to be zero. This is because the nature and extent of U.S. military activity to protect U.S. interests in the middle east are not elastic with oil consumption. Instead, such missions depend on a range of interacting geopolitical factors of which oil is only one.

Furthermore, the level of military effort judged to be necessary is likely to be independent of oil consumption over a wide range of oil consumption levels. After all, regardless of whether the U.S. imports 20% or 30% of its oil from the middle east, the military effort necessary to ensure its availability would likely be the same. Even if the U.S. imported hardly any of its oil from the middle east, the U.S. might consider it strategically important to protect middle east oil anyway, since many of its allies would import much their oil from the middle east.

The Report bases its estimates of oil security costs on two reports—Delucchi and Murphy (1996), and Lieby et al. (1997).⁹ But Delucchi and Murphy base their estimates on the assumption that all middle east oil consumption is ended, rather than on marginal reductions. And Lieby et al. state outright that oil security costs do not necessarily vary with marginal changes in imports. Thus, the research literature cited in the Report actually doesn't support the Report's assumption that the U.S. could achieve marginal reductions in oil security cost through marginal reductions in petroleum consumption.

Ironically, reducing petroleum demand is instead likely to *increase* the percentage of oil imports that come from the middle east. Middle eastern countries are generally the lowest-cost suppliers, so reductions in demand would push other suppliers out of the market, increasing the middle east's market share.

Improvements in oil security account for roughly 10 to 15 percent of the Report's estimated benefits from reducing petroleum dependence. Since these benefits would not actually materialize, they should be removed from the Report's benefits ledger.

⁹ M. A. Delucchi and J. Murphy, *U.S. Military Expenditures to Protect the Use of Persian Gulf Oil for Motor Vehicles, Report #15 in the Series: The Annualized Social Cost of Motor-Vehicle Use in the United States, Based on 1990-1991 Data* (Davis, CA: University of California at Davis, 1996), P. N. Lieby et al., *Oil Imports: An Assessment of Benefits and Costs* (Oak Ridge, TN: Oak Ridge National Laboratory, 1997).