TESTIMONY

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Economic Perspectives on Revising California's Zero-Emission Vehicle Mandate

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PREFACE

This publication contains the written statement of Lloyd S. Dixon and Steven Garber delivered on March 28, 1996 to the California Air Resources Board. The statement is based on a recently completed RAND Institute for Civil Justice study of California's ozone-reduction strategy for light-duty vehicles, but it does not necessarily reflect the opinions or policies of RAND or of its research sponsors.

The authors drew on the study results to comment on the proposed revision to the Zero-Emission Vehicle mandate that was under consideration by the California Air Resources Board.
Statement on the Zero-Emission Vehicle Mandate
Submitted to the California Air Resources Board
by
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Institute for Civil Justice, RAND
March 28, 1996

We have just completed an extensive study of California's ozone-reduction strategy for light-duty vehicles (LDVs). We presented some of our findings on the zero-emission vehicle (ZEV) mandate to you last December, and you should have recently received the summary of our technical report.¹

Today, we will explain why we believe it is wise for the Board to revise the ZEV mandate. We will assess the proposed revision and provide suggestions for increasing its payoff. In particular, we believe that the intense debate over the ZEV mandate has distracted attention from the critical importance of the other prong of California's strategy--control of emissions from internal combustion engine vehicles (ICEVs). We want to underscore that the effectiveness of this prong will make or break California's strategy over the next ten years or more and, as is less widely recognized, is critical to determining how hard California should continue to push the development and commercialization of ZEVs. The Board should pay special attention to the design and implementation of the scrappage, on-board diagnostics, and smog-check programs--programs that are crucial to the effectiveness of California's ICEV emission-control strategy.

¹Lloyd Dixon and Steven Garber are Economist and Senior Economist, respectively, at RAND. RAND is a nonprofit institution located in Santa Monica, California that helps improve public policy through research and analysis.
WHY THE ZEV MANDATE SHOULD BE REVISED

There are great economic and environmental risks to proceeding with the ZEV mandate in its current form. Our research suggests that EVs could turn out to cost much more to produce and operate than ICEVs, and—if the elements of California's ozone-reduction strategy aimed at ICEVs are effective—EVs could be displacing fairly clean ICEVs.

The ZEV mandate could cause ICEV prices to rise by as much as $550 per vehicle because the mandate—which links EV sales requirements to ICEV sales levels—is likely to create an additional cost of selling ICEVs in California. Such price increases would translate into substantial losses for the buyers of ICEVs and, by reducing new vehicle sales and slowing fleet turnover, perhaps even cause emissions from LDVs to increase in the initial years of the mandate and attenuate the direct emission benefits of ZEVs for many more.

The current mandate may also harm the long-run commercial prospects of ZEVs. Consumers could well be disappointed with the EVs offered during the early years of the mandate because of their limited range, reliability, and infrastructure. This may make it difficult to market ZEVs in the future even if such limitations are overcome.

The great risk to proceeding with the ZEV mandate, however, does not mean that CARB should turn its back on ZEVs. Without ZEVs, California also faces great economic and environmental risks. Suppose that California were to repeal the mandate and ZEV technology stagnated. Suppose further that the ICEV control strategy does not work very well and that new economical emission-control options are not discovered. Then to comply with federal ozone standards in the South Coast Air Basin by 2010, California may have to turn to measures that are extremely costly, such as very aggressive transportation control measures or even restrictions on industrial activity.

We concluded that CARB should look for courses of action that do not involve such big risks, specifically ZEV policies that allow California to:

- avoid extremely bad outcomes,
- learn about the promise of EV technology and the cost and effectiveness of other policies to reduce emissions, and
• modify the policy as new information becomes available.

The desirability of policies with these characteristics is driven by the extreme uncertainties about ZEVs and the other elements of California's ozone-reduction strategy and the need to accommodate this reality rather than deny it.

**ASSESSMENT OF PROPOSED REVISION TO MANDATE**

How does the proposed revision to the mandate measure up against these three recommended characteristics of ZEV policy?

First, the proposal to revise the ZEV mandate is more likely to avoid extremely bad outcomes than either the current mandate or its outright repeal. By eliminating EV production quotas through 2002, the proposed revision avoids the possibility of very high costs and short-term increases in LDV emissions during the early years of the mandate and the potential for consumer disappointment and long-term marketing problems for EVs. By requiring manufacturers to field thousands of new ZEVs with advanced batteries and to continue contributing to the U.S. Advanced Battery Consortium, the proposed revision continues to promote the development of ZEV technology—reducing the possibility that we will forsake a promising strategy and be left with only much more costly alternatives for reducing emissions by 2010.

Second, the proposed revision allows us to learn more about whether or not ZEVs should be a cornerstone of California's long-term ozone-control strategy. It will provide information about the performance, cost, and availability of EV technology. It will also provide information about how consumers use ZEVs and value their attributes.

Third, the biennial reviews specified in the revision provide CARB with the ability to modify the ZEV program as new information becomes available.

The proposed revision may not be the only promising way to revise the mandate, but it is consistent with the features of ZEV policy that our research recommends and we think clearly superior to both the current mandate and its outright repeal. How successful it will be depends importantly on how it is implemented. We conclude with three suggestions on how CARB can get the most out of the revision.
SUGGESTIONS ON IMPLEMENTING THE REVISED MANDATE

First, CARB should collect information from manufacturers on EV performance and cost in a way that allows it to aggregate the data and make them publicly available without compromising legitimate proprietary concerns. This would help inform policymakers, the public, and investors about the real costs and commercial prospects of ZEVs.

Second, CARB should announce soon the major factors that will be considered when the ZEV mandate is reviewed, and, to the extent possible, specify how these factors will be used in determining whether and how to modify the mandate further. This would help strike a balance between the flexibility necessary to take advantage of what is learned and the predictability that is so important to investors and to the continued development of the technology.

Finally, and most important, CARB should pay close attention to the non-ZEV elements of its ozone-reduction strategy. There are two reasons for this. First, the non-ZEV elements are sources of potentially large emission reductions. Second, their effectiveness in reducing ICEV emissions is critical in determining the proper role for EVs: EVs become more desirable the dirtier are the ICEVs that they replace. Particularly deserving of scrutiny are the scrappage, on-board diagnostics, and smog-check programs. Any or all of these could be a great success or a great disappointment with tremendous consequences for air quality in the South Coast.

- The scale and duration of the proposed scrappage program are unprecedented, and its effect on emissions is far from certain. If older vehicles are no sooner scrapped than replaced with similar vehicles drawn into the South Coast or if drivers are given strong incentives to delay repairs or to make their vehicles dirtier to qualify for the program, the program could backfire.

- On-Board Diagnostics II could pay enormous dividends, but returns may be disappointing unless behavioral pitfalls are avoided. Its effectiveness will depend on the crucial but little-understood response of drivers and smog-check technicians to the check-engine light.
Smog Check II could make a real difference, but past difficulties in California and in other states indicate that success is hardly assured. Reducing emissions from high emitters is such a high priority that Herculean efforts to make smog check work are warranted, but we should recognize that even Herculean efforts may fail.

CARB and the public should pay careful attention to the design and implementation of these programs and monitor them closely both to assess whether their emission reductions are worth the resources invested and to determine how hard California should continue to push ZEVs.