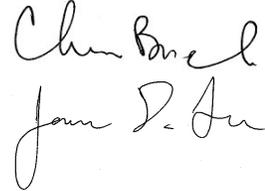


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FROM:

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DATE: 9 December 2008

RE: Reply to Criticisms of CARB AB 32 Scoping Plan Economic Analysis

We write in response to three sets of comments on CARB's Economic Evaluation of the AB 32 Proposed Scoping Plan (PSP):

1. The Analysis Group's Judson Jaffe and Jonathan Borck memo with comments on the Economic Analysis Supplement for CARB ("Jaffe/Borck Report")
2. Legislative Analyst Office (LAO Study)
3. Peer Reviews by Stavins, Burtraw, Yohe, Kahn, Adkins and Peace (Peer Review).

These documents make some useful suggestions for improving the economic evaluation of the Proposed Scoping Plan (PSP) but overstate its limitations and incorrectly imply that additional analysis would lead to a strategy that is significantly different from the well-founded, comprehensive and carefully articulated package of measures in the PSP. We note that the PSP is in line with the approach recommended by the Market Advisory Committee, which called for a mix of market-based and other regulatory measures.¹

Though significant progress has been made in several rounds of economic evaluation², CARB has committed to analytical work in support of rulemaking processes to implement AB 32 measures. We agree with the LAO Study that "We would expect that full analysis would accompany regulatory development of the measures." (pg. 13) We note that none of the peer reviewers call for delay in achieving the Scoping Plan milestone.

¹ The Market Advisory Committee expresses its preference for a mixed approach within a package of policies in at least three instances, e.g. : "By itself, a cap-and-trade program alone will not deliver the most efficient mitigation outcomes for the state. There is a strong economic and public policy basis for other policies that can accompany an emission trading system," (Final Report) p.19.

² The economic evaluation of the Scoping Plan is been revised several times, and builds on at least two rounds of modeling California's climate policy.

- Updated Macroeconomic Analysis Of Climate Strategies Presented In The March 2006 Climate Action Team Report Final Report, Economics Subgroup, Climate Action Team, CARB, 10-15-07,
- Managing Greenhouse Gas Emissions in California: Economic Assessment of some California Greenhouse Gas Control Policies: Applications of the BEAR Model, Roland-Holst, plus chapters by Farrell, Hanemann, Busch et al., California Climate Change Center, UC Berkeley. 2006.
- Economic Growth and Greenhouse Gas Mitigation in California, D. Roland-Holst, California Climate Change Center, UC Berkeley. Aug 2006.

We concur that continued progress in AB 32 implementation is crucial, and that more analysis remains to be done. Nevertheless, the current findings are based on diligent research that merits acknowledgement and provides a useful vision for a low-carbon California.

Our view is that CARB's economic analysis findings agree with several prior studies, i.e. those listed in footnote 2, suggesting AB32 measures will not have a large negative effect on the state's economy and likely will have small net positive effects in terms of job creation, increased person income and higher gross state product.

In summary, we argue that.

1. The models used by CARB conform to the current state-of-the-science economy-wide modeling and their limitations are shared by other models widely used by federal and other state government agencies.
2. The technical debate over whether AB32 will be a small positive or a small negative for California's economy is interesting for economists, but ignores the most important piece: What will happen to California's economy, and to the world as a whole, from unfettered climate change.
3. There are persuasive reasons to consider CARB's findings to be an underestimate of net benefits. The analysis does not include the avoided costs of climate change, and increasing energy security and public health.
4. Criticism fails to recognize that there are factors that could bias the cost results downwards (i.e. innovation lowering the cost of clean energy) and not only upwards.
5. While the baseline – like any prediction of the future – is subject to debate, CARB has a consistent rationale for the policy measures that have been included (whether or not implementation of the policy is underway and is primarily a measure to reduce global warming pollution). Also sensitivity analyses conducted subsequently by CARB responds directly to this concern.
6. CARB deserves credit for the innovative aspects of its work, notably the integration of bottom-up engineering inputs in a Computable General Equilibrium framework which serves to correct the implicit assumption that markets are currently close to perfect perfectly rational and competitive.
7. Critics fail to disprove CARB conclusions that implementing AB 32 could yield economic benefits. While the Peer Reviews suggest pushing harder to explore policy alternatives, and voice concerns of both over and under estimation of benefits (mostly the former), the directional findings are not as important as magnitude findings that indicate the overall affects of climate policy on the economy will be small.
8. Corroboration of EDRAM results by the independent BEAR model is significant.

Conclusions on cost and the notion of net benefits

We emphasize that the costs of inaction are not considered in CARB analysis, including the increased risk of the most severe effects of global warming and costs of human adaptation. Other ancillary benefits of investments in global warming solutions – improved public health and also improved energy security. It is important to recognize that the analytical framework takes into account only a limited range of costs and benefits

While the reviews dutifully identify some analytical assumptions in the CARB economic evaluation that may bias findings, there seems to be a one-sided focus on assumptions that could lead costs to be higher. The CARB analyses do not incorporate a number of factors that could lead to other positive economic impacts. It is not correct to imply that modeling simplifications and assumption serve only to bias cost estimates downward. For example, the modeling:

- Makes no assumptions about innovation lowering future costs of renewable energy or other improved climate mitigation technologies.
- Doesn't take into account massive venture capital investment in clean energy firms based in California and the related potential that these firms will capture a large share of rapidly growing global market in renewable energy markets
- Uses relatively low forecasted future fossil fuel energy costs (to the extent these are higher, future energy savings due to improved efficiency will be more valuable).³
- Greater use of renewable energy and efficiency will put reduce demand for natural gas, all else equal, putting downward pressure on natural gas prices and this is not represented in the internal workings of the model (the price of natural gas is not endogenous either). Since greater use of natural gas will be an important climate policy, this is an important effect.

The Jaffe/Borck Report claims, “if opportunities for cost-saving energy efficiency improvements are in fact real, many of them likely will occur even without the Scoping Plan’s implementation,” (p.2). This sentiment is echoed in the Peer Reviewer. This claim seems not to be based on empirical evidence, but rather a belief that markets, firms, and people are closer to the economists ideal (perfectly competitive, completely informed, and rational) than not. Such a doctrinal claim that unencumbered free markets produce close to optimal outcomes seems particularly difficult to accept after Alan Greenspan has altered his worldview that banks could be relied upon to produce optimal outcomes in their industry.

To be clear, we view market-based policies as very important tools in the policy makers toolbox. Nonetheless, the lack of regulation and existing market distortions impede full utilization of cost saving investments, notably household, commercial building and vehicular energy efficiency, or what Peer Reviewer Burtraw referred to as " reductions in

³ The critics might respond by saying that higher fossil fuel prices would change the baseline, i.e. business-as-usual scenario. That is true, but doing so will also reduce the amount of reductions needed, making it less costly overall to achieve the AB 32 Implementation mandate.

payments for fuel." (pg. 8) The proposed measures will help to correct this distortion. AB32 implementation will create a slight near-term redirection of business strategies toward investments in cleaner, more efficient production that, over the long run, leads California to a cleaner, more efficient and more competitive economy. It is irrationally optimistic and dismissive of past experience to assume that firms will get to this place independently in the absence of climate policy that includes clear, significant and long-term price signals and other policies to encourage efficiency.

We must point out the flawed reasoning that energy prices equal energy costs. In fact, energy costs (bills) are a function of both the price of energy and the quantity of energy consumed. Californian policy makers are well aware of the energy cost savings, and associated economic benefits, that have been achieved through efficiency programs⁴. Moreover, past success in the efficiency savings do not mean the supply of efficiency benefits has been exhausted. To the contrary, efficiency is a renewable resource, and there is every reason to expect that efficiency will be a core strategy in achieving AB 32 reductions as CARB anticipates. It is also wrong to imply that CARB ignores the costs of efficiency measures, or other costs. Incremental costs, either capital or labor, are factored in each of the bottom up engineering-economic measure level inputs. These incremental costs are measured against energy savings. Surely more can be done, should be done and will be done to better define the costs and benefits of action, but we see little in the way of specific refutation of the detailed bottom up inputs to the modeling. The bottom-up approach offers some advantages in that they can more completely incorporate the costs and challenges of technology innovation and adoption, transactions costs, and program administration costs.

Baseline definition

It is not correct to say that CARB's baseline is arbitrary. One critique states that: "CARB is inconsistent in its decisions about whether to treat existing state policies as part of the baseline or instead as part of the Scoping Plan's impact," (Jaffe/Borck Report, p. 5). In fact, a straightforward, objective approach is used to decide which policies to include in the baseline. If a policy is already being implemented or if it isn't primarily a GHG reduction measure, then it isn't included in the AB 32 scoping plan. The baseline also includes a 1.5% annual improvement in energy efficiency, which is an assumption consistent with historical trends.

We concur with the observation that both the baseline and the AB32 scenarios are inherently uncertain and CARB deserves criticism for imbuing their results with a higher degree of precision than appropriate. We agree with the Jaffe Report and Peer Review that CARB should do more to explore uncertainties, but the critiques are incomplete in their consideration of the implications of this uncertainty. The Jaffe/Borck Report only considers the possibility that the analysis errs in ways that reduce benefits or increase

⁴ 2008. **Energy Efficiency, Innovation, and Job Creation in California** David Roland-Holst for Next 10 at www.next10.org/research/research_eeijc.html. See also 2008. Moss, S. Getting the Job Done Right: Employment Growth and California's Global Warming Solutions Act, Steven Moss for Environmental Defense Fund at www.edf.org/documents/8897_AB32%20MCubed%20Jobs%20study.pdf.

costs. In fact, business as usual emissions could be higher; the supply of negative cost measures could be larger than anticipated currently; the PSP may induce faster technological innovation than expected. Moreover, when we extend the range of costs and benefits beyond the narrow range taken into account in CARB's analysis, we can be quite confident that society will be better off for acting.

Whereas the Jaffe/Borck Report offers a slow-down in vehicle sales and tight credit markets as evidence for a dramatic downturn in forecasted business-as-usual emissions, these near-term economic trends are brief snapshots of the California economy that have no more to say about the 2020 economy than the dot.com boom of the 1990's or the sustained housing boom that predated the current down cycle. Given the well-established cyclical nature of our economy, and the long-term planning timelines of AB32, the use of snippets of evidence from current newspaper headlines should not be given more weight than the results of CARB's involved, detailed analytical efforts. .

The Jaffe Report, LAO study and the Peer Reviews raise concerns about the baseline assumptions. They point out the need to modify energy efficiency investments and BAU emissions based on forecasted price increases for electricity, natural gas and transportation fuel. To the extent that price changes due to broader economic trends largely exogenous to California, it is appropriate to capture resultant changes in consumer demand in the baseline scenario. However, price changes caused by AB32, and resultant changes in consumer demand, are the result of AB32 and should not be incorporated into the baseline scenario. To the extent that the CARB analysis omits both types of price response, we note that the net effect is probably small compared with other uncertainties inherent in the study.

The Jaffe/Borck Report claims that "to be cost-effective, the Scoping Plan must offer the least costly means of achieving California's 2020 target" (pg. 3). Cost-effectiveness is defined explicitly in AB32 as "the cost per unit of reduced emissions of greenhouse gases adjusted for its global warming potential." This definition in no way implies that the lowest-cost strategy is mandated. To the contrary, AB32 seeks to "maximize benefits" while "minimizing costs", but it also has several additional important criteria for identifying and selecting emissions control measures. Most notable amongst these criteria is avoiding harm and securing benefits for California's most vulnerable communities. Community benefits and protections pertain to questions of equity, not efficiency. Comparatively, cost-effectiveness is a measure of efficiency, not equity, and is only one of many factors considered by CARB in developing the Scoping Plan.

Extent of comparative modeling and innovative aspects of CARB's modeling

By integrating bottom-up engineering policy inputs in a nontrivial way, the modeling improves over other efforts that include a hidden assumption of a perfectly competitive market with perfectly rational actors. After the recent financial and economic troubles, it is difficult to accept the notion that less government, more deregulation is always better. This is what underlies the view that government policy cannot possibly have a positive economic effect by, for example, encouraging additional investments in energy

efficiency. One could take issue with the specifics of the bottom up engineering-technology inputs to the modeling work, but this is not the core point of the critiques.

Some of the critiques cite the US EPA's modeling work as better on considering uncertainty, but this work does not compare cap-and-trade to direct regulation. CARB's modeling follows a similar approach to the US EPA modeling in the use of two Computable General Equilibrium Models. The US EPA uses ADAGE and IGEM. CARB uses EDRAM and BEAR. In this way, both approaches entail a modest effort at corroborating modeling results, using two different models to answer the same question. The Jaffe/Borck Report critique seeks to use the fact that CARB's two modeling exercises producing similar results via different structures as a weakness, but such an outcome lends credibility to the findings of any one model and is thus the preferred result of a corroborative modeling exercise.

The Jaffe/Borck Report criticized CARB for failing to provide insights about the "economic impact of many other consequential policy choices", specifically related to design specification for the cap and trade program. It is true that design choices will have economic and equity implications, and that more work should be done. However, the issue some economists seem to have is the line drawn in the amount of the effort that will be carried by sector specific policies as opposed to cap-and-trade. We are not aware of any analyses that have sought to fine tune the mix of cap-and-trade and other policies in a package of policies aimed at achieving economy-wide reductions. Once the PSP is adopted, CARB will embark on an extensive, stakeholder-informed process of designing all of the AB32 measures, including cap and trade policy, to meet the requirements of the law.

We agree with the Jaffe/Borck Report, LAO Study and Peer Review that CARB could do more to consider uncertainty and to incorporate sensitivity analyses in their future work. And in response to the Peer Review, initial steps have been taken in this direction, and the results of this have been findings not fundamentally different than the initial results. The question we have is what specific analytical example would the critics point to for fine tuning the mix of cap-and-trade and other policies? Again, we are not aware of any example of such work (ex-ante analysis of economy-wide climate action that compares a range of mixes between market-oriented and other policies) and to hold the CARB analysis to a standard of perfection that has never been achieved before seems unfair. Furthermore, we are well aware of the limited ability of models to inform this question with reliable results.⁵ For too long, opponents of climate action have used "we need more research and analysis" as an excuse for delay, and to use perfection as a standard of adequacy is simply inappropriate. We agree that CARB should continue to improve and refine their economic and public health analyses but note that the work completed thus far provides a good foundation for moving forward. No criticisms of the CARB economic evaluation, nor the PSP more broadly, refute the conclusion that the most expensive course is inaction.

⁵ For example, see Richard McCann (2008) *Challenges of Modeling AB32 Policy*, December 9. Environmental Defense Fund.