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Chairperson Mary D. Nichols and Members of the Board
California Air Resources Board
1001 "I" Street
Sacramento, CA 95812

Re: Commentary on the Market Advisory Committee's report, "Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California," June 30, 2007[1] (for consideration at the July 27, 2007 Board meeting[2])

Dear Dr. Nichols and Members of the Board:

Prior to adoption of the California Global Warming Solution Act of 2006 (AB 32), the Governor's Climate Action Team (CAT) determined that statewide emissions in 1990 amounted to approximately 426 MMT, and it identified emission reduction measures that could reduce emissions to about 410 MMT by 2020.[3] Under the premise that the 426 MMT figure is correct and that a reduction to 410 MMT would be feasible and cost-effective, should the AB 32 regulations seek to reduce emissions in 2020 to 410 MMT, or would a reduction to 426 MMT suffice?

AB 32 is unequivocal on this question: "The state board shall adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions …" (Sec. 38560). The clearly intended meaning of this maximum feasibility mandate is that emissions should be reduced to 410 MMT or less by 2020 if such reductions would be feasible and cost-effective.

The MAC recommendations are equally unequivocal, but contrary to AB 32: "In 2020, the emissions cap in a California GHG trading program should be set equal to total allowable emissions under the Global Warming Solutions Act minus projected emissions from sources and sectors not covered by the cap-

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[1] Market Advisory Committee http://www.climatechange.ca.gov/policies/market_advisory.html
Note: I have previously submitted public comments on this topic to the MAC:
http://www.climatechange.ca.gov/events/2007-02-27_mac_meeting/public_comments/KenJohnson2_corrected.pdf
http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/public_comments/Ken_Johnson_Comments_2007_06_05.pdf

[2] Board meetings archive: http://www.arb.ca.gov/board/meetings.htm#past

[3] CAT Final Report (March 2006)
http://www.climatechange.ca.gov/climate_action_team/reports/2006-04-03_FINAL_CAT_REPORT.PDF

and-trade program." (Sec. 8.1, first recommendation) According to the MAC recommendations, any sectoral emission reductions beyond what would be required to achieve the 426 MMT cap would not result in additional statewide emission reductions; they would merely allow other sectors to increase their emissions irrespective of whether greater emission reductions in those sectors would be feasible and cost-effective. This applies not only to emissions within the cap; the MAC recommendations also imply that additional emission reductions outside the cap-and-trade program would be neutralized by either relaxing the cap stringency or by generating offset credits within the cap. The MAC recommendations implicitly reject and contravene the AB 32 maximum feasibility mandate.

It would make sense to prioritize cost reductions over emission reductions, as recommended by the MAC, if the emission cap in 2020 would achieve climate stabilization goals. But AB 32 is clearly based on a recognition that reduction of emissions to 1990 levels, even if achieved globally, may not be sufficient to avert catastrophic climate change; and the statute therefore prioritizes "maximum technologically feasible and cost-effective greenhouse gas emission reductions" over maximal cost reductions.

The implications of the MAC recommendations can be illustrated in the context of transportation policy. The CAT report's "emission budget" (from which it determined that a 410 MMT statewide emission target would be achievable) included 30 MMT reduction from the transport sector, resulting from California's motor vehicle GHG standards (AB 1493). This 30 MMT reduction is relative to a projected business-as-usual baseline in 2020 that is about 60 MMT above the 1990 level, so even with the new regulations transportation emissions in 2020 would be about 30 MMT higher than in 1990. But much greater emission reductions from transportation might be possible.

At current fuel prices of about $3.00/gal, the fuel cost associated with each ton of vehicle CO2 emissions is about $300, so it is clear that fuel savings alone could justify emission technology costs (e.g. for plug-in hybrids) far beyond anticipated emission trading prices under AB 32. Furthermore, considering that projected average compliance costs for AB 1493 are only about $0.51/gal (applied to lifecycle fuel consumption)[4], it is clear that neither AB 1493 nor the MAC-recommended cap-and-trade program can fully exploit the high potential for transport-sector emission reductions. The combined effects of rising fuel prices, technology advancement, and supplementary regulatory incentives such as vehicle feebates could nevertheless result in significantly greater emission

[4] Aug., 2004 ISOR: http://www.arb.ca.gov/regact/grnhsgas/grnhsgas.htm
http://www.arb.ca.gov/regact/grnhsgas/isor.pdf
Sept., 2004 ISOR Addendum: http://www.arb.ca.gov/regact/grnhsgas/addendum.pdf
Projected emission rates in 2016 are stated in the ISOR, Tables 6.2-1; baseline rates are inferred from Table 6.2-2; and costs associated with emission reduction are stated in the ISOR Addendum, Table 6.2-7. The compliance cost, in $ per gm/mi, is converted to $/gal using a fuel GHG intensity of 8900 gm-CO2/gal and a vehicle lifetime VMT of 200,000 miles.

reductions in the transport sector, perhaps returning transportation emissions in California to their 1990 level by 2020. But under the MAC's recommended cap-and-trade program, an additional 30 MMT reduction in transportation would be offset and neutralized by increased emissions in other sectors (as long as there are buyers willing to pay for the transport sector's surplus emission allowances), and there would be no net reduction in statewide emissions.

The MAC report advocates the use of complementary policies such as AB 1493 and feebates (Sec. 3.2.1), but in the context of cap-and-trade such policies would only function to shift the burden for emission reductions to sectors subject to supplemental regulations – they would provide no further reduction in statewide emission reductions. All greenhouse gas policies, regulations, and supplemental incentives would be subsumed by the emission trading program. Furthermore, if interstate or international offsets (Sec. 6.3) and linkages (Sec. 6.5) are employed, then the program might not even achieve the "Statewide greenhouse gas emissions limit" as defined by AB 32 (Sec. 38505(m,n)). The fundamental weakness of the MAC recommendations is that they are constructed to implement textbook cap-and-trade theories and dogma rather than the precise statutory requirements of AB 32.

The report suggests one possible policy approach that would address the maximum feasibility requirement while also ensuring compliance with the statewide emissions cap. As noted in Sec. 6.4.2 (last paragraph), the Board could impose a price floor on allowance sales, which might achieve emission reductions beyond the minimal requirements determined by the cap. To the extent that "cost-effectiveness" is quantified in terms of a marginal cost limit, a price floor set to the marginal cost limit could achieve maximal cost-effective emission reductions.

The price floor would essentially operate as a carbon tax, and could potentially be implemented as a supplementary tax policy rather than being incorporated in the cap-and-trade system. However, conventional carbon taxes may be politically unviable and economically impracticable because of the huge taxation burden that they would impose (in addition to the cost of emission reductions).

The problem can be clearly illustrated in the context of transportation policy. To some extent, fuel taxes could induce reduced fuel consumption, but price incentives applied directly to new vehicle sales would more effectively induce a market shift to low-emission vehicles and alternative-fuel-compatible vehicles. The AB 1493 regulations were based on a marginal cost limit of $1.18/gal, which was defined by a $1.74/gal fuel price, discounted at a 5% rate over a 16-year typical vehicle lifetime. (This means the technology cost required to achieve a 1-gallon marginal reduction in lifecycle fuel consumption should not exceed $1.18. Actual projected average compliance costs for AB 1493 are much lower – about $0.51/gal.) Considering current fuel prices, energy security risks,

and climate impacts of vehicle emissions, a marginal technology cost of $1.18/gal would clearly be cost-effective, but a carbon tax at that level would amount to over $11,300 per vehicle[5].

The high tax could be avoided by using tax refunding in much the same way that emission trading systems use free allowance allocation to minimize distributional costs. For example, a vehicle feebate (i.e. refunded tax) could be designed to achieve the same $1.18/gal marginal incentive for fuel-efficient technology, but with average per-vehicle fees of about $800 (not $11,300), which would be balanced by rebates of the same magnitude.[6] This type of feebate program would be very similar to emission trading (with free allocation), in that it would be revenue-neutral within the regulated sector and would be profitable for the most efficient vehicle models.

The Board's cost-effectiveness criteria should clearly be based on consideration of the distributional costs of regulatory policy, not just marginal costs. This applies to both price and quantity instruments, and the same policy considerations apply to refund allocation (in the context of price instruments) and allowance allocation (in the context of quantity instruments).

The MAC report advocates evolution toward a 100%-auctioned cap-and-trade system, which would be equivalent to an unrefunded carbon tax in terms of its distributional characteristics. Part of the rationale for auctioning is that it would avoid windfall profits in the electric sector, but such profits would not be antithetical to the AB 32 legislative policy if such profits accrue to low-emission energy producers – particularly renewable-energy producers. This would occur if an output-based, free allocation method is used, including renewable sources in the allocation. The high profitability of low-emission energy could induce an explosive expansion of new, renewable energy generation, and market competition from such sources would help keep energy prices down. One deficiency of the MAC report is that it gives no consideration to output-based allocation and appears to consider grandfathering to be the only alternative to auctioning.

Output-based allocation can also be used effectively with tax refunding. The best example of an operational refunded tax program is the Swedish Refunded Emission Payment (REP) program for stationary-souce NOx emissions, which uses an output-based refunding method. (Refunds are allocated in proportion to "useful energy output".) Attribute-based vehicle feebates would be effectively "output-based" in the sense that the refund distribution is a function of some vehicle attribute (or combination of attributes) that correlates roughly with the economic value (transportation utility) associated

[5] This is based on model-year 2005 national sales data and an assumed lifetime VMT of 200,000 miles.
[6] This would be for a weight-based feebate, which would neutralize weight-changing incentives (both upweighting and downweighting) without diminishing incentives for energy efficiency. (Supplementary policies or crediting mechanisms would be required to incentivize lightweighting technologies.)

with vehicle emissions. Output-based or attribute-based allocation operates to reduce emissions by focusing regulatory incentives more exclusively on low-emission technology.

Price instruments such as vehicle feebates could be used in conjunction with cap-and-trade to incentivize maximum feasible and cost-effective emission reductions while also capping emissions. This hybrid policy approach would not work, however, unless price instruments are broadly applied. If they are implemented sporadically or incrementally, then additional emission reductions in industries subject to emission price regulation would simply be offset and neutralized by emission increases in other sectors.

If emission price regulation creates incentives sufficient to achieve the emission cap, then trading prices would be expected to fall to zero and the cap-and-trade system would become dormant. If price regulation is not sufficient, then trading prices would rise to make up the balance between the regulated prices and the cap compliance cost. However, it should be recognized that if emission price regulations are constructed to achieve maximum feasible and cost-effective emission reductions, then the cap-and-trade system would only become active under the condition that the cap is not feasible and cost-effective. This is an important point that the MAC report does not address.

The primary rationale for cap-and-trade is that “The cap establishes certainty as to the total amount of emissions that will occur under the program.” (Sec. 2.1) Any mention of “emissions certainty” should prompt the question, “At what cost?” The cap establishes “certainty” only to the extent that it is enforced at any cost, without regard to limitations of feasibility or cost effectiveness. The AB 32 legislation appears to be inconsistent, in that it requires that the regulations be feasible and cost-effective, and yet gives the Board no authority to modify the cap in the event that the cap is determined not to be feasible and cost-effective. The MAC report does not recognize or attempt to reconcile this inconsistency; it just ignores the feasibility and cost-effectiveness requirements and propounds a policy that imposes the cap unconditionally.

The governor and the CAT determined prior to enactment of AB 32 that the mandated emission cap would be feasible and cost effective, and this determination was evidently accepted by the legislature. Under this premise, a regulatory policy that is constructed to achieve maximum feasible and cost-effective emission reductions will achieve the cap, but the converse is not necessarily true. The mandated cap can therefore be interpreted as a minimal requirement, which is subsumed by the maximum feasibility mandate, and which functions to ensure that the Board’s interpretation of maximum feasibility is at least consistent with the CAT analysis and with minimal requirements for climate stabilization.

Price instruments, which can provide direct regulatory control over both marginal costs and distributional costs, would be well-suited to the maximum feasibility mandate. From the perspective of regulated firms, such instruments would be essentially equivalent to emission trading, but without the price variability and transaction costs of trading systems. The advantage of cap-and-trade over price instruments (according to the MAC policy rationale, Sec. 2.1) is that the former would maintain the cap irrespective of whether the cap is feasible and cost-effective. However, the MAC report and AB 32 provide no basis or justification for prioritizing the cap over feasibility and cost-effectiveness. In any case, a price instrument could be employed to maintain the cap unconditionally by doing exactly what emission trading would do to control emissions: Raise the price without limit. Thus, cap-and-trade would not be required, and would not provide any practical benefit, if price instruments are employed to implement AB 32.

One of the key examples of a prior cap-and-trade policy cited by the MAC report is the U.S. SO2 trading program (Sec. B.1 in Appendix C)[7]. This program is widely regarded as an unqualified success because compliance costs have been much less, and economically quantifiable benefits far greater, than originally anticipated. However, I would encourage the Board and ARB staff to evaluate this program from the perspective of the AB 32 legislative policy. Specifically, has the program achieved SO2 emission reductions commensurate with limitations of technological feasibility and cost-effectiveness? And how might the SO2 program have evolved if it had been implemented as a price instrument similar to the Swedish NOx program, based on an SO2 emission price comparable to either original expectations of program compliance costs or current trading prices (under the Clean Air Interstate Rule)? I believe these considerations will make it plainly clear what price is paid, in terms of environmental effectiveness, for cap-and-trade's putative advantage of environmental certainty.

Sincerely,

Kenneth C. Johnson

copy to:
Chuck Shulock, Office of Climate Change, ARB
Edie Chang, Office of Climate Change, ARB
Robert Jenne, Office of Legal Affairs, ARB
Fereidun Feizollahi, Economic Studies Section, Research Division, ARB

[7] See also the presentation by Brian McLean at the Feb. 27, 2007 MAC meeting:
http://www.climatechange.ca.gov/events/2007-02-27_mac_meeting/presentations/AcidRainandNOxProgram.ppt