Allen Lloyd
Bob Epstein

California Business Letter to ARB in Support of

The Proposed Scoping Plan

Dear Governor Schwarzenegger, Chairperson Mary Nichols, and Members of the California Air Resources Board,

As California business leaders, we are writing to emphasize our strong support for the Proposed Scoping Plan. Together we represent large, small and medium-sized businesses, entrepreneurs, innovators and investors from several regions in the state.

With global financial markets in turmoil and global warming emissions rising faster than the worst-case projections of leading scientists, we are at a historic crossroads. Those who say we cannot afford to enact California's proposed policies to reduce greenhouse gas pollution do not understand this critical moment or the economic opportunities presented by moving from a twentieth century fossil fuel-based economy to the twenty-first century economy that runs on clean, renewable energy.

By developing solar panels, electric cars and fuel cells, harnessing wind and solar power, creating biofuels, and making data centers and buildings more energy efficient, companies will create jobs as they combat climate change. Additionally, saving energy boosts businesses' bottom lines and puts money in consumers' pockets, money that is recycled into the California economy. A recent study from the University of California, Berkeley, reported that California's energy efficiency policies over the last thirty-five years have saved consumers $56 billion, created 1.5 million jobs, and generated $46 billion in payroll.[1]

California has been a leader in energy efficiency, and the Proposed Scoping Plan enables us to go even further. Improving California's energy efficiency just 1% per year will expand the Gross State Product by approximately $76 billion, will boost real household income by as much as $48 billion and will create as many as 403,000 new jobs, according to the UC report. With policies designed to increase energy efficiency and renewable energy, to stimulate investment in clean technologies, and to create green jobs, the Proposed Scoping Plan helps make California companies more internationally competitive and less vulnerable to volatile fossil fuel prices.

We represent some of the best and most innovative leaders in technology and business. We keep California competitive in the world market by challenging the traditional players and practices, and by recognizing and seizing opportunities for change. The state's proposed plan fuels the entrepreneurial spirit that makes California a world economic leader. We must seize this precious opportunity to transform our energy infrastructure and retain the first mover advantage that AB32 creates for us in the multibillion dollar clean technology world market.

We urge you to adopt the Proposed Scoping Plan. We understand that the Proposed Scoping Plan provides the framework for meeting the 2020 and 2050 targets and that the specific details will be developed further during the rulemaking process. We look forward to working with ARB in 2009 to develop these details and to partner with you in creating California's clean energy economy.

---

[1] Professor David Roland-Holst. UC Berkeley. *Efficiency, Innovation and Jobs Creation in California*. October 2008.

Enclosure I: Recommendations for the Final Scoping Plan

1) Overcoming Market Barriers

As noted in the proposed scoping plan, all three of the committees advising the state on the implementation of AB32 have recognized that pricing carbon is a complimentary policy to direct measures, not a replacement. For example, clean vehicle standards will overcome the following market barriers to cleaner, more efficient on-road vehicles:

- General market barriers to RD&D
- Instability in fuel prices are a deterrent to manufacturer investments in advanced technology
- Incomplete customer information and instability in fuel prices are a market barrier to demand-pull for the most efficient vehicles
- Externalities such as GHG emissions are not factored into decision-making by manufacturers and consumers
- Upstream refining & production VOC, SOx, fine particulates, NOx, air toxics and other pollutants are additional externalities that are not factored into decision-making by manufacturers and consumers

We note that there are 14 measures listed in Enclosure III that CARB has determined would achieve significant cost-savings, even without considering reductions of GHG and co-pollutants, and was previously considering. These measures range from heavy duty vehicle engines to efficient use & production of cement/concrete. We believe CARB is now planning to omit these measures based on an assumption that they will automatically occur due to cap & trade (CARB also notes the possibility of federal standards for heavy duty vehicles, although these standards are not expected until the 2016-2017 timeframe). The fact that these reductions have not occurred yet despite large cost savings is a clear signal that major market barriers are blocking these actions, and are unlikely to be overcome by a relatively small (with allowance prices at the level predicted by CARB) additional economic incentive under cap & trade. The CEQA evaluation acknowledges (p J-86) that "ARB cannot predict in which sectors" emission reductions would occur if they are covered only by cap & trade and not sector-specific measures.

These measures would also achieve very important reductions in air pollution including ozone and fine particulates, which are a major threat to public health in California. For instance, we estimate that over twenty thousand tons of criteria pollutants per year would be reduced under the concrete/cement efficiency measures developed by CARB staff. Thus, we recommend that CARB add these 14 measures to the final scoping plan, or provide a complete evaluation for public review of why CARB believes that these measures are not necessary to achieve the maximum technologically feasible and cost-effective GHG reductions and air pollution benefits. (Please see Enclosures II and III for more details) We recognize that implementation details for each measure may need to be tailored for each sector based on additional information gained through the rule development process.

2) Use of Allowance Value

We appreciate CARB's recognition of the proposed California Carbon Trust as an opportunity for achieving a number of important objectives. Our recent discussions with representatives of the United Kingdom's Carbon Trust confirm that this is a very promising framework for selecting high-value projects through a rigorous process of evaluation and competition.

While the proposed scoping plan mentions a wide range of possible uses for allowances/allowance auction revenues, more information is needed regarding the potential use of allowance value. California has not yet committed to auctioning more than 10-25% of allocations under cap and trade, and thus the final scoping plan should acknowledge the high costs and lost opportunities that would occur under this formula and note the importance of avoiding windfall profits that have occurred under the European Unions Emissions Trading System. We note testimony from the Director of the US Congressional Budget Office to the US House of Representatives Ways and Means Sub-Committee in September 2008 that free allowance distribution would be very costly and inequitable. Please note other testimony that investments in efficiency provide high economic and equity returns while decreasing the cost of cap & trade by reducing allowance prices (Please see Enclosure II for further details regarding this issue).

The value of allowances is likely to exceed the resources spent to make reductions and/or purchase offsets under cap & trade by an order of magnitude. Thus, we strongly recommend that the Board adopt a final scoping plan that gives priority[1] to investing the value of allowances in clean air/clean energy/clean transportation (including supporting policies such as job training and RD&D) to meet the following AB 32 goals:

- Adopting a plan with economic incentives that facilitate the maximum feasible and cost-effective reductions of greenhouse gas emissions (section 38561(b))
- Maximizing environmental and economic co-benefits and helping meet air quality goals (section 38501(h), section 38562(b)(4))
- Protecting environmental justice communities (section 38562(b)(2))
- Providing disadvantaged communities with an opportunity to benefit from public investments (as well as leveraged private investments) (section 38565)
- Maximizing the economic and environmental benefits of market-based compliance mechanisms (section 38570(b)(3))

3) Backstop Measures

The proposed scoping plan contains emission reduction measures that provide a backstop for sectors outside of cap & trade, which we support. For the large sectors, however, cap & trade is

[1] Note that prioritizing this program need not preclude other programs such as low-income assistance. While clean air investments are likely to focus on the energy and transportation sectors, prioritizing this type of investment would provide sufficient resources to provide the opportunity for clean air projects outside of energy & transportation to compete for funding along with these types of projects.

the de facto backstop. We believe that the additional direct measures and an incentive program, which should be added to the final scoping plan for other reasons, offer a more solid foundation for a backstop. They will limit the potential erosion of in-state benefits, as cap & trade may not achieve the economic and environmental co-benefits of in-state reductions. In addition, relying on cap & trade as a backstop may drive up allowance prices by increasing demand for allowances.

4) Recycling/waste management

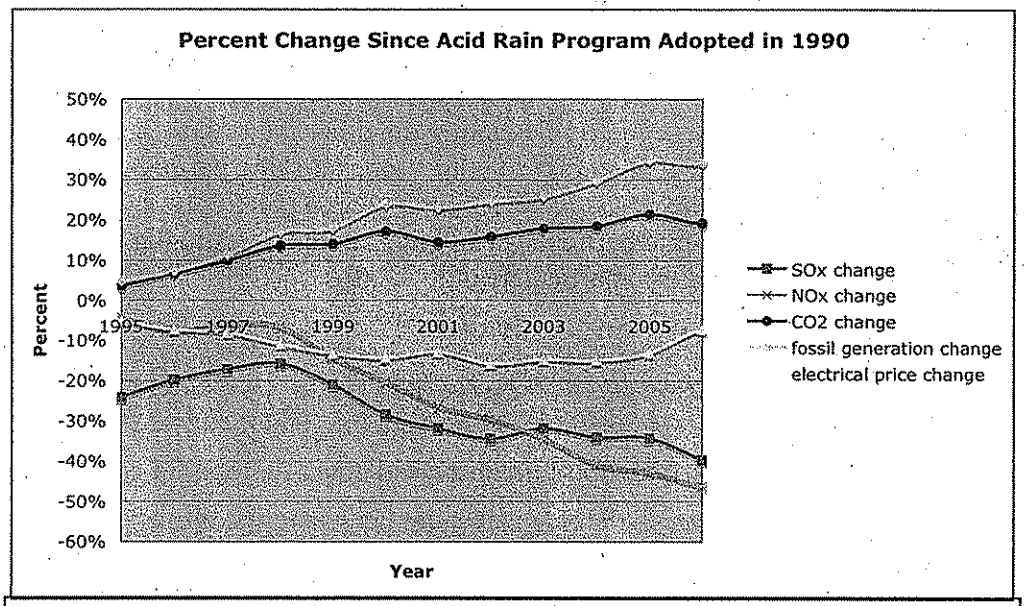
We appreciate CARB's addition of measures for recycling and waste management. We have not had the opportunity to meet with ETAAC experts in this area, and we will provide you with any specific comments that result from our next ETAAC meeting.

Enclosure II: Recommended Information for the Economic Analysis

This supplement does an excellent job of documenting the assumptions and calculations for the direct measures that are included. Decision-makers, stakeholders, and members of the public can review this information and judge it for themselves. We have provided several recommendations to help you provide similar information regarding potential market measures, and whether to include 14 cost-saving direct measures in the final scoping plan. This additional information will help the Board adopt a final scoping plan with the maximum technologically feasible and cost-effective GHG reduction measures while also maximizing reductions of co-pollutants.

1) Overcoming Market Barriers To Maximize Cost-Effective Reductions of GHG and Co-Pollutants

We concur with CARB's finding that putting a price on carbon is important, but not sufficient. For instance, achieving the state's GHG reduction goals will be more complicated than steps taken under the US EPA Acid Rain program. These steps (primarily low sulfur coal and existing scrubber technology) reduced SOx but were not intended to reduce GHG. The Economic and Technology Advancement Advisory (ETAAC) report contains dozens of recommendations that identify barriers that cannot be overcome just by pricing carbon.



Source: US Environmental Protection Agency for emissions data; US Energy Information Administration for fossil generation rates and electricity prices

Figure 1

California's continued commitment to overcoming resistance to clean passenger vehicle standards is just one example. Including these standards in the AB32 scoping plan will achieve

these reductions in California while creating a model for other states and Regions to follow. Standards for heavy duty vehicles are another good example that reinforces this point. Thus, we believe any updates to the economic analysis should highlight the tremendous economic and environmental benefits of these standards both in California and beyond state boundaries.

While the proposed scoping plan often follows this advice to include complimentary measures there are at least 14 direct measures that were not included despite apparent evidence of market barriers. CARB estimates that these measure would save over $3 billion per year if implemented voluntarily today without a price on carbon (please see enclosure III) – yet they are not occurring. The failure of the market to achieve these major economic and environmental benefits indicates that significant market barriers exist.

CARB has instead assumed that these 14 measures would occur under cap & trade without any direct measures to address market barriers. We have calculated the "break-even" point for a number of cost-saving emission reductions, as well as the change in annual cost-savings under CARB's predicted allowance price. The break-even point would typically occur one or two months earlier, and the percent increase in cost-savings appears to be modest (please see enclosure III). CARB should identify in the economic evaluation how it will overcome the market barriers for these 14 measures, in addition to putting a price on carbon, so that the final scoping plan will achieve the maximum technologically feasible and cost-effective reductions (including the value of co-pollutants).

These market barriers are also preventing emission reductions of co-pollutants that will protect public health and help the state meet challenging existing state standards and tightened federal clean air standards for ozone and fine particulate. For instance, the value of just the NOx reduction co-benefit from cement GHG direct emission measures would outweigh the entire predicted cost of those measures, even before counting the other major cost savings and GHG reductions[2]. As you know, NOx is a precursor to both ozone and fine particulates. Achieving these co-benefits would be particularly valuable at a time when CARB's best estimate is that 18,000 people die each year from fine particulates and the state is investing large sums to reduce emissions such as NOx, VOC, and fine particulates.[3]

2) Potential Costs & Benefits of Allowance Distribution

The economic analysis should clearly address the increased costs that would occur from any free distribution of allowances to historical GHG emitters; and at least qualitatively identify the value of using these allowances to benefit California's environment and economy. Recent United States Congressional Budget Office testimony to a US House of Representatives sub-committee notes that at the national level "Policymakers' decisions about how to allocate the allowances could have significant effects on the overall economic cost of capping CO_2 emissions and on the

[2] NOx data sources are CARB on-line emissions data base, Carl Moyer cost-effectiveness rules. Cost of direct measures is from CARB draft GHG scoping plan Measures Documentation supplement. Emissions from RECLAIM are not included in NOx savings.

[3] The states has a number of cost-effective programs such as the Carl Moyer incentive program.

distribution of gains and losses among U.S. households. Giving away a large share of the allowances to companies that produce fossil fuels or energy-intensive goods could be more costly to the economy and more regressive than selling them." A Resources for the Future study found that cap & trade with grandfathering at a national level provided economic benefits only to residents in the top 10% for income and foreign shareholders of the companies that received the allowances.[4]

This issue is particularly important in California. If California were to follow the WCI minimum of auctioning 10% initially, increasing to 25%, then the number of allowances distributed for free to power sector and large industrial sources (for instance) will exceed the combined total number of tons reduced and offsets purchased by these entities by an order of magnitude as shown below.[5] Based on CARB and WCI estimates, the total GHG allowances distribution by California in 2020 are estimated to have a value of approximately $3.6 billion to $23 billion dollars (in 2007 dollars). On a per capital basis, that is in the range of $300 - $2,000 per family of four.[6] The Congressional Budget Office (CBO) has found that "Researchers conclude that much or all of the allowance cost would be passed on to consumers in the form of higher prices"[7].

Thus, whether cap & trade would be cost-effective to California residents cannot be determined without 1) imposing boundaries on the distribution of allowances value – such as excluding windfall profits - and 2) determining whether allowance value would be invested in GHG reductions (including supporting purposes like RD&D and job training) or used in ways that return benefits to consumers[8] for the cost of allowances above and beyond the costs of any reductions that occur (other factors discussed below would also affect cost-effectiveness). For instance, recent studies of the RGGI system for power plants have found that benefits from investing the value of allowances in energy efficiency can virtually pay for the cost of the cap & trade

---

[4] The Incidence of US Climate Policy, Resources for the Future, Burtraw, Sweeeney, and Walls, September 2008.

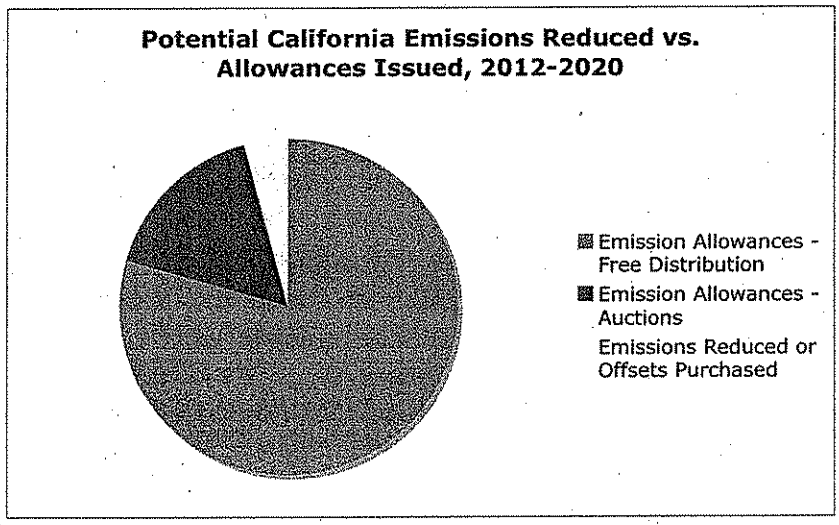
[5] Graphic assumes linear transition from 10% auction to 25% auction. A faster or slower transition to 25% auction would affect the exact ratio of free & auctioning allowances, but not the order-of-magnitude ratio between free allowances and emission reductions/offsets. The number of allowances issues would dramatically outnumber the emission reductions or offsets predicted under a cap & trade system. For instance, if reductions occurred linearly under California's proposed cap, which is proposed to reduce emissions by 0% in 2012 and 9% in 2020, then the ratio of allowances to reductions would be approximately 20:1 (94.5 % compared to 4.5%).

[6] Data sources: WCI modeling (appendix B) and CARB scoping plan for prices and quantity of allowances; California Department of Housing and Community Development for population

[7] "Trade-Offs in Allocating Allowances for CO2 Emissions, April 25, 2007, CBO, page 3. See also Mark Lasky, *The Economic Costs of Reducing Emissions of Greenhouse Gases: A Survey of Economic Models,* CBO Technical Paper 2003-4 (May 2003).

[8] The proposed scoping plan states that allowances may be used to encourage energy efficiency, renewable energy, GHG & air pollution reductions, and supporting programs such as RD&D and job training. California has many examples of existing programs that can serve as a model of programs for increasing clean air/clean energy/clean transportation with rigorous cost-effectiveness evaluations. The draft scoping plan also states that allowances may be provided for free as a subsidy to GHG emitters, to pay the cost of reducing GHG emissions, to avoid GHG leakage, to avoid competitiveness issues, and to avoid cost volatility These categories of free distribution are not linked to clean air/clean energy/clean transportation in the proposed scoping plan. .(October Proposed Scoping Plan p. 36 and p.71, October Proposed Scoping Plan Appendix C p.21. In the national context, reductions in various types of taxes and/or the national debt have been evaluated.)

system to consumers.[9] California also has extensive experience with cost-effective clean air/clean transportation programs encouraging voluntary emission reductions of the three types that CARB has noted are essential for achieving GHG goals: vehicles, fuels, and vehicle miles traveled. They would also provide extensive environmental and economic benefits once funded for GHG in addition to energy efficiency programs for electricity & natural gas customers.



Phase I Sources: Electricity and Large Industrial Sources, WCI Minimum Auction Levels
Source: International Council on Clean Transportation, based on CARB data

Figure 2

3) Costs due to offsets

The proposed scoping plan states that offsets have the potential to mitigate allowance prices should they rise above CARB's expected levels under cap & trade. It is equally important to provide information on whether further offset limits would help maximize additional economic and environmental co-benefits to California. For instance, the state of California may pay between $51 and $93 million dollars[10] for the value of reducing several of the co-pollutants that could be achieved with a one million metric ton GHG reduction spread evenly across California's medium and heavy duty vehicle sector in 2015. As noted elsewhere in this letter, reductions in the cement industry are another example with very large co-benefit values.

[9]Resources for the Future. The Incidence of US Climate Policy, September 2008, p45, citing one study for the state of Maryland and one study for the entire RGGI region.

[10] Low value based on nitrogen oxides (NOx) only; high value includes volatile organic compounds (VOC) and fine particulates (PM-10) also. NOx reductions are more certain, VOC and PM10 reductions may vary based on the way in which GHG are reduced. Calculated based on CARB CEFS database and Carl Moyer cost-effectiveness thresholds for criteria pollutants, and CARB GHG emissions data extrapolated to 2015 for GHG. Note that this value is based on adjusting CARB's NOx standards to reflect reduced emissions due to cobenefits from GHG reduction measures by 2015, rather than allowing co-benefits to result in less strict levels of NOx control efforts.

We also note that the WCI cap & trade design document Section 9.2[11] is unclear whether offsets must be both "surplus" and "additional", or whether one or the other is acceptable. Under an additionality requirement, reductions must be both voluntary and beyond what would have occurred without the incentive of generating offsets. A "surplus" standard, i.e. not legally required, would affect the cost-effectiveness of allowing offsets because California could pay large amounts of money for offsets that are voluntary but would have occurred anyway for other reasons.

4) Cost Effectiveness for Market Mechanisms

Market mechanisms can provide important benefits – such as encouraging innovation to create reductions above & beyond regulatory limits. They also have costs that should be assessed, as indicated by the BEAR modeling[12]. The scoping plan should be supported by an economic analysis that provides decision-makers and the public with information on the various types of costs and benefits that are likely to occur for the sectors that are proposed for coverage under market mechanisms:

- Estimating the cost of reducing emissions and/or purchasing offsets (if allowed) through a transparent analysis
- Estimating the cost of any free allowance distributions that are based on past or current GHG emissions rather than cost-effective public policy programs, as noted earlier
- Lost co-pollutants benefits. As noted earlier, this would tend to increase if out-of-state state offsets replace in-state reductions and if complimentary measures are not included for capped sectors.
- Cost due to leakage in industries such as cement.
- Agency & regulated entity administrative & enforcement costs, and transaction costs for regulated entities
- Qualitative assessment of the benefits from encouraging innovation to reduce GHG beyond regulatory targets
- Benefits from investing the value of allowances or other forms of revenue in clean air/clean energy/clean transportation programs, including supporting RD&D and job training programs. A conservative approach would be to calculate the cost burden (especially for low and average income groups) of any free allocations to producers that are not linked to cost-effective clean air/clean energy/clean transportation improvements. CARB could also qualitatively note that auctioned allowances for public purpose programs such as energy efficiency funding is expected to increase the net benefits to these groups. (Another recent report notes that while "grandfathering" allowances based on historical emissions is more costly and regressive than selling them, investing in energy efficiency will reduce total costs and is more equitable than "grandfathering[13].)

[11] Available at http://www.westernclimateinitiative.org. Last accessed November 4, 2008

[12] The BEAR model (Appendix III to the economic analysis) appears to predict that AB32 economic benefits due to non-cap & trade measures are diminished when cap & trade is added.

[13] Resources for the Future. The Incidence of US Climate Policy, September 2008, pp ii and pp 45-46

It is also important to acknowledge the importance of establishing a stable price on carbon when determining cost-effectiveness. For instance, a carbon fee or cap & trade with an effective price floor[14] is likely to be more effective at encouraging companies to make the structural changes necessary to achieve long-term goal. It is also more likely that banks and investors will provide innovators and capped entities with capital to reduce GHG if they can reasonably anticipate repayment. This will reduce the cost capital and the cost of GHG reductions. Without an effective floor, the beginning years of RECLAIM, EU ETS, and the initial results of the RGGI auction might otherwise encourage an expectation that significant investments will not be rewarded under cap & trade in California. This issue is especially important given uncertainties about top-down emission inventories and future economic circumstances.

We understand that cap & trade is effectively the proposed backstop for any short-fall that occurs from proposed scoping plan measures. We also believe that it is important to identify in the economic analysis how this would impact consumers and businesses if this leads to increased allowance demand and prices in lieu of implementing additional direct emission reductions.

5) Cement Industry Example

Cement is an important source of emissions with "businesses as usual" manufacturing emissions that are projected to equal approximately 20 mmtpy CO2(eq) in 2020 when imports are included[15]. Cement serves as a glue that holds concrete together. CARB staff have identified in the draft scoping plan measures to make more efficient use of cement and concrete, and to manufacturer these products more efficiently. Since cement is an international industry, efforts to develop new technologies that reduce GHG from cement use & manufacturing in California also have the potential to reduce GHG globally. In addition, efficiency will also decrease substantial emission from transportation of cement.

There are three main issues that should be addressed in the economic analysis prior to any final decisions on what measures to include in the final scoping plan for this industry:

- The cost-effectiveness of direct emission reduction measures that staff have identified as technologically feasible and cost-effective, including the co-pollutant benefits that would be achieved.

- The cost-effectiveness impact of leakage, and attempts to control leakage, from including cement under cap & trade in the scoping plan prior to international agreement(s) that

[14] There are various factors that could lead to overallocation. For instance, the US EPA estimates a high degree of confidence (95%) that GHG emission inventories from electricity production from coal fall within a range of 14%, and that GHG emission inventories from electricity production from natural gas fall within a range of 8%. (US EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2006, http://www.epa.gov/climatechange/emissions/downloads/08_CR.pdf.) Other factors include changes in economic growth rates, hydroelectric power, and other weather-related variations.

[15] CARB projects that in-state cement plant CO2 emissions are projected to reach 12.6 mmtpy CO2(eq) by 2020 - from http://www.arb.ca.gov/cc/inventory/data/forecast.htm. 40% of in-state use is imported, with increased CO2 emissions of 25% due to transportation, primarily from China.

- would include foreign manufacturing under a similar system with adequate targets, verification, and enforcement.

- The cost-effectiveness of fees on the in-state use of cement in order to mitigate emissions, improve efficiency, support RD&D, and support green technology.

Potential Cement & Concrete Direct Emission Reduction Measures

With regard to the first issue, the draft plan identified a number of measures that appear to be cost-effective and technologically feasible while also reducing co-pollutants. For instance, substituting waste materials for cement and making more efficient use of concrete and cement will accomplish these goals while also reducing the transportation emissions from cement imports. Reductions in manufacturing GHG intensity also appear to minimize the risk of leakage to the extent that California industry will reduce operating costs as a result.

The economic analysis does not indicate a reason for the decision to omit these potential measures from the proposed scoping plan. As noted in Enclosure 1, the market currently is not achieving these reductions, and it is uncertain whether reductions would occur under sector with cap & trade without complementary direct emission reduction measures. These direct measures would achieve NOx reductions that appear to be worth at least twice the annual cost of the measures – even without considering the cost-savings and reductions in GHG and other air pollutants that would be achieved. Thus, CARB should not omit these direct measures from the final scoping plan without an economic analysis that would support this decision and show that these measures are not cost-effective (including the benefits of criteria pollutant reductions).

Potential Costs of Leakage, and Attempts to Limit Leakage, Under Cap & Trade for Industries Such as Cement

Secondly, the proposed scoping plan notes that the cement industry is an example of an industry where leakage may occur[16], i.e. production moving out of state and simply transferring emissions elsewhere. Cap & trade can substantially increase the price of in-state production. While including the cost of pollution in the price that users pay is desirable, this price can be circumvented through imports under cap & trade. There is no system to inspect, verify, and enforce such a system in other countries that typically export large amounts of cement to California.[17] Leakage due to increased imports could increases transportation GHG emissions (as well as criteria pollutant emissions), as transport GHG emissions from imports are equal to 25% of the CO2 of manufacturing operations[18]. Thus, it is unclear whether cap & trade would

[16] Proposed scoping plan page 31

[17] Thus, leakage could occur over the long term if the cost of allowances exceeds profit margins in California by more than the cost of importing cement. Over the long term, construction of new plants and replacement of existing plants after they wear out would occur out-of-state, also transferring the GHG emissions out-of-state as "leakage". Leakage can also occur if existing operational plants cut production because allowance prices exceed their short-term operational costs.

[18] CARB, http://www.arb.ca.gov/cc/cement/meetings/041008/041008presentations.pdf

reduce emissions (including leakage) from sectors with high leakage potential such as cement manufacturing.

The proposed scoping plan notes that free allowances may be used to address leakage. The economic analysis should address the costs and effects of attempting to address leakage under a cap & trade system through subsidies for industries such as cement. The costs could range from about $100 million per year for a partial subsidy to about $1.2 billion per year for a full subsidy (see below – range covers both CARB and WCI allowance price estimates for 2020). The United States Congressional Budget Office recently testified that domestic subsidies may trigger a requirement to also subsidize foreign manufacturers: "If some or all of the allowances in the domestic cap-and-trade program were given away rather than sold, still other issues could arise. For example, they might be considered an actionable subsidy under the Subsidies and Countervailing Measures Agreement if a similar proportion of the permits required for imports were not given away"[19].

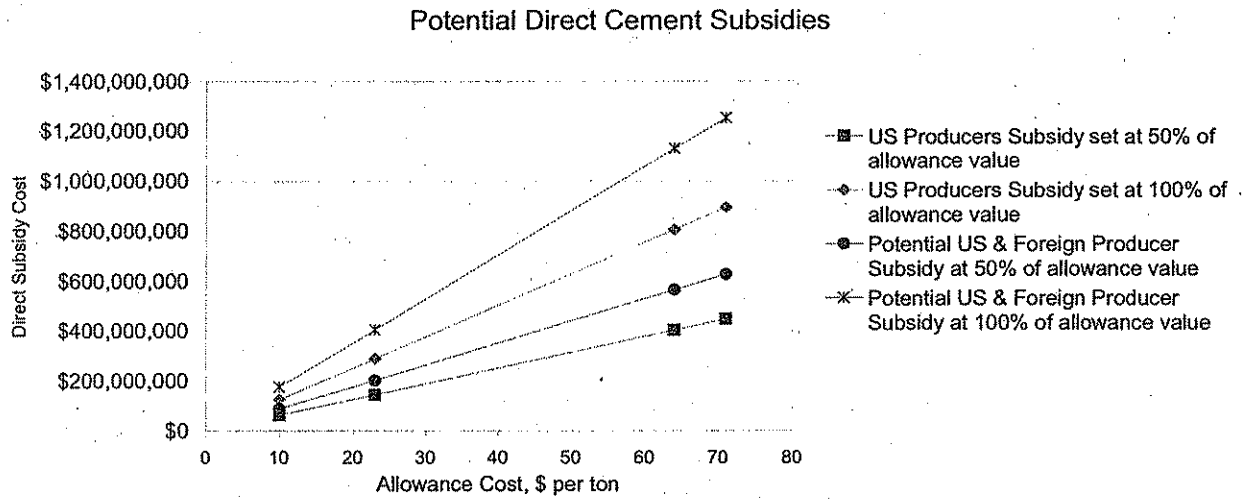


Figure 3

In addition, further information is needed to assess whether subsidies would increase emissions, decrease emissions, or have no effect compared to cap & trade with leakage. Subsidies based on historic emissions are likely to fall in the "no effect" category. The CBO has recently testified that "Giving allowances to energy-intensive manufacturers for free would not, in general, change their responses to a climate policy unless the grants were explicitly tied to specific production decisions."[20] Burtraw et al found that "Free allocation based on a historic measure provides no incentive to change behavior in order to affect one's allocation. The value of emissions allocations accrues to the firm independent of ongoing economic activity" (p.47) Thus, the effect

[19] US CBO, p.22, http://www.cbo.gov/ftpdocs/97xx/doc9727/09-18_ClimateChange_Testimony.pdf

[20] http://www.cbo.gov/ftpdocs/97xx/doc9727/09-18_ClimateChange_Testimony.pdf, see page 18

of subsidies based on grandfathering allowances would appear to be limited to redistribution of wealth.

On the other hand, subsidies tied to production levels could encourage production in California because the subsidy would hinge on whether production continues and/or increases. However, the downside is that subsidizing increased production would undermine a primary purpose of pricing carbon, encouraging efficiency and cleaner alternative products[21]. If domestic production-linked subsidies trigger foreign subsidies, this would create a large incentive for increasing production, transportation, and GHG emissions from imported cement on top of emission increases that could occur due to leakage.

Cement Industry GHG Fees

As noted in our prior letter, fees should be considered in addition to cap & trade. Given the questionable feasibility and cost-effectiveness of imposing a price on GHG emissions from the process of manufacturing cement through cap & trade, the economic analysis should especially evaluate user fees. The fees should include at least the calcination portion of cement GHG emissions[22], which accounts for the majority of emissions and is constant regardless of manufacturing process or location. California already imposes environmental fees on consumer purchases of tires, and CARB has already determined that fees can be a reasonable alternative to cap & trade that increases the benefits of pricing GHG by funding emission reductions. As noted in the description of fees on high GWP gases, fees can be used to mitigate emissions, improve efficiency, support RD&D, and support green technology. For instance, WestCarb has found that CO_2 capture from cement plants exhaust tends to offer more cost-effective opportunities for California CO_2 capture compared to existing power plants[23].

---

[21] For another example of this effect (the electricity industry) see "Written Testimony of Dallas Burtraw" to the US House of Representatives Ways and Means Committee, September 18, 2008. Accessed 11-4-08 at http://waysandmeans.house.gov/media/pdf/110/burtraw.pdf.

[22] The majority of CO2 is from a chemical process called calcinations. This relationship holds true for both current average levels of efficiency and for facilities with older, 1990-average levels of efficiency. See pages 23-24, presentation "Industry Background and Overview", http://www.arb.ca.gov/cc/cement/meetings/041008/041008presentations.pdf. Calcination is independent of fuel type and process, thus a fee could be set based on the CO2 from calcinations without needing any information about the origin of the cement. Fuel combustion, primarily coal or petroleum coke, is the second largest source of CO2 emissions from this process.

[23] West Coast Regional Carbon Sequestration Partnership, Quarterly Report Jan 2005-March 2005, p.15. High temp/high CO2 concentration carbon capture at cement plants would also be relevant to other facilities such as oxy-fuels glass plants. Note that other possible technologies have been publicized in addition to CCS evaluated by WestCarb.

Enclosure III

Examples of Change in Simple Payback Period from Baseline (no carbon dioxide price) to CARB predicted $10/ton Carbon Dioxide Price

Note: All costs in $ millions and constant dollars; all emission values in MMTPY CO_2(eq); simple pay-back period is initial cost divided by annual savings

	Capital Cost	Annual Savings Baseline	Reductions – tons		Cost-saving- due to carbon price with allowances= $10		Simple payback period		
							baseline	with Carbon Price	
			low	high	high	high		low	high
Refinery Energy Efficiency	$762	$461	2	5	$20	$50	1.7	1.6	1.5
Industrial Boiler Efficiency	$150	$127	0.5	1.5	$5	$15	1.2	1.1	1.1
Stationary IC Engine Electrification	$51	$25	0.1	1	$1	$10	2.0	2.0	1.4
Oil & Natural Gas Efficiency	$357	$167	1	3	$10	$30	2.1	2.0	1.8
Total	$1,320	$780	3.6	10.5	$36	$105	1.7	1.6	1.5

data source: CARB proposed measures documentation
accessed 10-23-08 at http://www.arb.ca.gov/cc/scopingplan/document/measure_documentation.pdf

Table III-1

Cost-Saving and Zero Net Cost Measures Under Consideration, but not Proposed, in draft CARB scoping plan

(does not include measures with cost-effectiveness tbd)

sector	page	Description	Potential Reductions MMTCO2(eq) in 2020 low est	Potential Reductions MMTCO2(eq) in 2020 high est	Annual Cost Savings (million $)	Cost Savings w/ CO2 at $10.00 per ton low est	Cost Savings w/ CO2 at $10.00 per ton high est	
Transportation	C-38	Feebates for light duty vehicles (with Pavley regs)	4	4	$1,015	$1,055	$1,095	
Local Government	C-48	Congestion Pricing	0	1				
Local Government	C-48	Pay as You Drive Insurance	0	1				
Local Government	C-48	Indirect Source Rule for New Development	0	1				
Local Government	C-48	Programs to Reduce Vehicle Trips	0	1	$621	$621	$631	<-- total cost of 4 local transportation measures
Electricity/Natural Gas	C-68	Additional Electricity Energy Efficiency	3.8	3.8	$553	$591	$629	
Electricity/Natural Gas	C-68	Additional Natural Gas Energy Efficiency	1	1	$146	$156	$166	
Industry	C-107	Carbon Intensity Standard for Cement Manufacturers	1.1	2.5	$3	$14	$39	
Industry	C-108	Carbon Intensity Standard for Concrete Batch Plants	2.5	3.5	$0	$25	$60	
Industry	C-108	Waste Reduction in Concrete Use	0.5	1	$28	$33	$43	
Industry	C-111	Refinery Energy Efficiency Process Improvement	2	5	$383	$403	$453	
Industry	C-117	Industrial Boiler Efficiency	0.5	1.5	$127	$132	$147	
Industry	C-117	Stationary Internal Combustion Engine Electrification	0.1	1	$13	$14	$24	
Transportation		Heavy-Duty Engine Efficiency (removed from measures)	0.6	0.6	$187	$193	$199	
		TOTAL	**16.1**	**27.9**	**$3,076**	**$3,237**	**$3,486**	
		Change				5.2%	13.3%	

Table III-2

CEMENT INDUSTRY CO-POLLUTANT EMISSIONS

	ROG	CO	NOX	SOX	PM	PM10
Total all Cement Plants emissions in tons per year, 2015	372	16228	19968	2634	8376	4520
Total Minus RECLAIM NOx and SOx	372	16228	19112	2523	8376	4520
Total 2015 (includes CARB 2% Growth Rate but not RECLAIM)	**445**	**19394**	**22840**	**3015**	**10011**	**5402**
Co-Benefits from Potential Cement GHG Reduction Measures	**138**	**8339**	**9821**	**1296**	**3103**	**1675**

NOx Benefit at $16,000/ton	**$157,000,000**
TPY Other Criteria Pollutants reduced	**12,800**
TPY All Criteria Pollutants reduced	**22,600**
Average NOx cost per ton cement	**$26**

note: does not include reductions in 1) air toxics 2) RECLAIM pollutants 3) product transportation emissions - especially marine

Annualized non-environmental Cost of Potential Direct Measures $74 (in million dollars)
Annualized non-environmental cost-savings of Potential Direct Measures $106 (in million dollars)
from Measures Documentation p. 31-33, http://www.arb.ca.gov/cc/scopingplan/document/measure_documentation.pdf

cement intensity factor - reduces combustion emissions by 17.00%
Measures Documentation p. 31,
http://www.arb.ca.gov/cc/scopingplan/document/measure_documentation.pdf
Concrete Manufacturing Intensity-reduces all cement emissions by 25.00%
Measures Documentation p. 32, http://www.arb.ca.gov/cc/scopingplan/document/measure_documentation.pdf

Reduced Waste - reduces all cement emissions by 8.00%
Measures Documentation p. 33, http://www.arb.ca.gov/cc/scopingplan/document/measure_documentation.pdf

Reductions in Cement =	31%	Used to determine for ROG, PM/PM10 reductions
Add'l Combustion Reductions=	17%	Reduces NOx, SOx, CO; conservatively not applied to VOC & PM/PM10
Total Combustion Reduced	43%	Reduces NOx, SOx, CO; conservatively not applied to VOC & PM/PM10

Does not include reductions from lower GHG intensity fuels
criteria pollutant emissions data source: CARB facility databased, confirmed by CEFS
http://www.arb.ca.gov/html/databases.htm

Table III-3