April 15, 2016

To: Andrew Panson (Andrew.panson@arb.ca.gov)

 Michelle Buffington (michelle.buffington@arb.ca.gov)

From: Norvell Nelson (norv@ltvcorporate.com)

Re: Comments on the April 4, 2016, Workshop on Development of the FY 2016-17 Funding Plan for Low Carbon Transportation and Fuels Investments and Air Quality Improvement Program (AQIP)…and including, in part,

Comments on the April 5, 2016, Workshop on Ongoing Evaluation of the Potential for Sector-Based Offset Credits in California’s Cap-and-Trade Program

**Overview**

The Governor’s Draft budget for 2016-2017 included the first large scale expenditures of the Cap-and-Trade funds collected by the state beginning in 2014. The Cap & Trade program is directed towards the reduction of greenhouse gas emissions (GHG) and employs several financial formulas to dis-incentivize emissions of GHGs, which are given in terms of metric tons of CO2 equivalent emissions. The legislative mandate for the use of the cap and trade funds directs their usage to promote the reduction of GHG (CO2) emissions and that about 50% of the funds be spent for disadvantaged communities.

An excerpt of the Governor’s Draft 2016-17 budget regarding the expenditure of Cap-and-Trade funds for “50 Percent Reduction in Petroleum Use” is given in the Table 1. The proposed expenditures allocate $500 million to the Air Resources Board (ARB) for LCFS programs. This total represents a significant expenditure for the low carbon fuels sector.



The LCFS Workshop held on April 4, 2016, presented the ARB’s program for these LCFS expenditures in much greater detail. In going over the programs outlined by ARB in the slide presentation for this Workshop, the following proposed expenditure summary could be developed. The proposed expenditures as presented at this Workshop are listed in Table 2.



The $50 million differential between the expenditures given in the ARB April 4 Table and the $500 million given in the Governor’s Draft Budget are owing to the inclusion of funds from DMV as noted in the Workshop presentation.

**Environmental Boundary Conditions**

There are some very important and urgent environmental conditions present in California that do not appear to be addressed in the LCFS programs as outlined in the April 4 Workshop. There are some immediate ambient air pollution conditions which should have the highest priorities for meaningful abatement. In particular, both SCAQMD and SJVAPCD are designated by the EPA as being “Severe Non-Attainment areas for non-compliance with the EPA ambient air standards for ozone. EPA has some target dates for achieving compliance; they are close being in the 2021 -2023 time frames.

**Nitrogen Oxides (NOx)**

Nitrogen oxide (NOx) emissions are implicated as the precursor compounds (along with other criteria pollutants, but not CO2) for ambient ozone formation. It follows then that the reduction in NOx emissions should contribute to the lowering of ambient ozone concentrations. The top 15 NOx source categories for SCAQMD and SJVAPCD are shown in the Figure[[1]](#footnote-1) 1.



Figure 1: Top 15 NOx Source Categories (SCAQMD & SJVAPCD

Figure 1 indicates that Heavy Duty Diesel trucks are the single most responsible source for NOx production in both air districts. Further, Figure 1 indicates that this mobile source has a very high potential for emissions reductions, the so called “low hanging fruit”.

The federal ozone regulations require both SCAQMD and SJVAPCD to reduce their NOx emissions[[2]](#footnote-2):

* SCAQMD must reduce NOx from 319 tons/day (t/d) to
	+ 115 t/d by 2023 – a 64% reduction
	+ 80 t/d by 2033 – a 75% reduction
* SJVAPCD must reduce NOx from 257 t/d to:
	+ 160 t/d – 38% reduction
* These reductions make HDD diesel truck emissions the #1 target

The magnitude of the problem can be appreciated when one considers that there are now 875,000 Class 8 trucks on California’s highways and only 18% are compliant with the 2010 truck standards on NOx (0.20 g/bhp/mile)[[3]](#footnote-3). This low compliance with the 2010 standard is confirmed by an independent report[[4]](#footnote-4) on the dieselforum.org and shown in Figure 2. Figure 2 also indicates that California is quite the laggard when it comes to operating “clean” trucks.



Figure 2: Share of Diesel Fleet that Meets or Beats the 2010 Standard

**Relationship between Ozone Non-Attainment and LCFS**

**Part I: Light Duty vehicles**

The preponderance of the funds in the light duty vehicle sector is devoted to supplying subsidies for the purchase of electric vehicles (EVs). Expansion of the EV fleet in CA will certainly eliminate most GHG emissions arising from direct operation of the EV. However, as seen in Figure 1 light-duty cars are not a major source of NOx emissions in SCAQMD. In fact, NOx emissions from light duty SI cars should be very low owing to their incorporation of 3-way catalytic converters. (Maybe the NOx contribution, shown in Figure 1, for light duty cars is anticipatory of the NOx emissions from all the “clean” diesel vehicles produced by Volkswagen).

There are 2 issues with the subsidies for EVs. The first can be looked upon as a subsidy for a major manufacturer of EVs located in California. While EVs do have low operating emissions and which meet the environmental mandate of the cap-and-trade enabling legislation, it has to be recognized that the CVRP program is a subsidy for EV manufacturers. There is, of course, nothing wrong with this application as it does important work to help reduce GHG emissions from cars while promoting manufacturing and jobs in California[[5]](#footnote-5).

The other issue regards the GHG emissions from generating electricity. Now, electricity generation was one of the very first operations to be subject to the cap-and-trade legislation so the inclusion of this industrial sector would account for capturing the GHG emissions arising from the “fueling” of the EVs. The question here is how the GHG emissions from power imports into the state are handled under cap-and-trade.

The importance of imported electric power will be an area of concern as we head into the summer months. CALISO and several of the southern California IOUs[[6]](#footnote-6) have cautioned their customers that there is a high probability of rotating blackouts this summer owing to the unavailability of natural gas from the Aliso Canyon storage facility owing to its earlier blowout this year.

The caution on the potential for rolling electric blackouts this summer could also have the effect of cooling some ardor for EVs. Something like an external influence such as a blackout should amplify “range anxiety” sales issue.

**Part II: Heavy Duty Diesel Trucks**

The proposed expenditures, under Cap and Trade, in the Heavy Duty Vehicle and Off-road Equipment Projects[[7]](#footnote-7); the Advanced Technology Demonstration Projects[[8]](#footnote-8); the Rural School Bus Pilot Project[[9]](#footnote-9); and, the Low NOx Engine Incentives[[10]](#footnote-10) are totally misguided in that they fail to address the real needs of the disadvantaged communities as promised in slide 5.

During the Q&A part of the ARB Workshop[[11]](#footnote-11) on April 5 looking to the Cap-and-Trade world post 2020, Ms. Rajinder Sahota was asked by an environmental justice advocate from Richmond whether the use of LCFS fuels in their neighborhoods would lower the emissions of criteria pollutants. Ms. Sahota replied that “the use of LCFS fuels will not, in of themselves, reduce the emissions of criteria pollutants”. I contend that the proposed expenditures of Cap-and-Trade funds for pure LCFS projects in the so-called “disadvantaged communities” is a misuse of the funds and an example of the exploitation of the “disadvantaged communities”[[12]](#footnote-12).

The scientific literature and popular press are replete with morbidity statistics regarding premature deaths from air pollution with the primary culprit being the NOx species. A recent article in the New York Times[[13]](#footnote-13) quoted ARB saying that 7,200 premature deaths per year in California are caused by air pollution. Further, many more cases of debilitating diseases, such as asthma and chronic obstructive pulmonary disease, are laid to NOx exposure.

The adverse health effects of exposure to ambient criteria are particularly exhibited by children with rises in asthma and other bronchotic diseases. The occurrences of respiratory diseases is especially prevalent in the disadvantaged communities in the SCAQMD and SJVAPCD extreme (ozone) non-attainment area[[14]](#footnote-14)s of California. The best and most important health promoting activity which CARB can do is to immediately begin to lower the concentrations of criteria pollutants in these 2 disadvantaged communities. They need relief from ambient NOx, not more diesel trucks running through their neighborhoods powered by bio-diesel.

Less this commentary sound as all gloom and doom, a very recent paper in the Journal of the American Medical Society[[15]](#footnote-15) entitled “Association of Changes in Air Quality with Bronchitic Symptoms in Children in Southern California, 1993-2012” reported some very good news. The paper is based upon 3 large scale studies performed by USC on the health of children (4,602 total population) in the almost 2 decade time period.

As we (recent former Californians) know the air quality in the SCAQMD basin showed dramatic improvements in reduced concentrations of the criteria pollutants including NOx. The ‘decreases in ambient pollution levels were associated with statistically significant decreases in bronchitic symptoms in children. Although the study design does not establish causality, the findings support potential benefit of air pollution reduction on asthma control”.

This study reveals some very good, but not unexpected, news, namely, reduce the irritant and lower the bad impact on children. The deleterious health effects of air pollution are (somewhat, in absence of other evidence) reversible. Clean the air and clear the lungs!

**A Modest Proposal[[16]](#footnote-16)**

A more recent report[[17]](#footnote-17) on the effects on children caused by riding in school buses powered by diesel engines older than 2007 is a major health concern. The article reported that “there are about 250,000 (diesel powered[[18]](#footnote-18)) school buses still on the road that were manufactured before stringent emissions regulations took effect in 2007”.

The article went on to calculate “that replacing one in 10 of these buses, a total of 25,000, would save about 5,000 excess tons of pollution in the first year, and the benefits would continue as long as the buses were on the road. In fact, replacing 25,000 old school buses would eventually make up for the cumulative total of 46,000 excess tons of nitrogen oxides from the polluting Volkswagens”.

“With a new school bus costing about $80,000, this bus-replacement effort would run Volkswagen about $2 billion, around 10 percent of its potential federal liability. We would welcome the company’s replacing even more old buses...it wouldn’t be hard to find thousands of schoolchildren who would benefit from new school buses. As the air pollution expert Dr. Robert J. Laumbach of the Robert Wood Johnson Medical School in New Jersey recently [wrote](http://www.ncbi.nlm.nih.gov/pubmed/26075420)[[19]](#footnote-19), “Efforts to clean up diesel engine emissions from school buses are likely to have tremendous societal benefits.”

There is an alternate approach for reducing the NOx emissions from older diesel engines, which is much more economical. This solution would work for the older buses as well as the 82% of the 875,000 Class 8 trucks currently operating in California that are not compliant with the 2010 standards, see the brief description of American Power Group, below.

Alternative approaches are now reaching the market, and we urge you to take a look at some of them. On the one hand, there is an aftermarket product from XL Hybrids[[20]](#footnote-20) that when retrofitted into place, immediately makes any system into a hybrid vehicle and provides both launch and brake assistance. In most cases this gives an immediate 20% reduction in fuel used, hence corresponding emissions. When incorporated with a new engine, either in new buys, or in power train replacements, it can be combined with a much smaller engine because the torque requirements for launch from a start are taken up by the hybrid retrofit….and in some cases, this change has the effect of enabling not just a smaller engine, but the use of an alternative fuel engine and removing the diesel (high torque) system altogether.

Of course, some demands on the powertrain can only be supported by the use of diesel systems, where high torque and power is required and hence the typical spark ignited alternative fuel engine just can’t provide the output. But there are now other options than that provided by 100% diesel and I would direct your attention to American Power Group[[21]](#footnote-21). This company has developed an aftermarket device, currently EPA certified on almost 500 engines, both pre and post 2010, that uses natural gas and/or renewable natural gas and provides an approximate 10% reduction in carbon footprint, 50% reduction in NOx and similar dramatic reductions in particulate matter. They also have CARB certification for one 2010 and newer engine, with two more pending. The results that they have achieved all come with out any reduction in torque or power, and allows for seamless transfer between fuel sources with rigorous reporting on fuels used for incentives and/or penalty enforcement.

Both of the products these companies offer are relatively inexpensive compared to the alternative prospect of repowering or replacement, and both offer products for certain segments of the market right now, with more on the way.

1. <http://www.calstart.org/Libraries/CalHEAT_Documents/Heavy-Duty_NGV_Roadmap_2014.sflb.ashx> #15 [↑](#footnote-ref-1)
2. Reference 1 #12 [↑](#footnote-ref-2)
3. Diesel Truck Lobby: Comments on slide 77 of the Workshop [↑](#footnote-ref-3)
4. <http://www.dieselforum.org/policyinsider/do-california-s-truck-incentives-yield-results> [↑](#footnote-ref-4)
5. Manufacturing and jobs in California may be the best benefit form Cap-and Trade spending for CVRP. [↑](#footnote-ref-5)
6. Investor Owned Utilities [↑](#footnote-ref-6)
7. Beginning with slide 46 from the April 4 Workshop [↑](#footnote-ref-7)
8. Beginning with slide 52 from the April 4 Workshop [↑](#footnote-ref-8)
9. Beginning with slide 63 from the April 4 Workshop [↑](#footnote-ref-9)
10. Beginning with slide 65 from the April 4 Workshop [↑](#footnote-ref-10)
11. ARB April 5 Workshop on “Ongoing Evaluation of the Potential for Sector-Based Offset Credits in California’s Cap-and-Trade Program [↑](#footnote-ref-11)
12. The letter of the governing law is just flat out wrong here. [↑](#footnote-ref-12)
13. <http://www.nytimes.com/2015/09/29/upshot/how-many-deaths-did-volkswagens-deception-cause-in-us.html> [↑](#footnote-ref-13)
14. These 2 air districts share EPA’s extreme non-attainment category alone in the country. [↑](#footnote-ref-14)
15. JAMA. 2016;315(14):1491-1501. Doi:10.1001/jama.2016.3444 [↑](#footnote-ref-15)
16. With apologies to Jonathon Swift [↑](#footnote-ref-16)
17. <http://www.nytimes.com/2016/01/09/opinion/dirty-school-buses-sick-kids.html?_r=0> [↑](#footnote-ref-17)
18. School districts prefer diesel engines owing to their (relative) economic operation and their longevity, hence, the large population seen for the older buses. [↑](#footnote-ref-18)
19. http://www.ncbi.nlm.nih.gov/pubmed/26075420 [↑](#footnote-ref-19)
20. http://www.xlhybrids.com/ [↑](#footnote-ref-20)
21. http://www.americanpowergroupinc.com/ [↑](#footnote-ref-21)