

September 30, 2014

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Dear Ms. Littaua,

We would like to thank you and your team at ARB for your efforts in carrying out a comprehensive assessment of technologies to reduce greenhouse gas and criteria pollutant from trucks, ships, rail and other segments of the on-road and off-road mobile source sector. Numerous technologies exist or are under development that can dramatically reduce these emissions and put California on track to meet national ambient air quality standards and climate emission goals. Below are some comments in response to the information presented at the workshops ARB held in early September which we hope you will consider as you develop the draft technology assessment report.

Truck Sector

The analysis presented on September 2nd covered a large range of technologies applicable to the truck sector ranging from vehicle technology improvements for combustion engines as well as electrified alternatives including battery electric and fuel cell vehicles. In evaluating these technologies, it will be important to consider how each performs in different applications and vehicle weight classes and to perform a consistent analysis across different technologies for comparison. This type of analysis will be important for informing both possible regulatory policies and for targeting investments in the most effective manner. The technologies should be evaluated for:

- Technology readiness and stage of commercialization
- Applicability of technology to weight class and specific end uses including applications such as urban delivery, drayage, regional-haul, long haul, transit or regional bus, refuse, work truck applications, or others.
- Current emission reduction performance and expectations of future performance
- Infrastructure requirements and barriers
- Technology cost in both the near term and long term
- Estimates of operational costs, savings and cost-effectiveness in both the near term and long term
- Potential for combinations of technologies to offer greater emissions benefits

Similarly, consistent comparison of technologies for the other sectors should also be carried out.

Mode-shifting

In addition to technologies to improve the performance of individual vehicles and equipment, an understanding of technologies to facilitate the movement of freight by more efficient, lower emission modes is also needed. An analysis released by the California Cleaner Freight Coalition in January¹

¹ California Cleaner Freight Coalition, *Moving California Forward: Zero and Low-Emissions Freight Pathways*, 2014. Available at http://www.ucsusa.org/sites/default/files/legacy/assets/documents/clean_vehicles/Moving-California-Forward-Executive-Summary.pdf. For the detailed technical assessment see

showed the potential for reducing emissions by shifting goods movement from trucks to more efficient modes including rail and barge. Importantly, it showed that combining the cleanest barge and rail technologies with mode shift provided the biggest gains. While the potential for mode-shift to reduce emissions is significant, a more comprehensive analysis is needed to identify the technologies and policies needed that would allow for mode-shifting while reducing health risks in communities near freight hubs such as ports and rail yards.

ARB's technology assessment is an opportunity to examine technology solutions that could facilitate mode-shifting and improve emissions. This should include freight shuttle and fixed guideway concepts, piggybacking trucks on rail cars, and technologies to improve efficiency of intermodal shipments to increase competitiveness compared to truck-only shipments.

Rail

In addition to the technologies presented in the workshop presentations, ARB should also include consideration of the [Bombardier electric rail technology](#) in their evaluation.

Marine and Aviation

All marine vessel categories, as well as aviation, should include a projection of emissions out until 2030, as was included in ARB's ocean going vessels presentation. The technology assessment should also include an explanation of the projected trends and an exploration of ways to reduce emissions beyond what is projected. The ocean going vessels presentation, for example, demonstrated reductions in emissions when 2000 emissions are compared with 2030 emissions. However, comparing 2015 projected emissions with 2030 projected emissions demonstrates an increase in PM emissions and a slight increase in SOx emissions. NOx emissions rise from 2000 to 2015, and decline from 2015 to 2030, but the overall reduction from 2000 to 2030 is relatively small. SOx and PM emissions are expected to increase from now until 2030, which complicates efforts to reduce emissions and meet ARB's policy goals. The assessment should explain the factors that created these emission trends, present data on the amount of emission reductions needed to meet policy goals, and explain the technological barriers that have contributed to the disparity between those two emission profiles.

Cross Sector Issues

Timelines for deployment of new technologies were a recurring theme in many of the presentations including ocean going vessels, cargo handling equipment, commercial harbor craft, and trucks. Given the slow turnover of many of these vessels, it will take many years to transform fleets. The commercial harbor craft presentation included a timeline for technology deployment under business-as-usual conditions (no incentives or research & development programs). However, similar timelines for other categories, including marine vessels, were not presented. Including estimates of the business as usual technology deployment timelines consistently across technologies and sectors would be useful in identifying near term and longer term options. Most importantly, ARB should explore accelerated alternative timelines for all the sectors assessed that include research & development programs, more ambitious regulations, and expanded incentive programs to hasten progress toward a cleaner freight system.

http://www.ucsusa.org/sites/default/files/legacy/assets/documents/clean_vehicles/Moving-California-Forward-Report.PDF

To facilitate technology development, ARB staff should also complete a more extensive evaluation of the infrastructure barriers facing zero emission or lower emission technologies presented for each sector. In the marine vessel and aviation technology assessment presentations, ARB staff cited lack of infrastructure as a barrier in developing promising technologies for ocean going vessels and commercial harbor craft. ARB staff described fuel cell technology for commercial harbor craft, liquefied natural gas for ocean going vehicles, and electrification at ports and rail yards for cargo handling equipment as technologies that ARB expects to play an important role in reducing emissions from ports. Staff also described limited fuel cell and liquefied natural gas infrastructure, and the difficulties involved in electrifying cargo handling equipment at ports and rail yards as opposed to distribution centers. Alternative fuels, such as plug-in electric vehicles, fuel cells, and liquefied natural gas technologies will need functional infrastructure to succeed. ARB proactively assessing infrastructure barriers now will help reduce the chances of those barriers hindering development of needed zero emission and lower emission technologies.

Thank you for the opportunity to comment and we look forward to working with you as you finalize the technology assessment this fall.

Sincerely,

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Union of Concerned Scientists

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Earth Justice

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