

# achatesPOWER

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California Air Resources Board

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Submitted via email to [mss@arb.ca.gov](mailto:mss@arb.ca.gov)

RE: Response to Mobile Source Strategy 10/7/2020 Workshop

Dear Mobile Source Strategy Division:

I am writing in response to the Workshop Discussion Draft 2020 Mobile Source Strategy.

Thank you for initiating the discussion and soliciting feedback.

I will address my remarks to the On-Road Heavy-Duty Vehicle market. Even while California seeks to enable electric and hydrogen fuel cell solutions for this application, it is vitally important that California also seek to enable near zero (NO<sub>x</sub>) and low CO<sub>2</sub> solutions for engines operating with diesel and diesel-like fuels.

Because every manufacturer of heavy duty trucks is spending substantial time, effort, and money on electric and hydrogen solutions, they are as a result spending less money on clean diesel and diesel-like solutions. The result could be a flattening of improvement in NO<sub>x</sub> and CO<sub>2</sub> reductions from heavy duty vehicles. To counter this – to sustain significant reductions from this application – CARB should maintain Pilot investments in advanced powertrains through 2024 and perhaps beyond.

I will point to following to support this proposal:

As CARB points out (p43 of the Workshop presentation), heavy duty vehicles contribute 33% of mobile source NO<sub>x</sub> and 16% of mobile source GHG emissions in California.

Battery electric and hydrogen fuel cell are unproven as zero-emissions solutions for long haul heavy duty vehicles. Challenges include: cost and weight of the powertrain solutions; infrastructure availability; refueling time; GHG impact of infrastructure development, vehicle production, and fuel creation. The entire lifecycle cost of the transportation solution has to be considered, as pointed out in The Dirty Secrets of “Clean” Electric Vehicles (Forbes Magazine) (<https://www.forbes.com/sites/tilakdoshi/2020/08/02/the-dirty-secrets-of-clean-electric-vehicles/?fbclid=IwAR02uBGAGchVSRaUR2duat8DEenMgst19kdo3y4QJf6wI98qoR4VdxqDJfU#7c0ec7c2650b>) and in The Battery Car Delusion (The Global Warming Policy Foundation)

(<https://www.thegwpf.org/content/uploads/2020/07/The-Battery-Car-Delusion.pdf#:~:text=%20%20%20Title%20%20%20The%20Battery,Created%20Date%20%20%207%2F29%2F2020%208%3A52%3A16%20AM%20>)

A large number of long haul heavy duty trucks are from out-of-state.

GHG reduction requires a global solution. California may achieve more GHG reduction by enabling a small reduction in the global fleet of trucks than it can by a massive reduction in the trucks used solely in California.

Some (including Bill Gates, here <https://www.gatesnotes.com/Energy/Moving-around-in-a-zero-carbon-world>) suggest that for long-haul heavy duty trucks, using biofuels and electrofuels (perhaps combined with carbon capture funded by taxes on petroleum based fuels) might be the long term solution for zero emissions heavy duty transport. If so, the solution will require ultraclean (to eliminate nearly all NO<sub>x</sub>) and efficient (because of the higher cost of fuel) engines.

Because there is yet no clear solution, California should foster all viable pathways towards truly zero emissions heavy duty long haul transportation, including near zero, efficient engines operating on diesel and diesel-like fuels.

CARB funded CALSTART for an Advanced Technology Heavy Duty Diesel Demonstration, featuring an opposed-piston engine. Measured results from the program shows great potential to meet California's objective for ultralow NO<sub>x</sub> while also reducing CO<sub>2</sub> vs. EPA Greenhouse Gas II requirements. Importantly, an independent cost study concludes that opposed piston engines cost at least 11% less than comparable conventional engines. This means that challenges with pre-buys and requirements for incentives can be considerably eased. The next stage of development is a Pilot of the advanced technology heavy duty opposed piston diesel engine. As noted above, engine manufacturers are reducing investment in advanced diesel technology in order to fund development of electric and hydrogen solutions. Pilot funding from California will enable development of these advanced technology engines to foster a key technology pathway to our sustainable transportation future.

Sincerely



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