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To: Tony Brasil,  
California Air Resources Board

September 26, 2021

**Subject:** Comments on the “Draft Advanced Clean Fleets Total Cost of Ownership Discussion Document”

We appreciate opportunity to submit these comments and suggestions and we hope they will receive due consideration. Wish you good luck.

- **Upfront costs:** The lag assumptions on battery cost seem arbitrary and unwarranted. Additionally, the battery costs in the US have been dominated by cost of NMC/NCA technology whereas LFP emerging as cheaper and longer-lasting alternative. **We suggest using current year prices.**
- **Replacement cost:** A simple calculation suggests the current assumption is too conservative. Using the numbers in the documents, 1050 kWh battery @ 2.1 kWh/mile and 65% DoD (i.e., 35% buffer) it implies 325 miles of range. So, a replacement of battery 300,000 as assumed, essentially means it is being replaced after only 930 cycles, which seems excessively conservative given most batteries are designed for 2000 cycles till max range depletes to 80% of original. Even a 500,000 mile replacement implies 1500 cycles to replacement. Additionally, LFP technologies are expected to last even up to 10000 cycles with proper maintenance. **We suggest a 600,000 miles replacement or higher**
- **Charging costs:** With an average of 300 miles per day and a 1050 kWh battery one actually doesn't need extreme fast charging or highway charging all the time. A more realistic assumption could be that for every highway charging event, there are two depot charging events (start and end point) or to be more conservative 40% of charging at highway and 60% at depots. In this case one needs to take a weighted cost of tariffs one can take advantage of as a retail customer of utilities at warehouses and retail customer of third-party providers. Finally commercial fleets will be able negotiate price discounts based on volume.
- **Hydrogen:** Steeply declining precipitously H2 cost while NG prices are projected to be practically flat needs more justification. It suggests there are massive economies of scale in making H2 and building H2 stations which needs additional evidence. Secondly, LCFS credits only address GHG emissions but H2 from NG will lead to non-GHG emissions which imposes some additional societal costs.

If you have any further questions, please feel free to contact me.

Sincerely,

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