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Submitted Electronically: http://www.arb.ca.gov/lispub/comm2/bcsubform.php?listname=techfuel-report-ws&comm_period=1

RE: **Comments on the California Air Resources Board's Draft Technology Assessment: Medium- and Heavy-Duty Battery Electric Trucks and Buses**

The California Trucking Association (CTA) and the American Trucking Associations (ATA) are pleased to have the opportunity to review and comment on the California Air Resources Board's Draft Technology Assessment: Medium- and Heavy-Duty Battery Electric Trucks and Buses.[1] We appreciate staff's efforts in preparing the assessment and view the draft as a starting point for a discussion of this technology. The following comments reflect the experience and viewpoint of the trucking industry as they pertain to this technology and should be reflected in the assessment.

General Comment: The 5 to 10 year forecasts for battery costs do not indicate that this technology will be cost competitive for medium- and heavy-duty BEVs. In addition, the lack of a standard charging system or approach could result in the duplication or incompatibility of the electrical supply equipment infrastructure; especially when facilities may be asked to provide electrical infrastructure for personal vehicles, work trucks and transport refrigeration units. Currently, all (or nearly all) medium- and heavy-duty BEVs have been deployed as a result of financial incentives. This economic equation is not expected to change in the next 5 to 10 years.

P. ES-4: The assessment cites current battery costs of $500 to $700 per kWh. In comparison, it has been estimated that these costs will need to reach the $200 to $225 per kWh range to be competitive for medium-duty BEVs.[2] While the assessment includes a number of forecasts which project future battery costs, nearly all of these projections exceed this threshold over the 10-year horizon. This perspective should be reflected in the assessment.

[1] CTA serves the commercial motor carrier industry in California and the companies that provide products and services to the trucking industry. ATA is the national trade association representing the American trucking industry and is a united federation of motor carriers and suppliers, state trucking associations, and national trucking conferences.

[2] Electrification Coalition, *EV Case Study: The Electric Drive Bellweather? FedEx Express on Lessons Learned from Global EV Deployments*, http://www.fleetanswers.com/sites/default/files/FedEx_case_study.pdf (2012).

P. ES-5: The cost range cites a basic charger at around $1,000. As noted in previous demonstration, medium- and heavy-duty BEVs will require more power than is provided by AC Level 1 charging.[3] Therefore, this cost estimate for a basic charger is not appropriate for the medium- and heavy-duty BEV assessment.

P. I-2: The use of gasoline to power conventionally-fueled medium-duty vehicles should be noted as an option being used today. This option should be reflected in the emissions discussion and throughout the document.

P. IV-13: Urban delivery vehicles are characterized to be in the "early commercialization stage" in this section while other sections describe them as "limited commercial availability" (p. ES-3) or "nearing early commercialization" (p. VIII-4). The assessment should define what characteristics it is using to assess and define technology readiness.

P. IV-13: We would disagree that medium-duty BEVS will have "widespread penetration into the market place" in the next 5 to 10 years. Rather, given ongoing demonstrations and operational considerations, it is more likely that increased use will be possible over selected routes but these will not constitute widespread penetration.

P. IV-13: The cost of the CEC-funded electric delivery vans of $143,000 are highlighted in the assessment. In contrast, our member companies have stated the current price of an all-electric delivery van ranges from $179,000 to $200,000 compared to a gasoline-powered van at $52,000. The incremental cost difference for these vehicles, including 7% tax on the cost difference, ranges from $136,000 to $158,000. Because of the expense associated with diesel aftertreatment, gasoline-powered vans are now being used for delivery applications. The report should be revised to reflect these updated costs and operational considerations.

P. IV-13: Although the assessment cites no performance or reliability issues with electric delivery vans, both the CEC-funded demonstration (CALHEAT, 2013b) and a New York State demonstration mentions these types of issues.[4] Specifically, the CEC-funded evaluation identified "several E-truck specific issues" and noted that "several issues that made (E-trucks) generally less available than conventional diesel trucks." The New York State demonstration identified maintenance savings and vehicle reliability as two areas that rated as worse than expected. As noted in this demonstration, while the impacts of a less reliable vehicle can be more easily overcome during small demonstration projects, larger volumes necessitates the need for reliable vehicles. The assessment should be revised to expand upon the potential performance and reliability issues reported in these demonstrations.

P. V-3: The assessment highlights a couple estimates of battery pack costs for the light-duty fleet (Ayre, 2015; Andeman, 2014) which are 2-3 times lower than the multi-sourced forecasts

[3] New York State Energy Research and Development Authority, *New York City Green Loading Zone Study* (July 2014).
[4] Electrification Coalition, *ibid.*

contained in Figure V-2. The assessment should provide an explanation of what factors are contributing to the significant differences reflected in these battery cost forecasts.

P. V-8: The payback estimate of 3 to 5 years (WCC, 2011) does not accurately reflect the cost variables associated with medium-duty BEVs. For example, as previously discussed, the current incremental cost of an electric parcel van is nearly double the $69,000 to $86,000 used in the estimate. The payback estimate also assumed $23,000 of financial incentives would further reduce this substantially lower incremental cost. Diesel fuel costs of $4.39/gallon were also assumed which is more than 1.5 times the current California price of diesel and gasoline, which is $2.44/gallon and $2.84/gallon, respectively.[5]

In comparison, the CEC-funded evaluation (CALHEAT, 2013b) found a minimum 5-year simple payback period (SPP) for Class 4-5 parcel delivery E-truck traveling similar mileage but only with incentives of $40,000. For E-trucks traveling fewer miles or without incentives the SPP ranges from 8 to 36 years. The assessment should be expanded to present a more appropriate payback estimate.

P. V-9: In addition to a need for greater standardization, fleets that have tested BEVs expect to spend from $10,000 to $25,000 on infrastructure to supply electricity to each vehicle.[6,7] In addition, limits on the number of vehicles and chargers deployed at each facility are generally instituted to avoid dealing with expensive upgrades to electrical panels or utility infrastructure. In short, a comprehensive infrastructure assessment is needed to gauge the feasibility and costs associated with the further deployment and expansion of electric vehicle supply infrastructure. In addition, consideration and opportunities for achieving faster charging times should be discussed.

P. VII-1: With a range of 100 miles or less, BEVs can only be employed in select applications. These limits provide very little margin for error in terms of travel distances and charge/discharge frequencies. As a result, a higher number of BEVs may be needed to service a given area than would be needed with an alternative technology such as hybrids, for example. This can lead to not only higher costs but also more vehicles in a fleet and on the road. To avoid these types of issues, fleets must be given the flexibility to choose the vehicle technology which best fits their operational considerations.

If you have any questions regarding these comments, please contact us at your convenience.

Respectfully,

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[5] California Energy Commission, *California Gasoline Statistics and Data*, http://energyalmanac.ca.gov/gasoline/ (accessed 1/11/2016).
[6] Electrification Coalition, *ibid.*
[7] New York State Energy Research and Development Authority, *ibid*.

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