BYD Motor Inc.

Build Your Dreams

November 12, 2015

California Air Resources Board
1001 I Street
P.O. Box 2815
Sacramento, CA 95812

Re: Comments on the Draft Technology Assessment: Medium- and Heavy-Duty Battery Electric Trucks and Buses

Dear Chairwoman Nichols and Members of the California Air Resources Board:

Thank you for this opportunity to comment on the draft Technology Assessment: Medium- and Heavy-Duty Battery Electric Trucks and Buses pending before the Air Resources Board ("ARB").

BYD applauds ARB's consistent drive to keep abreast of technological developments, which are evolving at an unprecedented rate. BYD is at the forefront of these innovations and we are confidant that this technology assessment will help the transit market understand the opportunities made possible by advanced battery electric technology.

BYD is an international manufacturer of zero emission light-duty, medium-duty and heavy-duty vehicles. BYD has chosen to locate its North American headquarters in Los Angeles and its North American manufacturing facilities in Lancaster because California is the global leader in advancing a policy agenda that squarely addresses climate change and the dangers it poses for our future. BYD stands ready to do its part to make the emission reduction goals of the ARB and the Governor a reality.

BYD respectfully submits the following technical corrections to the Draft Technology Assessment. For simplicity, the page or table numbers of the Draft Technology Assessment serve as headings and are followed by the suggested correction.

Technical Suggestions

II-2

We suggest the following definitions, which provide greater insight into the chemical processes behind battery electric vehicles (BEVs).

Separator: Permeable insulator that separates the anode and cathode.

Electrolyte: Usually a liquid substance that carries the electrons through the permeable separator from cathode to anode during recharging.

ES-2

The final paragraph of item 3, BEV applications, contains a mistake. The sentence regarding medium and heavy-duty truck deployments references urban vocational work trucks as focused on "urban transit buses and intracity delivery." Urban vocational trucks do not serve the same purpose as urban transit buses.

ES-3

The second paragraph of ES-3 states that Proposition 1B funds can be used to upgrade to BEVs. However, there was no specific allocation for BEVs until the Year 5 funding cycle, which has not yet been awarded. It should also be noted that Year 5 is the final year of Proposition 1B funding.

Table ES-1

The table states that there are three commercially available battery electric transit buses. There are at least ten commercially available battery electric transit buses. BYD has seven commercially available bus models in the U.S. These include four low floor transit models (30', 35', 40' and 60') and three over the road coach models (23', 40' and 45'). It is our understanding that Proterra has two models and New Flyer has one model.

ES-4

It would be worthwhile to mention the recent Multi-Source solicitation and the potential for the commercialization of BEV off-road yard trucks.

ES-5

The paragraph on chargers in Item 7 should also note that infrastructure upgrades must be considered when transitioning to BEVs. These renovations are often more expensive than customers expect, as they incur costs related to grid upgrades and behind the meter upgrades.

ES-6

Item 8 underestimates the cost of BEV drayage trucks. In 2015, the cost should range from $300,000 to $450,000.

Table ES-2

The incremental costs for BYD battery electric buses run between $275,000 and $325,000.

ES-7

Item 9 should also note that BEVs benefit drivers due to reduced vehicle vibration and reduced noise.

Table ES-3

The Table underestimates the cost of BEV drayage trucks. In 2015, the cost should range from $300,000 to $450,000.

ES-10

Another non-battery component that will need to improve is the heater. Heaters consume a significant amount of power and will need to become more efficient.

II-13

The assessment notes "the transmission can be eliminated in some applications where high speeds are not needed." This is not entirely accurate. BYD's in-wheel-hub-motors can achieve highway speeds without inefficient clutches, transmissions or an axle drivetrain.

II-14

The assessment states "wheel hub mounted motors… can prohibit the use of a transmission, which is typically needed to achieve highway speeds." As noted before, BYD's in-wheel-hub-motor solution is able to achieve highway speeds without a transmission.

III-5

The assessment's review of chargers does not paint a complete picture of the available technology. BYD utilizes direct AC charging for its buses using on-board inverters. This solution can achieve charging rates well above Level

3 or DC fast charging. The assessment's description of the limitations of on-board chargers is inaccurate for the same reason.

Table III-1

The table describes Level 3 AC fast charging as "under development." While it is true that SAE has not developed a standard used in the U.S., AC fast charging has been fully developed abroad. In Europe and China, the charger is known as the "GB AC fast charge coupler standard." This standard has been used to charge over 2,500 deployed electric transit buses at 80 kW per bus. For comparison, ChaDeMo Level 3 DC charges at a maximum of 62 kW.

Figure IV-2

The page break should occur before the "Figure IV-2" heading. BYD would like to use the included high-quality image to take the place of the current stock photo.

IV-3

BYD's 40' bus has a capacity of 324 kWh and a range of at least 155 miles.

BYD offers three motor sizes: 90 kW, 150 kW and 180 kW.

The final sentence of the paragraph describing BYD's offerings understates the number of models available. BYD would like to suggest the following language:

"BYD offers four different low floor transit bus models: 30', 35', 40' and 60' articulated buses. The first ten 30' buses are scheduled to begin delivery in November 2015. Orders for the 35' model are pending in and out of California. The 60' articulated bus, the first of its kind, will begin Altoona testing in the beginning of 2016. BYD also offers three battery electric over the road coach options: 23', 40' and 45'. The 23' and 40' coach models have been demonstrated throughout California. The 45' model will begin Altoona testing in early 2016. Every BYD bus includes the charging interface in the cost of the vehicle."

IV-5

The price of the 30' begins at $450,000, not $350,000. It should be noted that the prices listed for BYD vehicles include the cost of charging infrastructure. We are not aware of any other OEMs that incorporate the cost of charging infrastructure into their quoted prices.

Table IV-1

The 40' model has a battery size of 324 kWh. Its motor is available in 90 kW or 150 kW. The charge time is 2-4 hours with a range of 155+ miles. The asterisk on the charge time for the 40' should assume an 80 kW charger, not a 60 kW charger.

The range on the 60' model is 200+ miles.

Table IV-2

An asterisk should be added noting that BYD has another 20 additional options under the LA Metro contract.

IV-13

The assessment cites a CEC report stating that no "performance or reliability issues have been reported to date" in reference to medium-duty EVs. This is not entirely true, as UPS has elected to not utilize funds to purchase additional trucks because they have experienced issues with electric motors.

IV-17

BYD recommends including a paragraph on weight considerations with respect to drayage trucks. Batteries capable of achieving 100-mile range add approximately 5,000 lbs., directly reducing the truck's payload and limiting commercialization. Exceptions to the weight restriction are important for long-term adoption.

Table V-2

The Table underestimates the cost of BEV drayage trucks. In 2015, the cost should range from $300,000 to $450,000.

V-10

The "Smart Grid" heading mentions time of use charging as a way to reduce fuel costs for BEVs. It should also address demand charge exceptions, which will be critical for the implementation of DC and AC fast charging.

The "Vehicle to Grid" heading should note that BYD is the only OEM with bi-directional inverters *on-board* its transit buses, allowing its buses to act as mobile generators. V2G capability is standard on all BYD buses.

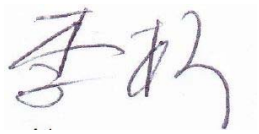
VIII-2

Although technology transfer from light- to medium- and heavy-duty applications is difficult, there is ample opportunity to move from one heavy-duty application to another. For example, the drivetrain that powers a battery electric bus can also power a battery electric drayage truck. The same components are used in both applications, easing the transition.

Conclusion

The Draft Technical Assessment will go a long toward raising market awareness of the mature state of zero emission bus technology. California, more than any other state, has both the ambition and ability to make transformative progress. We are pleased to support ARB as it seeks to meet the state's GHG emission reduction goals and would be pleased to meet with interested ARB Board Members to discuss our ideas in greater detail. Please do not hesitate to reach out to me (stella.li@byd.com) or Mark Weideman at the Weideman Group (mark@weidemangroup.com).

Sincerely,



Stella Li
President
BYD Motors, Inc.