STATE OF CALIFORNIA
AIR RESOURCES BOARD

Proposed Advanced Clean Truck Regulation; Initial Statement of Reasons	**)**	**Hearing Date: December 12, 2019**

COMMENTS OF THE TRUCK AND ENGINE MANUFACTURERS ASSOCIATION

December 9, 2019

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Introduction

The Truck and Engine Manufacturers Association ("EMA") hereby submits its comments in opposition to the Proposed Advanced Clean Trucks (ACT) Regulation, which the California Air Resources Board (CARB) released for public review, along with CARB Staff's Initial Statement of Reasons (ISOR), on October 22, 2019.

EMA is the trade association that, among other things, represents the interests of the world's leading manufacturers of heavy-duty and medium-duty on-highway vehicles and engines. Those vehicles are the subject of the pending ACT Regulation. Accordingly, EMA has a direct and substantial interest in this rulemaking.

EMA's members are investing billions of dollars to develop zero-emission technologies for the heavy-duty market and support expanding the market. But, as detailed below, the Proposed ACT Regulation is not ready for adoption. In essence, CARB's pending ACT proposal would put the cart before the horse by mandating that manufacturers sell an increasing percentage of zero-emission heavy-duty and medium-duty vehicles (ZEVs), without first ensuring that the requisite ZEV recharging infrastructure and ZEV-purchasing requirements will be in place. Until those two critical legs of what should be a three-legged rulemaking are established, the Proposed ACT Regulation is likely to collapse. Simply stated, commercial vehicle manufacturers will not be able to sell, on an economically viable basis, an increasing number of ZEVs unless a robust ZEV infrastructure is assured and in place, and unless a sufficient number of commercial vehicle fleets in California are required to purchase ZEVs on a similarly increasing-percentage basis. Without those two prongs of what needs to be a three-pronged regulatory paradigm for widespread ZEV deployment, vehicle manufacturers will be faced with unacceptable costs and market risks, and may be compelled to reduce their sales into the California market, or abandon that market altogether. That adverse result becomes even more likely when the costs, burdens and market disruptions of CARB's anticipated and contemporaneous Omnibus Heavy-Duty On-Highway (HDOH) Low-NO_x Regulations are factored in.

In light of the fundamental shortcomings of the Proposed ACT Rulemaking, the Board should not adopt the current proposal. Instead the Board should direct CARB Staff to develop a more strategically focused rule that: (i) couples fleet-and-application-specific ZEV sales mandates with fleet-and-application-specific ZEV purchase mandates; (ii) includes provisions and financial incentives to cover the increased marginal cost of ZEV trucks and to ensure the timely development and installation of the requisite ZEV infrastructure; and (iii) better coordinates, and takes into consideration, the parallel and compounding adverse impacts of both a HDOH ZEV sales mandate and a contemporaneous "omnibus" HDOH ultra-low NO_x rule.

The Fundamental Challenges at Issue

In evaluating the merits of the Proposed ACT Regulation, it is important to note, as an initial matter, that commercial trucks and the commercial truck market are not analogous to the passenger car market. The size of the respective markets, the nature of the respective motor vehicle products, and the needs of the respective motor vehicle purchasers are fundamentally different.

The passenger car market in California covers more than 30 million vehicles, with annual sales volumes approaching one million. In sharp contrast, the data presented in the ISOR show that annual sales of heavy-duty trucks (Classes 4-8) in California total less than 20,000 units. (ISOR, p. IX-4.) Thus, when the aggregate costs of transforming the medium-duty and heavy-duty truck market into a ZEV-based market are considered, the relatively small size of the relevant commercial vehicle market cannot be overlooked. Unlike the passenger car market, there is a very limited number of trucks to which the very substantial costs of a market-wide ZEV-sales initiative could be allocated. And, compounding that fundamental problem in this instance, those substantial market-wide costs will need to be absorbed and recouped in the same time frame that manufacturers will be forced to absorb and recoup the substantial market-wide costs associated with CARB's anticipated Omnibus Low-NO_x Rule. Thus, the prospects for truck manufacturers to generate any profits on the mandated sale of medium-duty and heavy-duty ZEVs are, at best, remote, especially in the absence of corresponding ZEV-purchase mandates.

Similarly, the nature and utilization of commercial trucks are markedly different from passenger cars. Commercial trucks are built to highly detailed specifications for a very broad range of unique applications, including, to name a few, contractor pickup trucks, parcel delivery vans, pickup and delivery trucks, concrete mixers, dump trucks, bucket trucks, garbage trucks, fire trucks, ambulances, regional freight tractors, and line-haul tractors. Commercial vehicle manufacturers need to be able to meet all of those varying customer needs and produce all of those highly specialized vehicles, while still generating a profit. The product planning, manufacturing process, array of vehicle platforms, production schedules, and product distribution and services functions, again, are nothing like the passenger car industry where the volumes are orders-of-magnitude higher and the range of customer needs and vehicle applications is far narrower. Consequently, while the passenger car market potentially can spread vehicle development costs over literally millions of cars, thereby more readily preserving per-product profit margins, the commercial truck market presents no opportunity to do so. The low product volumes and the high number of different commercial vehicle applications make a unilateral, broad-based and naked ZEV sales mandate inherently impractical.

The needs of commercial vehicle purchasers also are fundamentally different from car-buyers. Commercial trucks are capital assets acquired for specific commercial purposes to help derive profits from specific commercial enterprises. They are amortized over longer time periods than cars, and they are assessed, not with regard to the subjective criteria of style and comfort, but solely on the objective basis of performance capability and cost-efficiency. Thus, truck purchasers' decisions turn on detailed up-front assessments of a truck's utility for the job at hand, and its purchase price, durability, operating costs, and resale value. To the extent that new vehicle technologies or regulatory controls impact those criteria — as in the case of a broad-based regulatory mandate for the sale of ZEV trucks — truck purchasers will alter their purchase patterns and choices, especially in the absence of substantial incentives to cover the increases in the

purchase price and operating costs of ZEV trucks.

Putting all of this together, it becomes clear that the pending ACT Proposal, with its market-wide unilateral mandate for the sale of ZEV trucks, will create very significant adverse market disruptions, unless the Proposal is modified in substantial ways. Without those necessary changes to the Proposal, truck manufacturers will be forced to incur very significant per-vehicle costs to design, test, and manufacture a broad array or ZEV trucks, with no assurance that truck-buyers would elect to assume those significantly increased costs through ZEV purchases, and with insufficient volumes to recoup any meaningful return on their overall investments in the development of ZEV technologies.

The fundamental challenges associated with the Proposed ACT Regulation are compounded even further by CARB's other anticipated and contemporaneous rulemaking for commercial trucks — CARB's Omnibus Low-NO_x Rulemaking. That rulemaking will apply to manufacturers of traditionally-fueled commercial vehicles, and will entail new low-NO_x tailpipe standards, new low-load and in-use testing requirements, extended useful life and warranty provisions, and enhanced vehicle-recall liability. As it stands, commercial vehicle manufacturers would be forced to face the significant technical challenges and costs of that "omnibus" rulemaking (which will take effect in the 2024 model year (MY)) at the exact same time as the ZEV sales mandates would kick in.

The sales volumes and market demands applicable to commercial trucks in California likely cannot accommodate one sweeping regulatory program, much less two at the same time. Consequently, to the extent that CARB continues down its current two-track regulatory path for medium-duty and heavy-duty vehicles, there is a very real chance that manufacturers will be forced out of the California market, not by choice, but by the compounding mandates of CARB.

There is a better path. First, the pending ACT Regulation and the Omnibus Low-NO_x Rule should be coordinated to better assess the combined aggregate costs and feasibility issues. Second, with due regard to the production volumes that inherently constrain what can be done, specific commercial-truck fleet types and applications should be identified and prioritized for a more focused and optimized introduction of ZEV trucks. Third, the sales mandates directed at those prioritized fleet applications ("beachhead" markets) should be coupled with corresponding ZEV purchase mandates applicable to the operators of the target fleets of commercial trucks. Fourth, significant incentive funds should be identified and deployed to construct the necessary ZEV infrastructure for the covered fleets and to reimburse fleet operators for the increased marginal costs of purchasing and operating ZEV trucks. And fifth, given what will be the shrinking size of the remaining market for diesel-fueled trucks, the Omnibus Low-NO_x Rule should be scaled back substantially to allow for a cost-effective and growing transition to medium-duty and heavy-duty ZEV technologies.

Summary of the Proposed ACT Rule

The Proposed ACT Rule is centered around a mandate that medium-duty and heavy-duty vehicle manufacturers — manufacturers of vehicles with a gross vehicle weight rating (GVWR) greater than 8,500 pounds — produce and sell into California an increasing percentage of ZEVs, calculated on the basis of the manufacturers' overall sales of medium-duty and heavy-duty vehicles

in California. In essence, "affected manufacturers would incur deficits for each vehicle sold into California starting with the 2024 MY that must be met with credits generated from producing and selling ZEVs or NZEVs into California starting in the 2021 MY." (ISOR, p. III-8.) The ZEV sales mandates would increase annually until the 2030 MY, as follows:

Table III-1: ZEV Sales Percentage Schedule

Model Year (MY)	Class 2b-3 Group*	Class 4-8 Group**	Class 7-8 Tractor Group
2024	3%	7%	3%
2025	5%	9%	5%
2026	7%	11%	7%
2027	9%	13%	9%
2028	11%	24%	11%
2029	13%	37%	13%
2030 and beyond	15%	50%	15%

*Excludes pickups until 2027 MY
**Excludes Class 7-8 Tractors, Includes Yard Tractors

The ZEV credit values that would be used to offset non-ZEV sales would be scaled based on vehicle weight classes to account for the higher emissions associated with larger vehicles, and "to keep credits and deficits approximately equitable from an emissions standpoint." (ISOR, p. III-9.) The specific proposed weight-class credit modifiers are, as follows:

Table III-2: Weight Class Modifiers

Weight Class	Class 2b-3	Class 4-5	Class 6–7*	Class 7 Tractors and All Class 8
Weight Class Modifier	0.6	1	1.5	2

*Excludes Class 7 tractors

Limitations would be placed on the use of ZEV credits. In particular, only Class 7 and 8 tractor credits could be used to satisfy the Class 7 and 8 tractor deficits, and all ZEV credits would have a limited lifetime before they would expire. Credits could be generated, banked and traded starting in the 2021 MY, but the means for generating such early credits appear to be largely illusory.

The Proposed ACT Regulation Is Not Supported by Data or Well-Reasoned Analysis

Beyond its fundamental challenges, as noted above, the Proposed ACT Regulation appears, in part, to be an exercise in wishful thinking, and threatens to re-create the decades-long difficulties and market disruptions that CARB encountered through its passenger car ZEV sales mandates.

All stakeholders recognize that there are three core elements to a viable ZEV program for commercial trucks: (i) a well-funded, widespread and assured infrastructure for the prompt and efficient recharging and service of heavy-duty and medium-duty ZEVs; (ii) fleet-and-application-specific purchase mandates (which could and should be incentivized) to ensure that a sufficiently

large market exists for ZEV trucks (which will have significantly higher purchase prices, and so might not be acquired by fleet operators in the absence of mandates); and (iii) correspondingly-scaled production mandates to ensure that commercial vehicle manufacturers have ZEVs available in sufficient varieties and numbers to meet the specific market segments and applications covered by the ZEV purchase mandates.

The Proposed ACT Regulation includes only one of those three core elements, and so amounts to an inherently flawed proposal. Any assembly that requires three integrated pieces cannot be built with just one piece. In this instance, vehicle manufacturers will find it difficult if not impossible to incur the very significant costs of developing, testing and manufacturing commercial ZEVs in the absence of an assured ZEV infrastructure and an assured ZEV market. Again, a three-legged stool with only one leg is difficult to sit on. Consequently, until CARB Staff is prepared to propose a thoroughly vetted (and sufficiently funded) three-element ZEV rulemaking for commercial vehicles, the pending rulemaking, which pertains to only one element, should not be adopted.

Beyond its elemental shortcomings and challenges, the Proposed ACT Rule lacks a sufficient basis in data or robust market analysis and projections. Rather, the ISOR includes multiple aspirational statements, with citations to various Executive Orders and legislative targets for addressing climate change. That compendium of good intentions does not amount to a sufficient rulemaking record.

Representative examples of CARB Staff's hopeful but unsubstantiated assertions in support of the Proposed ACT Regulation are as follows:

- Over time, projected price reductions and continued zero-emission technology improvements will allow the ZEV market to expand broadly throughout the trucking sector. (ISOR, p. I-1.)
- Longer range ZEVs are expected to become available as technology continues to improve. (ISOR, p. I-10.)
- The Proposed ACT Regulation would provide certainty for manufacturers to make investments today to produce increasing numbers of ZEVs, . . . and also would foster a self-sustaining zero-emission truck market through increasing sales of zero-emission trucks and buses in California. (ISOR pp. II-7 and II-8.)
- The Proposed ACT Regulation will increase the number of ZEVs deployed, which will in turn increase the amount of electricity supplied by utility providers. (ISOR, p. V-2.)

There are no actual objective data or studies in support of any of the forgoing claims. To the contrary, CARB's history of imposing aggressive ZEV sales mandates on the passenger car industry, without adopting companion purchase mandates or ZEV infrastructure requirements, demonstrates that unilateral sales mandates for medium-duty and heavy-duty commercial ZEVs in all likelihood will not succeed on the timeline that CARB has assumed.

CARB correctly identified that it is essential for a commercial vehicle buyer to accurately calculate the total cost of ownership (TCO) and predict a return on the capital investment before they will purchase a new vehicle. However, the assumptions that CARB uses to assess TCO of

battery-electric medium- and heavy-duty vehicles fail to fully recognize the importance of battery capacity for work trucks and overestimate the benefits of available government incentives. Regarding incentives, a fleet that is considering converting all its trucks to ZEVs over time will need to be able to predict the TCO of ZEVs over many years, likely more than a decade. To ensure a return on the purchase price investment, the fleet must consider (i) up-front purchase price, (ii) operational and maintenance costs, (iii) infrastructure costs, (iv) electricity costs, and (v) resale value. Before considering incentives in that calculation, a fleet would need adequate assurances from the government that the incentives will be available over the time it takes to convert the entire fleet to ZEVs. Without that assurance, a fleet likely will not be able to factor in incentives when calculating whether it makes financial sense to begin converting its fleet to ZEVs.

With respect to battery capacity, the TCO analysis for Class 7-8 ZEVs assumes a configuration that has a daily range of only 140 miles. To meet that range the ZEV utilizes a 400 kWh battery pack and would cost $64,312 more than a conventual vehicle. However, in tractor applications, which the ACT rule would specially mandate, even a regional tractor will typically operate more than 300 miles per day. To achieve a 300-mile range, the ZEV would need a 740 kWh battery pack. Assuming $200/kWh cost for the battery pack and 2.1 kWh/mile for the added range, the incremental cost to the buy a ZEV tractor would more than double to over $131,000 above the cost of a conventional tractor. That staggering up-front purchase price increase for a ZEV, to perform the same work as the tractor it replaces, still does not take into account the charging infrastructure costs, electricity costs, battery replacement costs, or loss of residual value.

Even with the overly-optimistic assumptions in CARB's TCO calculator, a conventional Class 2B-3 pickup trucks still is less expensive to operate than a ZEV pickup in the 2024 through 2030 timeframe. When CARB's assumptions are corrected to maintain the towing and hauling capacity that are deciding factors in the purchase of a Class 2B-3 pickup truck, the battery size increases 2.5 times. Using the TCO calculator default assumptions with the increased battery size, a Class 3 pickup truck would cost $32,000 more than a conventional truck (a 66% increase).

A deep source of real-world insight into what it takes to deploy zero-emission commercial vehicles exists in programs such as the extensive Low Carbon Transport Heavy-Duty Pilot and Demonstration Projects and the Zero- and Near Zero-Emissions Freight Facilities Project. CARB has invested hundreds of millions of dollars in those projects to test zero-emission commercial vehicles in select market applications, and the data from the projects hold the solutions to the challenges of the development of self-sustaining beachhead ZEV markets. However, but for a few passing comments in the ISOR, CARB Staff choose to ignore the real-world data from those projects and how that rich dataset could be used to create a well-reasoned rule.

Tellingly, the only actual data that CARB staff point to in their ISOR is a zero-emission truck market assessment that EMA prepared. (See ISOR, Appendix E.) But the results and conclusion from that assessment do not support a market-wide sales mandate for ZEV trucks. Rather, the conclusion from that assessment is that there are a limited number (approximately seven) of specific prioritized commercial truck-fleet applications that should be targeted for near-term ZEV deployment through a comprehensive program of purchase and sales mandates, and substantial investments in ZEV infrastructure. Thus, the "updated" market assessment that CARB has appended to the ISOR does not, in fact, make the case for the pending ACT proposal.

Significantly, CARB knew as much when it first considered the adoption of mandates for medium-duty and heavy-duty ZEVs. In CARB's 2016 "Mobile Source Strategy" and its related State Implementation Plan (SIP), CARB targeted "last-mile delivery" fleets as best suited for an initial ZEV truck regulatory program. (See ISOR, p. I-1.) That type of targeted fleet-application program, which EMA has recommended, could be made to work. In contrast, CARB's subsequent expansion of its ZEV truck program to encompass the entire medium-duty and heavy-duty market through unilateral sales mandates will not work, and may well undermine the developing market for ZEVs due to its significant overreach. To avoid that likely negative outcome, CARB should return to the application and fleet-specific approach that it first envisioned for a commercial vehicle ZEV program.

EMA and its members have over the past two years consistently and constructively pointed out to CARB the flaws in a unilateral ZEV sales mandate for the commercial vehicle sector. In addition to the concerns we have shared, we have read and endorse the recommendations in an August 2019 paper titled *Issues Concerning the ARB ZEV Truck Mandate Proposal,* by independent researchers Miller, M. & Burke, A., at the University of California, Davis. (The paper was provided to CARB and copies are available from the authors upon request.) The paper makes detailed findings on issues with CARB's proposal, including (i) increased ZEV purchase prices and maintenance costs, (ii) significant charging infrastructure investments needed, (iii) uncertainty of Low Carbon Fuel Standard credits over time, (iv) ZEV operational issues for fleets, (v) lack of ZEV availability across the broad vehicle categories included in the mandate, and (vi) strategies fleets will use to avoid purchasing unprofitable ZEVs.

Multiple Obstacles Are Likely to Prevent the
Effective Implementation of the Proposed ACT Regulation

To their credit, CARB staff do mention in their ISOR the very real issues that are significant obstacles to the successful implementation of the Proposed ACT Rule. Among those issues are the following:

- Large manufacturers have been absent from the ZEV market until recently, and have refrained from investing significant amounts of capital in ZEV trucks because of the uncertainties relating to the longer-term market and due to the substantially estimated higher costs. (ISOR, pp. I-7, I-8 and IX-29.)

- ZEV trucks are not suitable for towing heavy loads, and ZEV technologies have inherent characteristics that may be detrimental to certain commercial vehicle applications. (ISOR, pp. I-9 and I-16.)

- ZEV trucks have a higher curb weight (e.g., battery packs can weigh 8,000 pounds), less cargo space, and higher near-term cost than conventional commercial vehicles. (ISOR, pp. I-11.) Although this, in and of itself is detrimental to the market, it also incurs other problems. For example, many vehicles are built to GVWRs that don't exceed 26,000 pounds so the drivers do not require a Commercial Driver's License, that as a ZEV may need to exceed that GVWR threshold to perform the same work, and thus would require licensed drivers – increasing fleets' operating costs. Similarly, many vehicles are built with a GVWR that does not exceed 33,000 pounds so they are not subject to the 12 percent

Federal Excise Tax that as a ZEV may exceed that threshold – increasing fleets' acquisition costs.

- The ACT Proposal would require extensive development and installation of high-powered charging and hydrogen-refueling stations. That in turn will require site assessments, extensive and time-consuming local and state permitting processes, agreements with utilities, construction of additional electrical infrastructure, and related planning and build-outs, all at very significant expense. (ISOR, pp. I-14 and I-15.)

- Currently, differing types of charging stations are being deployed and utilized, and there is no common SAE charging standard, which could lead to stranded infrastructure investments. (ISOR, p. I-17.)

- Manufacturers would bear the considerable risks associated with the incremental costs related to the design, production and sale of ZEVs, especially when compared to compliance strategies that depend on modest improvements in conventional truck technologies. Manufacturing ZEV trucks requires large upfront costs that go into research and development, prototyping, assembly-line upgrades and tooling, and other cost categories, including increased component costs. (ISOR, pp. IX-2, IX-29 and IX-31.)

- The absence of a ZEV purchase mandate means that manufacturers bear the risk of having to sell ZEVs below cost to meet the requirements of the Proposed ACT Rule. (ISOR, p. IX-31.)

- Staff estimates that the batteries of a ZEV would need to be replaced every 300,000 miles and compares that to an 850,00-mile useful life for a heavy-duty diesel engine. (ISOR, IX-23). Using those estimates, a fleet would have to completely replace the batteries of ZEV twice before it would need to rebuild the diesel engine of a conventional truck. Such a comparison highlights that a diesel engine will initially last much longer, and by performing a relatively inexpensive rebuild the fleet can further extend the return on its investment in a diesel engine.

- While not identified in the ISOR, ZEV purchase incentive funding that exists today may not be available tomorrow. For example, funds for the fiscal year 2019-2020 Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP), that provides the primary source of purchase incentives for ZEV trucks, already are exhausted and future purchase incentives have been put on hold pending identification of a new funding source.

- Additionally, not mentioned in the ISOR is the prevalence of wildfires in California, and the attendant extensive Public Safety Power Shutoff (PSPS) events that further enhance the multiple uncertainties that impede the development of a robust ZEV market and infrastructure for commercial vehicles. The utilities proposed long-term solutions to avoid PSPS events is to harden the infrastructure, clear vegetation around hundreds of thousands of miles of transmission and distribution lines, increase inspection frequency, increase energy storage, and deploy microgrids. The costs of those solutions must be passed on to ratepayers, creating further uncertainties for fleets attempting to calculate the life-cycle costs of operating ZEVs.

There is no evidence in the record relating to this rulemaking that any of the foregoing obstacles and challenges will be overcome in a manner sufficient to allow for any type of cost-effective implementation of the pending ACT proposal. Consequently, and as already noted, the Board should direct staff to make substantial revisions to the proposal to narrow its scope, provide for corresponding purchase mandates and incentives, include adequate assurances of a robust and widespread ZEV infrastructure, and incorporate a more modest low-NO_x program for conventionally-fueled vehicles.

The ACT Proposal Will Not be an Effective
Means to Address Nearer-Term Ozone NAAQS Attainment Issues

One asserted justification for the Proposed ACT Regulation is that it will help to achieve California's criteria pollutant requirements, including the national ambient air quality standard (NAAQS) for ozone. (ISOR, pp. ES-I, ES-5 and Section VI.) That is unlikely.

As stated in the ISOR, the NO_x reductions from the Proposed ACT Regulation are projected to be 5 tons per-day (tpd) on a statewide basis as of 2031. (ISOR, p. VI-1.) However, in order to reach attainment with the 2024 ozone NAAQS (of 80 ppb) in the South Coast Air Basin (SoCAB), additional NO_x reductions of 108 tpd will be required by 2023. Even greater NO_x reductions (on a tpd basis) will be required to achieve the 2031 ozone NAAQS (of 75 ppb) in the SoCAB. The 5 tpd NO_x reductions potentially resulting from the ACT Regulations as of 2031 — statewide reductions that likely scale to only 2 tpd of NO_x in the SoCAB — do not address either the non-attainment issues facing the SoCAB in 2023 or thereafter. To the contrary, as stated in the SCAQMD's recent Draft Final Contingency Measure Plan, "without considerable emission reductions from sources under federal control, the South Coast Air Basin will not be able to reach attainment in 2023 or the subsequent attainment dates for other air quality standards." (Id. at p. 38.) Accordingly, the Proposed ACT Regulation is not a relevant control measure for achieving attainment with the ozone NAAQS in the SoCAB on the applicable timeline, and so cannot be justified on that basis.

Moreover, adoption of the proposed ACT Regulation is just as likely to worsen NAAQS-attainment concerns as it is to ameliorate them. As the ISOR notes, "it is possible that manufacturers may shift sales for new California-bound trucks out of state to avoid the requirements of the Proposed ACT Regulation, which would consequently reduce overall projected emission reductions." (ISOR, p. IX-32.) That possibility becomes much more of a likelihood when CARB's anticipated "Heavy-Duty Low-NO_x Omnibus Regulation" is considered. As noted, the "multi-pronged" requirements under that regulation — including lower tailpipe NO_x standards, a new low-load test cycle, longer emission durability and warranty requirements, new in-use standards, and other measures — "will go into effect at the same time the Proposed ACT Regulation will begin to require ZEV sales." (ISOR, pp. 1-12 and III-14.)

Thus, one likely possibility from the adoption of the Proposed ACT Rule, when coupled with the significant burdens and costs that manufacturers will face under the contemporaneous Low-NO_x Omnibus Regulations, is that some number of medium-duty and heavy-duty engine and vehicle manufacturers may choose to exit the California market in advance of the 2024 MY. Irrespective of that reasonably foreseeable outcome, customers likely will pre-buy current technology vehicles and engines, and fleet operators will retain their older trucks for longer time

periods than currently anticipated. The net result would be an increase in NO_x emissions from the assumed baseline, not a decrease. The Board should give due consideration to this important adverse consequence of the proposed regulations.

The Proposed ACT Regulation Fails to Provide Sufficient Leadtime

The Proposed ACT Regulation is scheduled to become a fully-adopted and final rule in late 2020, perhaps even later than that depending on when California's Office of Administrative Law approves the rulemaking. Thus, the Proposed ACT Regulation, which will take effect in the 2024 MY, will provide less than four-years of leadtime before its implementation.

In order to implement the Proposed ACT Regulation, which would establish new emission standards for new motor vehicles, CARB must seek and obtain from U.S. EPA a waiver of federal preemption under the Clean Air Act. (See 42 U.S.C. § 7543(b).) One of the necessary prerequisites to EPA's granting a preemption waiver is that the California standards at issue must be consistent with section 202(a) (42 U.S.C. § 7521(a)) of the Clean Air Act. That referenced section, among other things, requires a minimum of four full years of leadtime before new heavy-duty vehicle emission standards can take effect. Accordingly, since the Proposed ACT Regulation does not satisfy that necessary leadtime prerequisite under the Clean Air Act, it would be invalid under federal law.

Specific Comments on the Provisions of the Proposed ACT Regulation

As noted, EMA urges the Board to withdraw and reconsider the Proposed ACT Regulation in a manner than is consistent with the foregoing comments and concerns. However, should the Board elect to approve the Proposed Regulation, EMA has the following specific comments regarding the draft regulatory language:

1. **Off Ramps.** CARB should add regulatory language that would suspend the manufacturer sales mandates in advance of their 2024 implementation if the commercial vehicle marketplace in California is not ready to effectuate those sales. Stated differently, CARB should add "off-ramps" that would suspend the ZEV sales mandate if adequate fleet-rule purchase mandates and ZEV infrastructure installations are not in place by 2024 (*i.e.,* the other two legs of the three-legged stool). The adequacy of the off-ramps for the sales requirements must take into consideration the volume of ZEVs required by the anticipated future fleet-purchase mandates and any off-ramps in that corresponding purchase-mandate rule. Additionally, the sales requirement off-ramps should be further refined to provide unique provisions for each weight class category (*i.e.,* Class 2B-3, Class 4-5, Class 6-7, Class 8, and Class 7-8 tractors).

   EMA recommends including the following specific off-ramps in proposed § 1963.1:

   A. **Purchase Mandate by 2022.** Fleet rules must be in place by 2022 that require ZEV purchases in 2024 in quantities that exceed the number of ZEVs that traditional vehicle manufacturers are mandated to sell plus ZEVs sold by new market entrants and low-volume manufacturers.

B. **Infrastructure by 2023.** Robust charging infrastructure elements for commercial vehicles must be in place by 2023, or scheduled for completion by 2024, to support the number of ZEVs that traditional vehicle manufacturers are mandated to sell, plus ZEVs sold in 2024 by new market entrants and low-volume manufacturers, plus ZEVs already in service. The chargers must be "Level 2 or 3" and located at fleet terminals, and with expansion plans so they can meet the needs of more ZEVs.

2. **Tractor Deficits.** CARB should remove the restriction in § 1963.3(e) and allow a manufacturer to use *truck* credits to make up *tractor* deficits.

3. **Deficit Make-Up**. CARB should extend the requirement in § 1963.3(b) so a manufacturer must make up a deficit within three model years, like the GHG rule at 40 C.F.R. § 1037.745(e).

4. **Credit Life.** CARB should extend the credit lifetime in § 1963.2(g)(2) to allow ZEV credits to be used for five model years after the year in which they are generated, like the GHG rule at 40 C.F.R. § 1036.740(d).

5. **Credit Retirement Order.** CARB should modify § 1963.3(c) to allow manufacturers more flexibility in using credits before they retire.

6. **Sales Reporting.** CARB should modify § 1963.4(a) to clarify that manufacturers must report by March 31 following the end of each model year.

7. **All-Electric Range Determination.** CARB should modify § 1963.2(b)(1) by adding language to clarify that manufacturers may determine "all-electric range" in the same manner as GHG certification, including the test procedure.

8. **Deficit Calculation.** CARB should modify § 1963.1(a)(1)(B) to clarify how deficits are calculated, specifically whether they are calculated per vehicle or across all sales.

9. **NZEV Credits.** CARB should remove the restriction in § 1963.2(b) that eliminated the generation of NZEV credits after 2030.

Conclusion

Medium-duty and heavy-duty commercial trucks are not simply big cars. They are capital investments used by business entities to help generate profits from specific business operations. Thus, detailed calculations of upfront purchase costs and ongoing operating and fueling costs, including any fuel-infrastructure costs (and the certainty and predictability of those costs), will dictate whether a given commercial vehicle is purchased or not. Commercial vehicle and fleet operators need highly-specified trucks to perform the specific work at issue, and require predictable costs and long-term reliability assurances before converting to a new vehicle technology platform.

In addition, commercial trucks, unlike passenger cars, are highly varied and customized to perform myriad functions in myriad applications, all in an efficient, durable and cost-effective manner. Those multi-various trucks will operate over different types and lengths of routes, under

different conditions, carrying different payloads, towing different cargo, and engaging in different patterns of stop-and-go behavior. While some of those highly variable vehicle applications could allow for the targeted introduction of ZEVs (assuming suitable corresponding purchase mandates, infrastructure assurances, and incentives), many applications would not. In some cases, fleets would need to purchase more than one ZEV to replace a single traditionally-fueled truck, due to limited range that a ZEV can operate between charges, the dwell time needed to recharge, and/or lower freight carrying capacity due to the additional weight of the batteries.

The net result is that commercial vehicle fleet operators and small business owners are unlikely to acquire ZEVs in any appreciable numbers until they are proven to be profitable over their useful lives in the particular application(s) of concern to the fleet operator. That includes providing fleet operators with sufficient up-front assurances of ZEVs' suitability, reliability, durability and cost-effectiveness, as well as the certainty of a readily available and affordable ZEV recharging/refueling infrastructure. Unilateral across-the-board ZEV sales mandates imposed broadly on commercial vehicle manufacturers will not provide the requisite assurances of profitability to vehicle fleet operators, and will not drive a viable ZEV market for commercial trucks.

At the same time, across-the-board ZEV sales mandates, especially when coupled with the additional burdens of CARB's Omnibus Low-NO_x Regulations, could compel some number of commercial vehicle and engine manufacturers to exit the California market. Under the current ACT Proposal, manufacturers would be forced to incur the massive costs of designing, testing and producing some relatively small number of ZEV trucks for a wide range of potential applications without any assurance whatsoever that their ZEV vehicles would be purchased in sufficient numbers to generate any profit, and without any assurance whatsoever that the requisite widespread ZEV infrastructure would be in place. Some manufacturers may elect not assume those costs and risks.

Given the foregoing, one potential outcome of the Proposed ACT Regulations is that commercial vehicle and engine manufacturers may be forced to abandon the California market, and fleet operators will "pre-buy" larger numbers of current-technology, while they retain their older vehicles longer than they otherwise would have. The ultimate impact of that reasonably foreseeable scenario in California is that vehicle emissions will increase, not decrease, compared against the relevant baseline.

To avoid those unintended adverse outcomes, the Board should direct CARB staff to refashion the ACT Rule so that it includes the three necessary components (the three legs) of a viable ZEV program. Those components are: (i) identification of a reasonable number of targeted commercial fleet applications that are best suited to the profitable operation of ZEV trucks; (ii) corresponding sales and purchase mandates for the ZEV trucks used in those targeted commercial fleet applications; and (iii) sufficiently robust regulations and incentives that can assure the development and installation of the ZEV infrastructure needed to support the targeted fleet applications. In addition, the Board should direct CARB staff to coordinate the development of its Omnibus Low-NO_x Rule with the ACT Regulation, and to scale-back that Omnibus Rule to account for the compounding burdens facing commercial vehicle manufacturers in California, and in recognition of the shrinking size of the remaining market for diesel-fueled trucks as the

prospects for a successful transition to ZEV technologies take root. That type of refashioned and holistic commercial-fleet ZEV program could work, and would be supported by EMA.

Respectfully submitted,

TRUCK & ENGINE
MANUFACTURERS ASSOCIATION

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