Truck & Engine Manufacturers Association®
Bringing Clean Power to the World™

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VIA ELECTRONIC SUBMISSION: www.arb.ca.gov

California Air Resources Board
1001 I Street
Sacramento, CA 95812

RE: Proposed Advanced Clean Fleets Rulemaking (acf-comments-ws)

The Truck and Engine Manufacturers Association (EMA) provides these comments on the draft regulatory text and draft cost discussion document for the Advanced Clean Fleets (ACF) regulation that the California Air Resource Board (CARB, or the agency) released on August 25, 2021. Included was draft regulatory text to sunset the Advanced Clean Trucks (ACT) regulation and replace it with a requirement that manufacturers sell only zero-emission vehicles (ZEVs) beginning in 2040.

EMA is the trade association that, among other things, represents the interests of the world's leading manufacturers of medium- and heavy-duty vehicles, internal combustion engines, and zero-emission powertrains. EMA and its members have worked constructively and successfully with policymakers over several decades to consequentially reduce the pollutant and greenhouse gas emissions from engines and traditional commercial motor vehicles. Looking forward, we recognize that ZEVs are the future of the trucking industry, and therefore EMA member companies are investing billions of dollars to develop and bring to market medium- and heavy-duty ZEVs that will meet the industry's needs.

EMA's members are subject to the existing ACT regulation and would be subject to the proposed 2040 100% ZEV sales requirement, and they correspondingly have a strong interest in the ZEV purchase requirements in the proposed ACF rule that will support both sales mandates. Accordingly, EMA and its members have a direct and significant stake in the subject rulemaking.

A Holistic Approach is Needed to Develop the Commercial ZEV Market

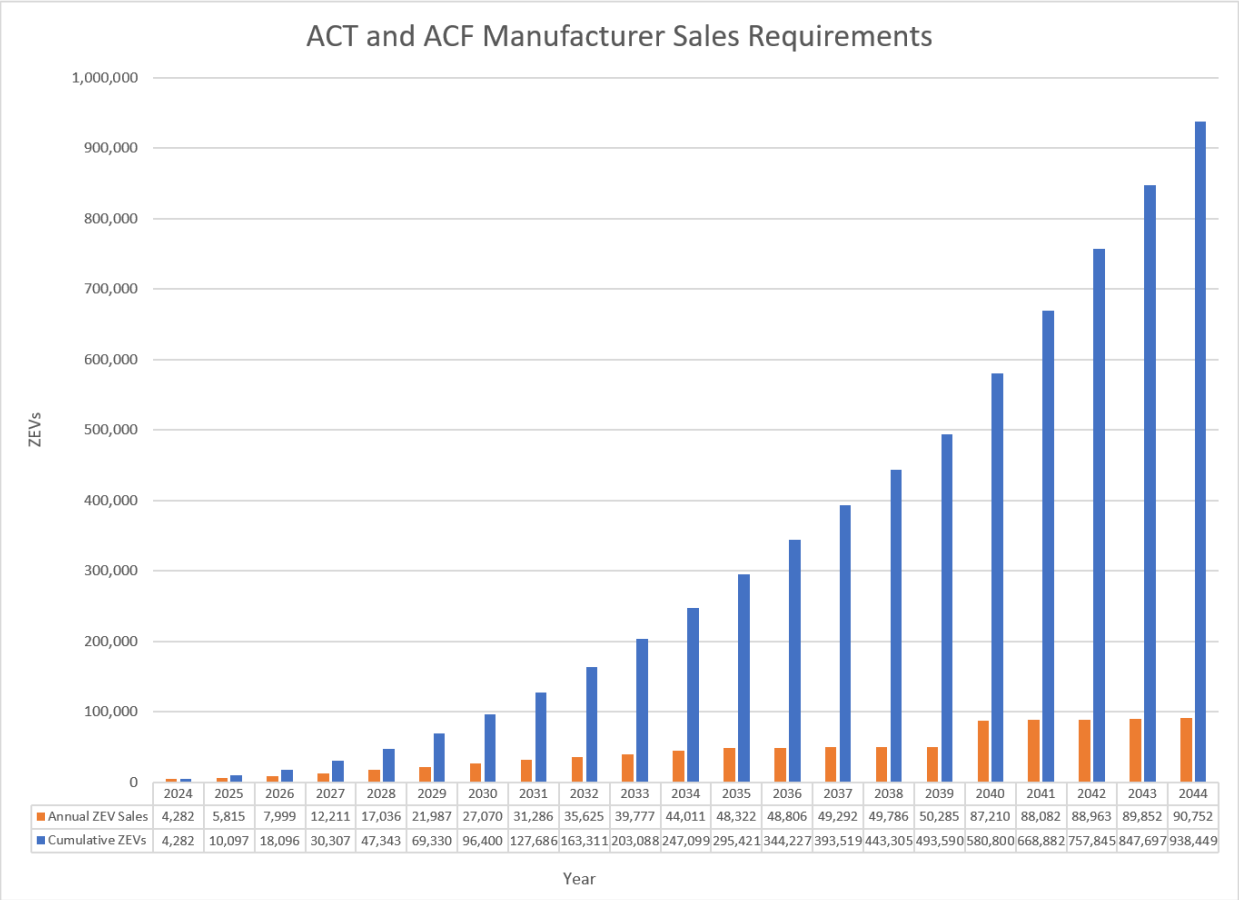
2040 100% ZEV Sales Requirement

CARB finalized the ACT rule on March 15, 2021, mandating that 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, based on the manufacturers' overall sales of medium- and heavy-duty vehicle sales in California. The required ZEV sales percentages increase through model year (MY) 2035, as follows:

Model Year	Class 2b-3 Group	Class 4-8 Group	Class 7-8 Tractors Group
2024	5%	9%	5%
2025	7%	11%	7%
2026	10%	13%	10%
2027	15%	20%	15%
2028	20%	30%	20%
2029	25%	40%	25%
2030	30%	50%	30%
2031	35%	55%	35%
2032	40%	60%	40%
2033	45%	65%	40%
2034	50%	70%	40%
2035 and beyond	55%	75%	40%

The proposed regulatory text for the 2040 100% sales mandate would terminate the ACT regulation at the end of MY 2039 and replace it with a requirement that manufacturers of vehicles with a GVWR greater than 8,500 pounds to sell only ZEVs beginning with MY 2040.

The cumulative effect of the ACT rule and the 2040 100% sales mandate can be estimated by multiplying the expected number of California vehicle sales by the required ZEV percentages. Based on the estimated California vehicle sales volumes in CARB's October 22, 2019, *Staff Report: Initial Statement of Reasons* for the ACT rule, and the ZEV percentages in the existing and proposed sales mandates, the number of ZEVs on California roads through the first twenty years would be as follows:



	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Annual ZEV Sales	4,282	5,815	7,999	12,211	17,036	21,987	27,070	31,286	35,625	39,777	44,011	48,322	48,806	49,292	49,786	50,285	87,210	88,082	88,963	89,852	90,752
Cumulative ZEVs	4,282	10,097	18,096	30,307	47,343	69,330	96,400	127,686	163,311	203,088	247,099	295,421	344,227	393,519	443,305	493,590	580,800	668,882	757,845	847,697	938,449

In evaluating the merits of CARB's proposal to increase the ZEV sales mandate percentages to 100% with MY 2040, it is important to note the unique nature of the commercial truck market. 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, intracity pickup and delivery trucks, concrete mixers, dump trucks, bucket trucks, garbage trucks, regional freight tractors, and long-haul highway tractors. Regardless of the application, commercial trucks are business tools and trucking fleets expect to earn a profit on their capital investment in the purchase price of a truck. Therefore, the total cost of ownership (TCO) of a ZEV must be competitive or the trucking fleet will simply purchase other available technologies, or maintain its existing trucks longer.

Commercial trucks must not only be able to successfully complete the specialized work of the trucking business, but the trucks must also do so in a cost-effective manner. Unfortunately, compared to traditional vehicles, ZEVs currently (i) cost a trucking company more to purchase, (ii) are not able to perform the same amount of work as traditional trucks, (iii) require new maintenance facilities and equipment investments, (iv) have lower residual values, and (v) require the build-out and maintenance of a completely new electricity charging or hydrogen fueling infrastructure.

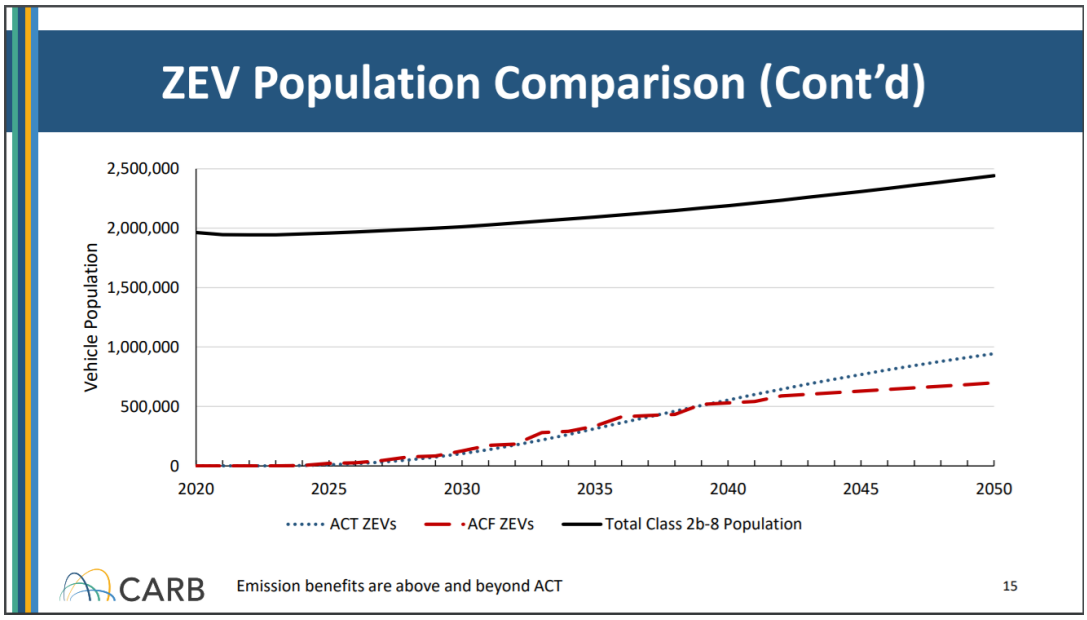
As we noted in our comments on the proposed ACT rule (available at the links below), for CARB to holistically and successfully develop the California market for medium- and heavy-

duty ZEVs, three crucial elements must be simultaneously addressed. First, there must be ZEV products available to meet the needs of commercial trucking businesses. To meet those needs, EMA member companies are developing and bringing to market a wide variety of medium- and heavy-duty ZEVs. Second, trucking fleets must be willing to invest in those ZEV products. Unfortunately, until the utility and life-cycle costs of ZEV are competitive with traditional vehicles, financial incentives and/or purchase mandates will be needed. The third and most challenging element of successfully developing a commercial ZEV market is the infrastructure needed to charge the vehicles or refuel them with hydrogen. A unique charging/fueling infrastructure is needed at locations where medium- and heavy-duty duty ZEVs will operate, and that infrastructure must be available before a fleet takes delivery of a ZEV.

- Initial ACT Proposal: EMA Comments 09Dec19
- Proposed ACT Amendments: EMA Comments 28May20
- Availability of Additional ACT Information: EMA Comments 20Oct20

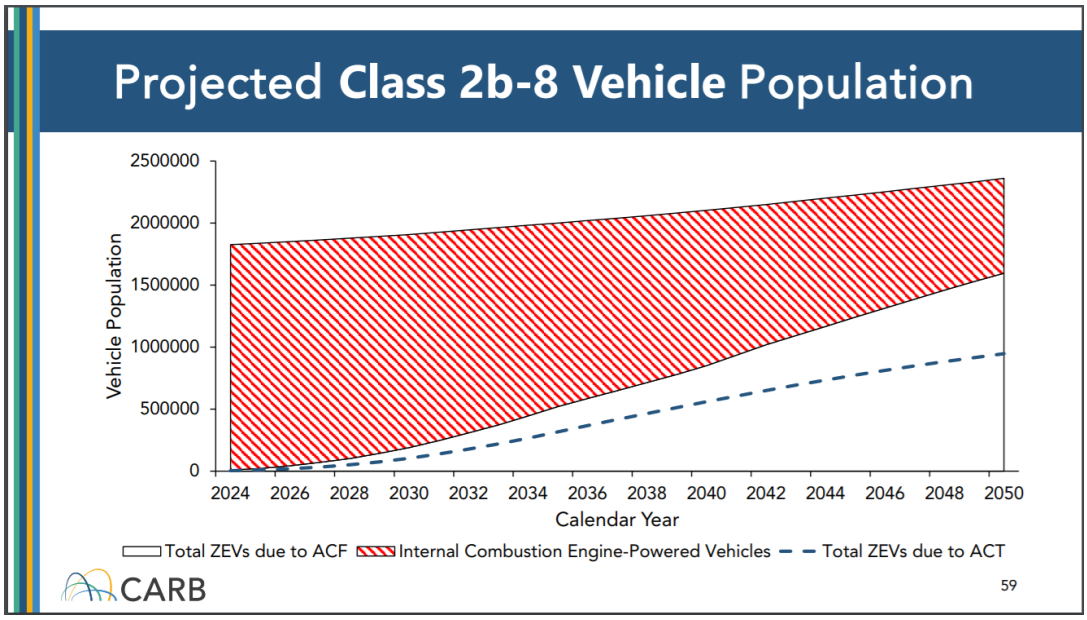
Since the charging/fueling infrastructure is the most expense and complicated element of successfully developing a medium- and heavy-duty market in California, it should be the priority. It can take 24-48 months from concept to complete an operational charging station for a medium- or heavy-duty ZEV and, depending on the number of stations needed at the location, electricity utility upgrades may complicate the installation and extend the timeline. To avoid having a stranded capital asset, a trucking fleet should have fully operational charging station in place before taking delivery of a new ZEV. Therefore, the charging stations to support the ZEVs to be sold in 2024 under the ACT rule (shown in the chart above) should be underway now. Development of the charging stations to support the ZEVs to be sold in 2025 should be underway this year or next. To monitor that progress, CARB should establish a tracking system, or "scorecard," of the charging/fueling infrastructure installations for ZEV population expected each year under the ACT rule and the proposed 2040 100% sales mandate. If the infrastructure will not be in place in time, CARB must reduce the percentages in the ZEV sales mandate rules accordingly.

Another crucial element of holistically and successfully developing a medium- and heavy-duty ZEV market in California is ensuring that customers will purchase the ZEVs. One way to do that is for the ACF rule to require fleets to purchase of the same types of commercial ZEVs, in the same quantities, that CARB's sales mandates will require manufacturers to sell. We are hopeful that will be the case, but the information CARB has shared at its workshops does not provide a clear picture of the expected ZEV purchases from the ACF rule. Specifically, during the March 2 & 4, 2021, workshop, CARB provided the following slide indicating that the ACF would result in approximately 700,000 ZEVs by 2050:



Advanced Clean Fleets Preliminary Inventory Analysis, March 2 & 4, 2021

The above slide shows that the number of ZEV sales mandated by the ACT will be greater than the ZEV purchases required by the ACF rule. During the September 9, 2021, workshop, however, CARB's assessment of the ZEV purchases mandated by the ACF rule was markedly different. Without proposing any significant changes to the ACF rule, CARB now expects the rule to result in 1,500,000 ZEVs by 2050, more than double the previous estimate. See the slide below:



Advanced Clean Fleets Regulation Workshop, September 9, 2021

If the second graph is accurate and the ACF rule will indeed mandate purchases of more

ZEVs than the ACT rule requires manufacturers to sell, that would provide a reasonable chance for the ACT rule to be successful. However, if the earlier graph turns out to be more accurate, the ACT rule would force manufacturers to sell ZEVs for which there are no customers – an untenable situation. Since we do not know which prediction will be more accurate, CARB must plan to reduce the ACT rule percentages, and/or the 2040 100% mandate, should the ACF rule ultimately result in less ZEV purchases than the optimistic estimate.

The ACF must also address the significant challenges in transitioning California's Class 2b-3 trucks to ZEVs. Class 2b-3 trucks make up a significant portion of the Class 2b-8 trucks on the road today; however, very few are owned by fleets and the majority are owned by individuals. Under the proposed 2040 100% ZEV sales mandate, approximately 72% of the ZEVs sold will be Class 2b-3, and 68% of the total Class 2b-8 ZEVs sold under the ACT through that year will be Class 2b-3, based on the estimated California vehicle sales volumes in CARB's October 22, 2019, *Staff Report: Initial Statement of Reasons* for the ACT rule. Individual consumers that must purchase those Class 2b-3 ZEVs to make the ACT rule successful will not be mandated to do so by the proposed ACF rule.

The ACT rule requires manufacturers to sell ZEVs of specific weight classes and truck types, by imposing weight class modifiers and credit transfer restrictions. However, the proposed ACF rule would allow fleets to achieve compliance by purchasing any vehicles, from Class 2b pickup trucks through Class 8 tractors. That misalignment threatens the ability of the two rules to work effectively together to grow the California market for medium- and heavy-duty ZEVs. CARB must ensure that the required purchases in the ACF rule match the sales mandates in the ACT rule – both in overall ZEV volumes and in the numbers of specific ZEV types.

ACF Exemptions

The proposed ACF regulation would exempt from the ZEV purchase requirements many different categories of medium- and heavy-duty vehicles including school buses, military tactical vehicles, emergency vehicles, historical vehicles, and dedicated snow removal vehicles. However, the ACT rule provides no exemptions from its ZEV sales mandates, and the proposed 2040 100% sales mandate only exempts emergency vehicles. It is fundamentally inconsistent to exempt certain vehicles from a purchase mandate, while not exempting those same vehicles from the sales mandates. To correct that inconsistency, if a fleet is awarded an exemption from the ACF purchase requirements, CARB must award the manufacturer of the traditional vehicle sold to the fleet instead of a ZEV equivalent relief from the ZEV sales mandate regulations.

NZEV Credits

The proposed ACF regulation would treat a near-zero-emission vehicle (NZEV) the same as a ZEV until 2035. Accordingly, a fleet could purchase an unlimited number of NZEVs and get the same credit under the ACF rule as purchasing ZEVs. The ACT rule also includes NZEV provisions, but the credits are severely restricted and discounted. Under the ACT rule, a manufacturer's NZEV credits are discounted based on the all-electric range of the vehicle, with the NZEV credit equal to no more than three quarters of a ZEV credit. Additionally, the ACT rule includes many restrictions on the manufacturer's use of those discounted NZEV credits,

further diminishing their value. To align the NZEV credits between the ACT and ACF rules, CARB must modify the ACT rule to provide manufacturers a full ZEV credit for the sale of an NZEV, through at least 2035.

To successfully achieve the goal of reducing emissions from medium- and heavy-duty vehicles through the ACT rule and the proposed ACF regulations, CARB should expand the definition of NZEV to include other low-emission technologies that use low-carbon or zero-carbon fuels. Doing so would not only provide manufacturers and fleets the flexibility to choose from more technology options for compliance, but also would provide additional opportunities for significant near-term emissions reductions. One example technology is hydrogen internal combustion engines (H2ICEs). In addition to the near-term emission reductions, H2ICE also would accelerate the transition to hydrogen fuel-cell electric vehicles by driving the infrastructure for hydrogen fueling. Considering that CARB already recognizes H2ICE as a compliant technology in the light-duty ZEV mandate (see, 13 CCR 1962.2(c)(3)(E)), CARB should include H2ICE and other low-carbon fueled engines in both the ACT rule and the proposed ACF regulations.

Total Cost of Ownership Document is Overly Optimistic

Much like the total cost of ownership (TCO) analysis for the ACT rule, the *Draft Advanced Clean Fleets Total Cost of Ownership Discussion Document* makes many overly-optimistic assumptions that make ZEVs look favorable. See, EMA Comments on the initial ACT proposal, December 9, 2019, pp. 4-7, and EMA comments on the proposed ACT amendments, May 28, 2020, pp. 6-8, at the above links. By way of examples, the draft cost discussion document for the ACF rule makes the following inaccurate assumptions:

- ZEV purchase costs that are too low.
- ZEV residual values are too high.
- No lost productivity to charge a ZEV.
- Average mileage will be adequate, when trucks are often needed for peak operation.
- Charger costs based on power ratings that are too low for heavy trucks.
- No infrastructure costs for sleeper cab tractors.
- No maintenance costs for infrastructure.

Based on overly-optimistic assumptions, the draft cost discussion document concludes that cost parity between ZEVs and traditional vehicles will occur soon. We request that CARB validate the assumptions in the draft cost discussion documents by conducting case studies of the medium- and heavy-duty ZEV pilot and demonstration projects that are underway in California. For reference, California Climate Investments describes many of those projects here. Additionally, the ACT Fleet Forum, a network of North American fleets that deploy advanced and clean truck technologies, provided insights into deploying zero-emission truck technologies in comments that are available here. The ACT Fleet Forum may be another resource for real-world data on the TCO of medium- and heavy-duty ZEVs. Without real-world validation, CARB's TCO analysis is merely wishful thinking,

ZEV Credit and Deficit Generation Timing
Remains Unworkable

In our comments on CARB's proposed amendments to the proposed ACT rule, we pointed out that it would be impossible to implement the new regulatory text defining when a manufacturer generates a ZEV credit or a deficit. See, EMA comments on proposed ACT amendments, May 28, 2020, pp. 15-16, at the above link. Unfortunately, CARB finalized that unworkable language. Following are two examples currently in the ACT regulation:

> *ZEV Credit Calculation.* A manufacturer may generate ZEV credits for each ZEV produced and delivered for sale in California for the manufacturer-designated model year. ZEV credits are earned when a new on-road vehicle is **sold to the ultimate purchaser in California.** The ZEV Credit generated for each vehicle sold is equal to the value of the appropriate weight class modifier in Table A-2 of section 1963.1. 13 CCR § 1963.2(a) (emphasis added).

> *Deficit Generation*. Starting with the 2024 model year, a manufacturer shall annually incur deficits based on the manufacturer's annual sales volume of on-road vehicles produced and delivered for sale in California. Deficits are incurred when the on-road vehicle is **sold to the ultimate purchaser in California.** 13 CCR § 1963.1(a) (emphasis added).

Delaying the generation of credits and deficits until a vehicle reaches an "ultimate purchaser" in California creates an unworkable requirement for truck manufacturers. Particularly with single-unit commercial vehicles, that are built in multiple stages by different manufacturers (many of which are small truck bodybuilders located around the country), the completed zero-emission vehicle may not be built until the bodybuilder designs a truck body that will work on the zero-emission chassis. The original truck manufacturer will experience a delay of months or even years after it sells an incomplete ZEV before it may generate credit toward compliance with the ACT regulation.

Truck chassis manufacturers are required to sell a prescribed number of ZEVs under the ACT rule and the proposed 2040 100% ZEV mandate, and fleets will be required to purchase ZEVs under the proposed ACF rule. While bodybuilders are an essential link in the production and sales chain of all vocational vehicles, neither the ACT nor the proposed ACF rule requires them develop truck bodies to work on zero-emission chassis or sell completed ZEVs. For the ACT and ACF to be successful, CARB must address the critical but missing bodybuilder link.

CARB proposes to modify the language with the 2040 100% ZEV sales mandate. The new proposed regulatory text is as follows:

> *2040 ZEV Requirement.* Beginning with the 2040 model year, all vehicles subject to this section that are **produced and delivered for sale to the ultimate purchaser in California** must be ZEVs. This requirement does not apply to authorized emergency vehicles.

Proposed 17 CCR § 95694(d) (emphasis added).

The new proposed regulatory text appears to maintain the delay in generating a credit until the vehicle is sold "to the ultimate purchaser in California." As such, it continues the unworkable regulatory requirement that exists in the ACT rule.

To resolve the impracticability of a truck chassis manufacturer waiting to generate a credit or deficit until a complete vehicle is sold "to the ultimate purchaser in California," CARB could modify the second part of the regulatory text in the sales mandates to read: "**produced and delivered for sale in California**." Doing so would match the language in the Advanced Clean Cars (ACC) and Greenhouse Gas Standards for Medium- and Heavy-Duty Engine and Vehicles (Heavy-Duty GHG) regulations. That simple change would align the ACT rule and the 2040 100% sales mandate with other rules and could capture all of a truck manufacturer's vehicles that are put into service in California. Manufacturers would generate a credit or deficit when they ship a vehicle from the truck factory based on where it will be put into service.

We believe that simple change to the regulatory text of both the ACT rule and the 2040 100% sales mandate would provide a workable approach for generating ZEV credits and deficits. We would welcome the opportunity to work with CARB on that modification or on other ways to make the timing of the generation of credits and directs workable and implementable. Recognizing that bodybuilders must manufacture completed zero-emission vocational trucks for the ACT and ACF rules to be successful, we also look forward to working with CARB to address that overlooked aspect of the rules.

Conclusion

The ACT manufacturer sales mandate is set to implement in 2024. However, before that even happens, CARB is attempting to increase the ZEV sales requirements with the 2040 100% sales mandate. Before doubling down on the sales mandates, CARB should instead focus on crafting an effective ACF rule to ensure that there will be sufficient purchases of commercial ZEVs to match the sales mandates by the ACT rule. Additionally, the agency should ensure that adequate and appropriate charging/fueling infrastructure is being developed so the anticipated ZEVs can do the work of the commercial trucking industry. If the ZEV purchase mandates and infrastructure will not be sufficient to support the anticipated ZEV sales volumes in the ACT rule, CARB must reduce the required percentages.

We look forwarding to continuing to work with CARB and other stakeholders to successfully develop the medium- and heavy-duty ZEV market in California. If there are any questions about these comments, or if we could provide any additional information, please do not hesitate to contact Tim Blubaugh at (312) 929-1972, or tblubaugh@emamail.org.

Respectfully submitted,

TRUCK & ENGINE
MANUFACTURERS ASSOCIATION