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October 17, 2022

Clerk of the Board
California Air Resources Board
1001 I St.
Sacramento, CA 95814

Submitted electronically

RE: Proposed Advanced Clean Fleets Regulation

Dear Chair Randolph and Members of the Board:

Thank you for the opportunity to comment on the Proposed Advanced Clean Fleets (ACF) regulation.

In addition to these comments, the California Trucking Association (CTA) has jointly filed comments with the Western States Trucking Association (WSTA) via our counsel at Wenger, Jones, Helsley PC specific to our serious concerns regarding the conformity of the proposed ACF with multiple State and Federal laws.

Nothing contained in these comments regarding the policies proposed by the California Air Resources Board (CARB) should be construed as conflicting with positions reflected in comments filed by counsel for CTA and WSTA.

For several years now, CTA, in conjunction with the American Trucking Associations (ATA), has convened experts from the nation's leading fleets to provide input and guidance on the development of zero-emission capable vehicle technologies. Based on this input, our organizations have met with staff and Board members to discuss our concerns with the proposed ACF.

Introduction

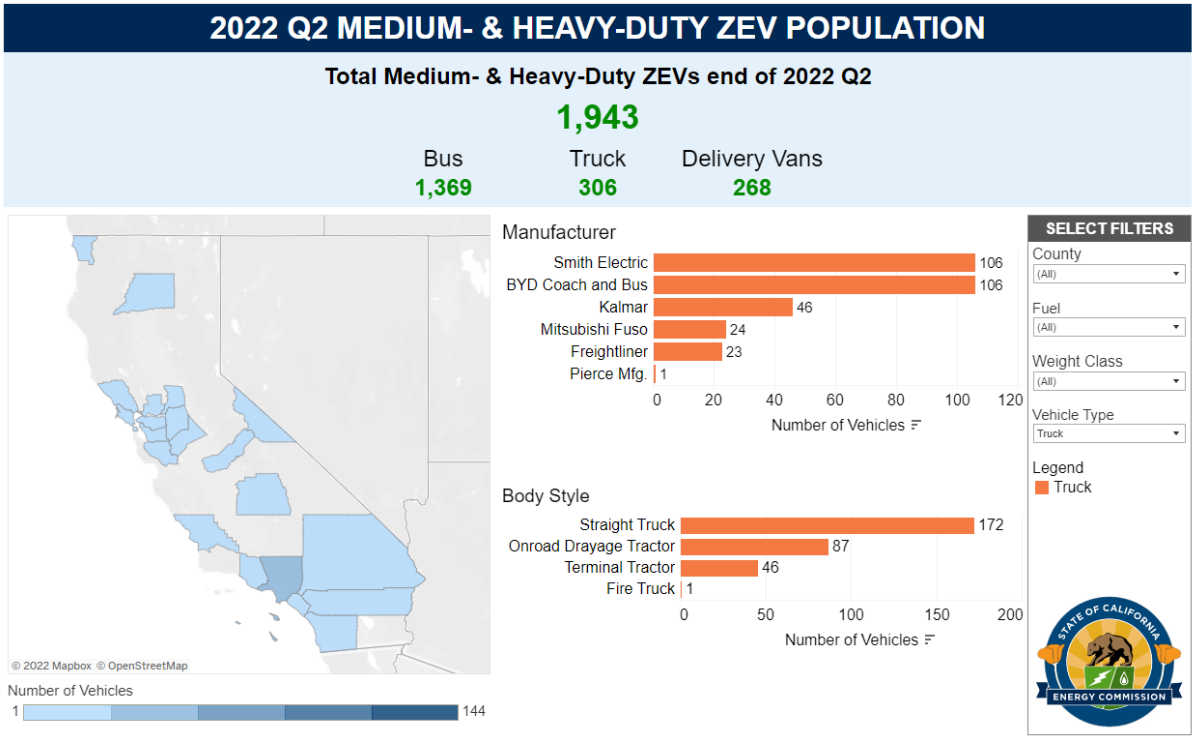
The fatal flaws of the proposed regulation can be summarized in three points:

1. The ACF requires deployment of zero-emission capable vehicles in use cases which are not prepared for this transition at a pace which is unseen in prior market transitions.
2. The ACF requires charging/fueling infrastructure, which does not exist, to be built at a pace which is unlikely to occur.
3. The ACF's exemptions are woefully inadequate.

1. The ACF requires deployment of zero-emission capable vehicles in use cases which are not prepared for this transition at a pace which is unseen in prior market transitions

The consensus of the CTA/ATA workgroup is that the best use case for zero-emission capable truck technology is with Class 5 and below trucks operating in limited range with 8 to10 hours to charge at a depot. Specific to drayage trucks, CTA/ATA's recommendations is to limit any regulation to port to near-dock rail operations (sometimes referred to as "land-bridge" or "IPI"). CARB's proposed regulation continues to ignore the experts.

To be clear, there is practically no zero-emission truck market to speak of today. According to data published by the California Energy Commission (CEC), there are 573 zero-emission Class 2b-8 commercial trucks on the road today, including 155 from a manufacturer which ceased business operations in 2017.[1]



According to this dataset, only 87 Class 8 tractors have been deployed, entirely from the manufacturer BYD. This model weighs over 8,000 lbs. more than a comparable Class 8 tractor and takes between 2 to 4 hours to charge with a published range of 125 miles.[2]

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[1] California Energy Commission, *Medium- and Heavy-Duty Zero-Emission Vehicles in California*, (October 2022). https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/medium-and-heavy

[2] CALSTART, *California's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project*, BYD 8TT Spec. Sheet (October 2022). https://californiahvip.org/wp-content/uploads/2020/09/2019-BYD-8TT-Cut-Sheet-190306.pdf

BYD 8TT Battery Electric Spec. Sheet

Dimensions	Length	278.3 in
	Width	100.4 in
	Height	121.3 in
	Wheelbase	166.3 in
	Curb Weight	26,235 lbs
	GCWR	105,000 lbs
Performance	Top Speed	65 mph
	Maximum Gradeability	25%
	Range	125 miles
	Approach/Departure Angle	16° / 40°
Chassis	Wheel Rim	8.25 x 22.5
	Tires	11R22.5
	Suspension	Front: Leaf Spring, Rear: Air Suspension
	Brakes	Front: Air Disc Brakes, Rear: Air Drum Brakes
Powertrain	Maximum Power	483 hp
	Maximum Torque	1,770 lb • ft
	Battery Capacity	409 kWh
	Charging Power	33kW AC+120kW DC or 240kW DC*
	Charging Time*	13.5 hrs AC / 4 or 2 hrs DC

Comparisons between the operational profile of this vehicle and a comparable diesel day cab demonstrate an astounding loss of productivity. Assuming an approximate 50,000 lbs. available for cargo for a traditional day cab and trailer combination, the added weight of the electric vehicle would reduce total available carrying capacity by 16%.

If the vehicle relied upon public charging, it would consume a minimum of 23% of a driver's theoretical maximum available hours (1,401 of 6,080 hours).[3]

	Diesel Day Cab	BYD Day Cab
Tank/Battery Size	160	409
Range (miles)	800	125
Annual Miles	60,000	60,000
Annual Refueling/ Charging Events	75	480
Refueling/Charging Time (minutes)	5.3	175.2*
Annual Refueling/ Charging Time (Hours)	6.67	1,401.6

*Assumes 150kWh charging speed

[3] Time spent monitoring a vehicle during public charging would be considered "on-duty, not driving" under the Federal Hours-of-Service Regulation.

These type of productivity losses would devastate the State's supply chain, which makes the omission of any type of mention of these issues (much less an analysis) in the Standard Regulatory Impact Assessment (SRIA) puzzling despite CARB's own estimates that 25% of day cab tractors and 75% of sleeper cab tractors will rely upon retail charging.

To achieve the turnover of the 518,000 trucks subject to the ACF by 2040, the following would need to occur:[4]

- An average of nearly 38% of new trucks sold in California would need to be zero-emissions from 2024 to 2040.

To achieve the turnover of the 1,590,000 trucks by 2050 as estimated in the high deployment scenario of the EA, the following would need to happen:[5]

- Assuming 100% zero-emission sales after 2040, an average of nearly 45% of new trucks sold in California would need to be zero-emissions from 2024 to 2039.

Zero-emission passenger vehicle sales in the first half of 2022 were 6% nationally and 18% in California despite California having adopted the first zero-emission requirements for cars in 1990.

	DC Fast Chargers Installed per Week	% New Vehicle Sales
Passenger	~ 14/week	18% CA, 6% Nationally in Q2 2022
ACF 2024-2040	Requires ~ 43/week	Avg. of 38% needed from 2024-2040
ACF 2024-2050	Requires ~ 82/week	Avg. of 45% needed from 2024-2039, 100% 2040-2050

There is simply no precedent for the rate of vehicle turnover to support CARB's deployment timelines in the ACF, even in the passenger vehicle space where the technology and market ecosystem is relatively mature.

2. The ACF requires charging/fueling infrastructure, which does not exist, to be built at a pace which is unlikely to occur

Due to the small population of existing commercial ZEVs, infrastructure to support these vehicles is nearly non-existent.

To achieve the turnover of the 518,000 trucks subject to the ACF by 2040, the following would need to occur:

[4] Staff's estimate for truck population subject to ACF.
[5] The Draft EA estimates significantly higher ZE populations "320,000 to about 510,000 in 2035, from about 780,000 to about 1,230,000 ZEVs by 2045, and from about 950,000 to about 1,590,000 ZEVs by 2050".

- An average of 82 MW of new charging capacity (382 depot chargers and 43 public chargers) installed per week, including more than 13 MW of publicly available ultra-fast charging above 750 kW.[6] [Note: Because these numbers were derived from HEVI-LOAD, these charger estimates do not include infrastructure necessary outside of California to facilitate interstate commerce.]

To achieve the turnover of the 1,590,000 trucks by 2050 as estimated in the high deployment scenario of the EA, the following would need to happen:

- An average of 158 MW of new charging capacity (739 depot chargers and 82 public chargers) installed per week, including more than 25 MW of publicly available ultra-fast charging above 750 kW.

The CEC projects that approximately 14 DC fast chargers will be installed per week from 2020 to 2025 to meet light duty charging needs.[7]

	Avg. DC Fast Chargers Installed per Week
Passenger 2020-2025	~ 14/week
ACF 2024-2040	~ 375/week
ACF 2024-2050	~ 725/week

There is simply no precedent for the rate of infrastructure installation necessary to support CARB's deployment timelines in the ACF, even in the passenger vehicle space where the technology and market ecosystem is relatively mature.

3. The ACF's exemptions are woefully inadequate

The exemptions in the proposed ACF do not provide sufficient flexibility for easily foreseeable delays.

i. Infrastructure Construction Delay

The ACF allows for a one-time, one year long delay in the delivery of ZE vehicles where the fleet operator can demonstrate the "delay is a result of any of the following circumstances beyond the fleet owner's control after obtaining construction permits: change of a general contractor; delays obtaining power from a utility; delays due to unexpected safety issues; discovery of archeological, historical, or tribal cultural resources described in the California Environmental Quality Act,

[6] Derived from Table 27 from the Draft SIP "HEVI-LOAD Infrastructure Results for 112,000 BEVs in 2030 and 289,000 BEVs in 2035". Linear growth in chargers was assumed at a rate of 1.79x (518k divided by 289k vehicles).
[7] California Energy Commission, *Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment; Analyzing Charging Needs to Support Zero-Emission Vehicles in 2030* (Table 3 assumes 3,607 DC Fast Chargers will be installed between 2020-2025) (July 2021).
https://efiling.energy.ca.gov/getdocument.aspx?tn=238853

Public Resources Code Division 13, Section 21000 et. seq.; or natural disasters." This extension requires an executed purchase agreement for a ZE vehicle.

The shortcomings of this provision reflect the general lack of understanding by CARB of the process of constructing zero-emission charging infrastructure. In 2021, the Port of Long Beach published a report which evaluated timelines to construct publicly available charging sites:

> "In total, a simple charging-station project that does not require a substation upgrade could take three to five years from pre-planning to completion, with projects built by the Port on the longer end of that range. A substation upgrade would add at least another five years to the timeline, requiring eight to 10 years for these larger projects."

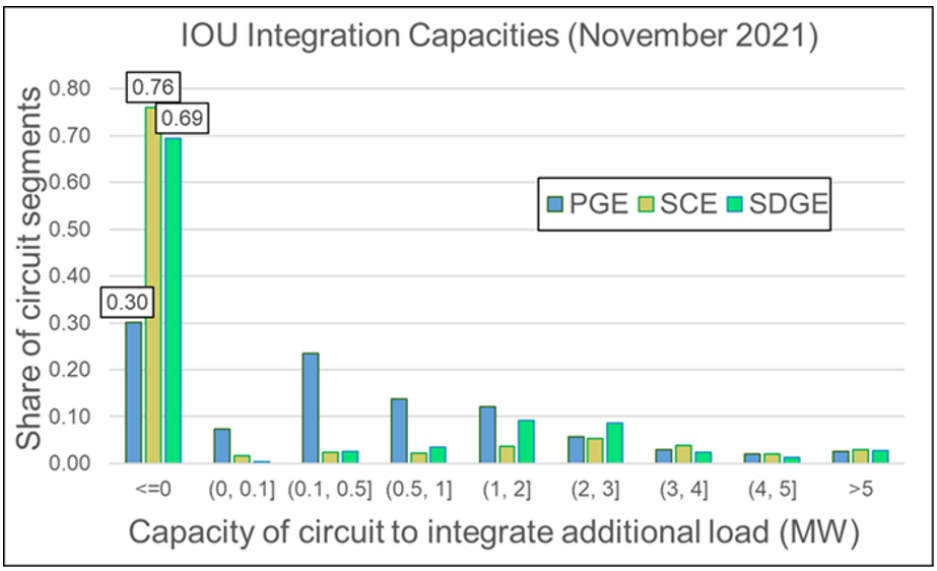
CTA has already been made aware of significant delays by members seeking to install truck charging.[8]

DSP Engineering has studied the Project at Ave and has determined that System Upgrades are required in order to serve the customer and we cannot meet the customers requested energization date of 2022.

SCE has approximately 0 MW of capacity currently available. If wants to utilize this available capacity you will need to submit a method on how you would safely limit the sites capacity that would be reviewd by SCE. Some examples would be phasing your equipment installation or limiting by means of a protection device that can be approved by the AHJ.

The upgrades required for SCE are estimated to take approximately Substantial System Work (24-36 months) and will begin once has agreed to move forward and completed a full design submittal package to SCE. This feasibility result is valid for 90 days from the receipt of this email or until the customer completes and submits a full design package to SCE.

The vast majority of circuits in investor owned utility territories have less than 5 MW capacity, including zero capacity to integrate additional load in 76% of Southern California Edison's territory.



[8] Information identifying fleet and location redacted.

Because the infrastructure construction delay provision requires an executed purchase agreement, a fleet operator could be required to take custody of a vehicle it is unable to charge for up to 9 years in the event of a substation upgrade. Given the lack of integration capacity today, significant delays are likely to be commonplace as the utilities are bombarded with over 150 MW of new demand on a weekly basis.

Even worse, there is no provision which addresses lack of available public charging infrastructure, despite CARB's own estimates that 25% of day cab and 75% of sleeper cab tractors will rely upon publicly available retail charging. A truck operator is simply expected to face the possibility that they will be forced to purchase a $300,000 to $400,000 zero-emission truck with no location to charge. Indeed, it's questionable whether a truck purchaser would even be able to obtain financing without identifying a charging strategy.

ii. Vehicle Delivery Delay Extension

As already demonstrated by recent issues with similar provisions in the Truck and Bus Rule, it is impractical to require purchase agreements for specific vehicles to claim the manufacturer delay provision. Due to ongoing supply chain issues creating parts shortages, production of medium and heavy-duty trucks have been curtailed in recent years.[9]

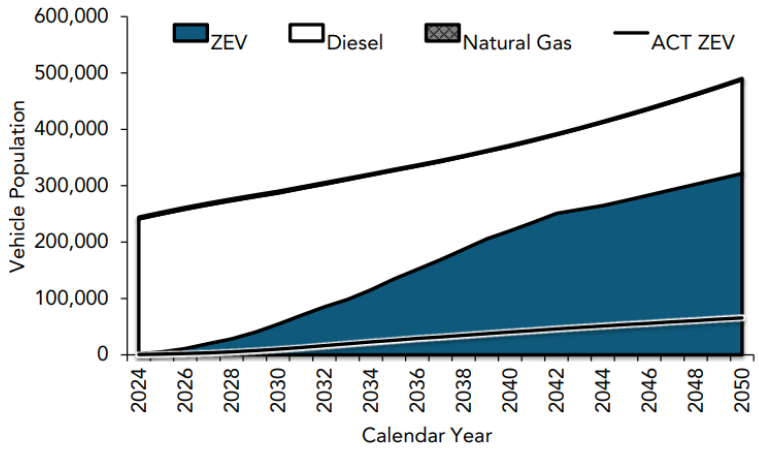
Bona fide purchase agreements cannot be provided unless there is a build slot available. CTA members have indicated that their truck dealers have received approximately 1/3rd of their typical allocations, leading to an inability to obtain purchase agreements.

It is likely similar issues will occur with the ACF, especially given the fact that the ACF calls for more zero-emission vehicles to be purchased by fleets than produced by manufacturers under the Advanced Clean Trucks regulation.

[9] Tita, Bob, *Truckers Want More Trucks Than Industry Can Build*, The Wall Street Journal (May 9, 2022). https://www.wsj.com/articles/truckers-want-more-trucks-than-industry-can-build-at-the-moment-11652094004#comments_sector

Appendix F

Figure 4. Projected population for Class 7 - 8 tractors in California



As this provision is written today, a fleet would be penalized for its inability to purchase a vehicle **which does not exist** and, therefore, cannot generate an accompanying purchase agreement.

iii. Daily Usage Exemption

While CTA and ATA appreciated the inclusion of this provision, CARB has undermined its practicality in several ways, rendering it unworkable. For instance:

- A fleet may not apply for this provision if a hydrogen fuel cell configuration is available, whether sufficient hydrogen fueling infrastructure exists on its required routes or not.
- A fleet may not apply for this provision if there is an NZEV available or a ZEV with specified battery capacities, regardless of cost, ability to support, service and repair and whether the manufacturer can in fact produce the necessary vehicles. There are several examples where ZEV manufacturers have not been able to fulfill purchase orders. For instance, the truck maker Chanje was sued in 2021 for delivering only 25 of a promised 125 purchased vehicles.[10]
- No daily usage exemption is provided under the Drayage Truck Requirements despite many drayage trucks having range requirements in excess of today's battery electric vehicles.

Quite simply, the proposed regulation is not feasible given today's technology limitations and the dearth of charging infrastructure. We have, and continue, to suggest workable solutions to address these limitations. These suggestions have been derived from fleets that have several

[10] Miller, Eric, *Ryder Seeks $3.7 Million Default Judgment Against Chanje*, Transport Topics (July 7, 2021). https://www.ttnews.com/articles/ryder-seeks-37-million-default-judgment-against-chanje

decades of experience working with alternative fuels and drivetrains and incorporating these technologies into revenue operations, including many iterations of battery-electric and hydrogen fuel cell vehicles. We ask the Board to work with us to incorporate the suggested changes to modify the proposed regulation in order to give it some chance of success.

High Priority Fleets Requirements Recommendations

1. **ZEV Fleet Milestones should be limited to Group 1 Vehicles**

The proposed application of ZEV Fleet Milestones to nearly all classes and use cases of trucks is premature. As noted by staff in the Advanced Clean Trucks Initial Statement of Reasons "Class 7 and 8 tractors…have more limited commercial availability, and have operational characteristics that are not as suitable for electrification…when compared to other medium- and heavy-duty vehicles. Many tractors engage in long haul operations where limited battery-electric range may be a concern, and public hydrogen fueling or fast charging for these vehicles is not yet available."

Table A: ZEV Fleet Milestones by Vehicle Body Type and Year

Percentage of fleet that must be ZEVs	10%	25%	50%	75%	100%
Group 1: Box trucks or vans, two-axle buses, yard tractor	2025	2028	2031	2033	2035 and beyond
Group 2: Work trucks, day cab tractors, three-axle buses	2027	2030	2033	2036	2039 and beyond
Group 3: Sleeper cab tractors and specialty vehicles	2030	2033	2036	2039	2042 and beyond

To address the lack of suitability of Class 7 and 8 tractors for electrification, staff proposes to process exemption requests via the Daily Usage Exemption, wherein a fleet operator would need to demonstrate it meets the requirements of Sec. 2015.3. However, it is clear that the vast majority of Class 7 and 8 tractors will apply for this exemption simply due to their operational characteristics.

For instance, EPA estimates that Class 8 sleeper cab tractors travel an average of 125,000 miles per year (500 miles per day and 250 days per year).[11] Respondents to the American Transportation

[11] U.S. Environmental Protection Agency, *Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles - Phase 2 Regulatory Impact Analysis* (August 2016). https://nepis.epa.gov/Exe/ZyPDF.cgi/P100P7NS.PDF?Dockey=P100P7NS.PDF

Research Institute's (ATRI) 2021 Operational Cost of Trucking Survey stated that the average annual mileage of a truck-tractor was 89,358.[12]

EPA assumes operational days per year at 250. Because commercial truck drivers are required to take at least 34 hours off-duty to reset their federally mandated hours of service, a driver could perform a theoretical maximum of 286 operational days per year.

TRACTOR MILES	Miles per day @250 days	Miles per day @286 days
EPA @ 125,000 miles	500	437
ATRI @ 89,358 miles	357	312

For truck tractors currently qualified to receive Hybrid Voucher Incentive Program funding, the average range is 223 miles from a 525 kWh battery which would have a minimum charge time of 1.5 to 4 hours. Therefore, it is not unreasonable to assume that a majority of truck tractors would qualify for the daily mileage exemption. Staff's preliminary estimate is that somewhere between 150,000-200,000 Class 7 & 8 tractors will be subject to the rule. Assuming 80% of 200,000 tractors applied for the daily mileage exemption, staff would need to process approximately 51 exemptions per day during the course of a 12 year phase-in.

Furthermore, staff should revisit assumptions about depot charging capabilities for even short-haul tractor operation. A 2013 survey conducted by the CALSTART on behalf of LA Metro and Gateway Cities Council of Governments found that 65% of survey respondents in the port drayage fleet at the Ports of Los Angeles and Long Beach did not have on-site diesel fueling.[13] Therefore, it is reasonable to expect that the majority of drayage trucks will primarily rely upon retail charging. Similar fueling patterns may exist in other short-haul operations that might otherwise be tapped for early transition as many terminals and parking facilities may exist on leased or temporarily rented land which would require the land owners themselves to make long term, multi-million dollar investments.

If customer cited infrastructure cannot be installed, fleets would have to utilize retail charging for the entirety of their needs, rather than as a supplemental opportunity charging. This would result in devastating losses of productivity and increased costs. Assuming three and a half hours of charging and drive-time at the nearest retail location, this could result in charging taking up anywhere from 25% to 44% of a driver's productive time per year.

In short, to be successful, ZEV Fleet Milestones should target vehicles most suitable for electrification and should therefore be limited to Group 1 vehicles. The limited number of Group 2 and 3 vehicles that may be suitable for electrification could be induced to adopt these vehicles earlier with both regulatory and financial incentives. For instance, Group 2 and 3 vehicles could

[12] Leslie, Alex and Dan Murray, *An Analysis of the Operational Costs of Trucking: 2021 Update*, American Transportation Research Institute (November 2021).
[13] Papson, Andrew and Michael Ippoliti, Key Performance Parameters for Drayage Trucks Operating at the Ports of Los Angeles and Long Beach, CALSTART (11/15 /2013) https://calstart.org/wp-content/uploads/2018/10/I-710-Project_Key-Performance-Parameters-for-Drayage-Trucks.pdf

be provided credits to allow owners of Group 1 vehicles more compliance flexibility. These credits could be generated by the fleets themselves or acquired from others. CARB could meet equity goals by applying multipliers to credits generated in disadvantaged communities.

For the above reasons, we urge CARB to focus ZEV Fleet Milestones to vehicles in Group 1 and turn to incentive mechanisms for Group 2 and 3 vehicles.

2. Modify Group 1 ZEV Milestone Dates

In light of manufacturing bottlenecks and production constraints exacerbated by a historic global supply chain crisis, realistic timelines to install charging infrastructure, and a host of other issues, we recommend CARB consider modifying the Group 1 ZEV Milestone dates as outlined in the table above.

% of fleet that must be ZEVs	10%	25%	50%	75%	100%
Group 1	2031	2033	2036	2039	2042

3. The Daily Usage Exemption needs to be revised

We urge CARB to revise the Daily Usage Exemption (DUE) to expand eligibility and applicability. The following are several examples of where this type of expansion is needed.

i. As proposed, a DUE is not available until a fleet has converted more than 10% of its existing vehicles to ZEVs or NZEVs. This provision assumes all fleets will be able to convert a portion of their vehicles to ZEVs or NZEVs, which may not be the case, especially for high mileage, irregular route operations, such as nationwide long-haul fleets that service California customers using primarily Class 8 sleeper tractors. In addition to usage limitations, these vehicles face the uncertainty of the development of a nationwide public infrastructure network. In order to ensure the DUE is available, if needed, the minimum 10% ZEV requirement should be eliminated.

ii. Drayage trucks should be eligible for the Daily Usage Exemption. As an example, drayage trucks currently travel the 400+ mile round-trip route over the Sierra Nevada Mountains from Reno to Oakland and back on a daily basis. Similar or longer routes over the I-5 Grapevine from the San Joaquin Valley to the Ports of Los Angeles/Long Beach also occur daily. While CARB assumes drayage tractors with adequate battery capacity for these routes are available, in fact, when usage factors are considered, this is not the case. In addition to the topography-related energy demands, the combination of winter temperatures and HVAC usage have been shown to decrease battery capacity by as much as 41%.[14] Continuing to haul drayage loads over these daily routes will be adversely affected under the proposed rule unless the DUE exemption is expanded to the drayage truck fleet.

[14] American Automobile Association, *AAA Electric Vehicle Range Testing* (February 2019).

iii. The criteria for defining commercially available under the DUE is arbitrary and fails to consider vehicle usage. For example, ZEVs and NZEVs tractors weigh more than their traditional counterparts and may not be an option for certain fleets or result in decreased payloads/increased trips (see auto hauler example below). ZEV tractors with at least 1,000 kWh rated energy capacity ignores operating impacts such as ambient temperature, HVAC usage, route topography, driver efficiency, available usable energy, and battery degradation and chemistry. The commercial availability criteria under the DUE should be modified.

iv. The proposed rated energy capacities are arbitrary and do not reflect usage considerations. For example, comparing the proposed 2.1 kW/mile factor for Class 7 and 8 tractors to the same type of tractors eligible for HVIP funding reveals a range of 1.9 to 3.3 kW/mile with the mean of 2.5 kW/mile being nearly 20% higher than the CARB factor.[15] This difference equates to 40 miles of less range for the HVIP tractors which average 525 kW of rated capacity. Rated energy capacity, per the proposed regulation, also includes non-accessible energy capacity. In addition, the combination of operator range anxiety and the physics of the fast charging curve constrain typically usable energy to 80% to 90% of rated capacity (or approximately 25 to 50 fewer miles than rated capacity). In total, these factors alone will reduce the range calculated by the CARB rated energy capacity by 65 to 90 miles.

v. Criteria (b)(2) should account for situations where "brand loyalty" is a factor. Some fleets rely on a primary manufacturer to supply and service their vehicles. Introducing a secondary manufacturer into the equation can result in modifications to purchase and maintenance agreements. These types of factors should be considered rather than simply identifying the "commercially available ZEV with the highest rated energy capacity available."

4. The ZEV Unavailability Exemption needs to include box trucks, vans, and tractors

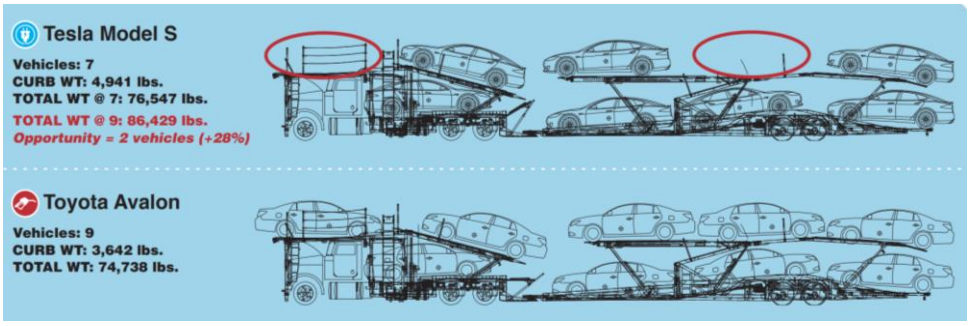
The following are some examples of how an expansion of this exemption is needed.

i. Box trucks with zero-emission multi-temperature refrigeration units are not currently available from TRU manufacturers. Under the TRU rule, a 1-year extension is provided if no compliance technology is available within 6-months of the compliance date with additional extensions available. The ZEV unavailability extension should be consistent with the provisions in the TRU regulation.

ii. Zero-emission tractors are not considered a viable option for picking up loads at fuel racks due to safety concerns. While the adaptability of this technology to service this type of operation needs further evaluation, a ZEV unavailability exemption for all categories of vehicles for valid public safety considerations should be included.

[15] CALSTART, *California's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project* (accessed October 2022).

iii. The added weight of zero-emission tractors can have a significant effect on payload, reducing cargo capacity and creating additional truck trips. As shown in the example below, the added weight of zero-emission passenger cars is already reducing the volume of cars that can be carried per load. Adding a zero-emissions tractors to this equation, which has been estimated to potentially increase the tractor weight from 5,000 to 8,000 pounds, would further eliminate two additional vehicles.[16] Heavy-haul loads, where state-issued permits are required, are another example of where vehicle weight, as well as route characteristics will limit the use of ZEVs. A ZEV unavailability exemption for circumstances where cargo capacity will be adversely affected should be added.



As illustrated by these examples, circumstances where a zero-emission box truck, van or tractor are not available or appropriate to use do exist. Additional situations are expected as fleets further evaluate the suitability of this technology. Once finalized, to ensure enforceability, the regulation will be limited to the adopted exemptions and extensions with little ability to address unexpected events (such as further chip shortages or new technology concerns). As a result, the regulation should include as much flexibility as possible for all categories of vehicles.

5. Infrastructure Construction Delay Extension needs to be expanded

i. The Infrastructure Construction Delay (ICD) Extension needs to provide flexibility necessary to accommodate infrastructure construction timelines. Infrastructure construction can take longer than expected due to a number of factors including permitting delays, land acquisitions, utility scheduling and unanticipated construction delays. Many of these factors are beyond the fleet operator's control. As noted in the comments submitted by Penske,[17]

> "Fleet scale infrastructure projects of 5+ MW take 3-5 years in a best-case scenario, meaning the initial 1/1/2025 deadlines are already an impossible target for most fleets, even with a one-year implementation delay."

As written, the proposed regulation provides a single one year extension as long as construction is started one year prior to the next applicable compliance date. In other

[16] Nikola Investor Presentation (March 2020).
[17] Penske, *Comments on Proposed Advanced Clean Fleets Regulation,* Art Valley, President (September 22, 2022).

words, installations that extend beyond two years will not be eligible for any further extensions and trucks will need to be in place even if the infrastructure is unavailable. Of note is the fact that CARB provided this flexibility under the Innovative Clean Transit Rule[18], but not under the proposed ACF. Additional flexibility is needed to address situations where unanticipated construction delays occur beyond the control of the fleet.

ii. In cases where non-owned property is involved, fleets will need to work with landlords to agree to property improvements terms and update leases. This negotiated process can take additional time and should be considered as one of the grounds for granting an extension should these negotiations take longer than expected or prove unfruitful and result in fleets having to relocate.

6. The California Fleet determination should include an option based on the Rental Vehicle Provision

As proposed, a "California fleet" must include all vehicles that operated in California at any time during the calendar year. Much like a rental fleet, interstate fleets, those with trucks registered under the International Registration Plan, would have to report and comply with all IRP vehicles in the nation that could possibly come to California on any given day which would present impossible compliance requirements, or the fleet may be forced to bar any non-California fleet trucks from entering the state, significantly raising costs and implementation challenges. An alternative option for interstate fleets to report the average number of vehicles that operate in California instead of every vehicle that could possibly come to California should be provided.

7. Broker/Common Ownership and Control language picks winners and losers

CARB staff has indicated "Brokers dispatching loads on ad-hoc or limited term basis" and "Load-board operations" would not be covered by the proposed rule.

Plainly, this is a disastrous, highly subjective provision that would undermine CARB's regulatory scheme by placing covered fleets at an enormous competitive disadvantage against multi-billion dollar freight brokers and digital load boards. While we understand why staff desires to fully exempt fleets operating under 50 trucks by also exempting significantly larger transportation intermediaries, CARB cannot have it both ways. Disastrous proposed provisions such as these further support revisiting of applicability of the high priority fleet requirements to Group 2 and 3 vehicles where transportation intermediaries play a large role in the market.

It's also questionable whether the legal and legislative history of CARB's authority to set emission standards would allow the agency to selectively apply purchase mandates by fleet size.

[18] 2023.4(c)(1)(C) provides flexibility "…if the transit agency can provide documentation that demonstrates the needed infrastructure cannot be completed within the two-year extension period or in time to operate the purchased buses after delivery, whichever is later."

Disastrous proposed provisions such as these further support revisiting of applicability of the high priority fleet requirements to Group 2 and 3 vehicles where transportation intermediaries play a large role in the market.

Also, we recommend that the definition of "common ownership and control" be consistent with existing CARB regulations and funding guidelines to ensure clarity and consistency. "Common ownership or control" as defined in the Truck and Bus regulation and the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) are as follows:

- HVIP: "If vehicles are under common ownership, for the purposes of the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) this means that they are owned by the same person, corporation, partnership, limited liability company, or association, including sharing a Tax Identification Number (TIN) or California Carrier Identification Number (CA#). In addition, vehicles managed day to day by the same directors, officers, or managers, or by corporations controlled by the same majority stockholders are considered to be under common control even if their title is held by different business entities."

- Truck and Bus Regulations: "'Common Ownership or Control' means being owned or managed day to day by the same person, corporation, partnership, or association. Vehicles managed by the same directors, officers, or managers, or by corporations controlled by the same majority stockholders are considered to be under common ownership or control even if their title is held by different business entities. Common ownership or control of a federal government vehicle shall be the primary responsibility of the unit that is directly responsible for its day to day operational control."

8. An exemption is needed for short-term vehicle activity

We urge CARB to provide an exemption that allows a vehicle to enter the state on a limited basis. Affected fleets will occasionally need to dispatch vehicles to respond to unexpected or unplanned demand. The highly transient short-term rental fleet, which serves many small businesses that may not have access to charging infrastructure, would also benefit from this type of exemption. Providing such an exemption for rental vehicles and designated fleet vehicles that operate in California for less than 10 days consecutively and no more than 30 days cumulatively in a single year will provide greater flexibility when dispatching and operating vehicles on an intermittent basis into the state.

9. Backup vehicle definition should be revised

The types of vehicles affected by the proposed rule range from local delivery to long-haul trucks. While the annual mileage traveled by these vehicles can be significantly different, the backup vehicle exemption is established at 1,000 miles. This definition needs to be revised to better reflect the different types of vehicle affected. A metric such as 10% of the annual mileage of the vehicle(s) which the backup vehicle would replace would be more appropriate.

10. Vehicles added/removed from an existing fleet should be reporting on an annual basis

The addition or removal of fleet vehicles should be aligned with the fleet compliance reporting requirements on an annual basis, no later than March 1st. This change will remove what for some fleets would be a monthly reporting requirement and instead track fleet vehicle changes as part of the annual compliance reporting process.

11. A consolidated compliance reporting system is needed

Trucking fleets currently report to multiple CARB databases (TRUCRS, DTR, ARBER) with additional databases proposed (HDIM, ACF). Much of the required information is reported multiple times (company/contact information) and, in many cases, covers or will cover the same vehicle (TRUCRS, DTR, HDIM, ACF). A streamlined process is needed that provides fleets a single database for all reporting requirements and transfers existing reported data to the new system. If done properly, this system should reduce compliance costs by eliminating duplication and enhance enforcement by providing a single reference point for fleets and enforcement personnel alike.

12. Fleet expansion pathways should be treated equally

Under the proposed regulation, existing fleets that increase their vehicle counts or revenues above the applicability criteria ("Newly Affected Fleet") will have two years to meet all of the requirements of the regulation. Conversely, fleets that increase their vehicle counts or revenues above the applicability criteria through mergers or acquisitions have 30 calendar days to comply with the requirements of the regulation. Similarly, entities that are already subject to the regulation and merge or acquire a non-affected entity will have 30 calendar days to comply with the requirements.

Given the timing of acquiring ZEVs and/or NZEVs to meet either compliance option, it is unreasonable to assume compliance can be achieved within 30 days. The regulation should be revised to allow fleets that acquired additional non-affected vehicles through mergers and acquisitions the same two year compliance window a newly affected fleet has.

13. Operator documentation

The requirements should be consistent with the information found on a shipment's bill of lading and allow the use of electronic forms.

14. State-provided incentive funding should be directed towards initial compliance

To date, the substantial acquisition cost of zero-emission trucks have been partially offset through the use of incentive funds. These incentive funds range from $7,500 for the smallest

Class 2b vehicle to $180,000 for a semi-tractor.[19] This latter incentive amount is roughly equal to the purchase price of a single new diesel semi-tractor; with zero-emission tractors being roughly 2 to 3imes the cost of a conventional tractor.

The loss of state-provided incentive funds will place the entire conversion expense in the hands of affected fleets. Passing the full costs onto customers will be difficult since not all fleets are subject to the regulation and will not experience the additional costs associated with vehicle and infrastructure acquisition and operational modifications. To reduce the cost of this transition, CARB should allow incentive funds to be used to purchase vehicles for compliance through 2030. This will help fleets to meet the first round percentages under the fleet milestone option and allow the zero-emission truck market to grow and mature.

15. Use of low and negative carbon intensity fuels should be allowed

The use of low or negative carbon intensity fuels can provide less costly options for achieving GHG reductions. As highlighted in a recent report, while battery-electric and fuel cell powered semi-tractors can achieve lifetime CO2 reductions compared to petroleum diesel fuel, alternative fuels such as renewable diesel or natural gas, can provide even further reductions in lifetime CO2 emissions.[20] CARB's proposed regulation limits informative analysis of these options by analyzing only tank-to-wheels GHG emissions. As shown by the recent report, both battery-electric and fuel cell vehicles generate the majority of their CO2 emissions during the production of their power sources, electricity and hydrogen, respectively, and battery production processes. The analysis accompanying the proposed regulation completely foregoes consideration of these important sources of emissions.

16. Life cycle impacts of the proposed regulation and other available options have been overlooked

A recent report indicates that life-cycle CO2 emissions from battery-electric trucks are lower than a comparable diesel truck largely due to the elimination of tailpipe emissions.[21] However, the report also identifies other alternatives, such as renewable diesel, that can provide even further reductions in life-cycle CO2 emissions. CARB analysis only compares tailpipe emissions and conveniently omits the broader life-cycle emissions associated with the proposed rule.

Drayage Truck Requirements

17. CARB must allow a reasonable amount of flexible capacity to remain in the drayage truck registry

[19] CALSTART, *California's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project* (accessed October 2022).
[20] Short, Jeffery and Crownover, Danielle, *Understanding the CO2 Impacts of Zero-Emission Trucks; A Comparative Life-Cycle Analysis of Battery Electric, Hydrogen Fuel Cell and Traditional Diesel Trucks*, American Transportation Research Institute (May 2022).
[21] Ibid.

Drayage trucks are a critical piece of the global supply chain, which is experiencing an unprecedented level of demand. An unanticipated surge of approximately 30% greater containers in 2021 has resulted in dozens of ocean-going vessels anchored in the San Pedro Bay. A risk modeling firm has estimated up to $90 billion in lost economic activity due to ongoing port congestion.[22] As this current crisis was precipitated by unanticipated demand overwhelming our supply chain infrastructure, failing to ensure adequate drayage supply to serve container terminals and rail ramps could result in similar economic calamity.

CARB currently proposes to apply a zero-emission new entrant standard into the drayage truck registry (DTR) starting 10/1/2023, grandfather in existing vehicles through the period of their SB1 Useful Life, and remove any vehicle from the DTR that does not call on a covered facility at least once annually.

To ensure that truck fleets have adequate capacity to service the movement of containerized cargo, they have long registered more vehicles in the DTR than would call on the ports on an annual basis. This was done for flexibility purposes as trucks which were dispatched in other types of revenue service could be called into port drayage during surges in cargo.

This flexibility is simply not possible under CARB's current proposal as it will take years, not weeks or months, to get new zero-emission vehicles ordered and the infrastructure installed to service them.

We recommend eliminating the once annual visit requirement altogether or allow fleets at least a 40% tolerance of vehicles within their SB1 Useful Life that can call on the port, based on their existing fleet size when demand surges occur.

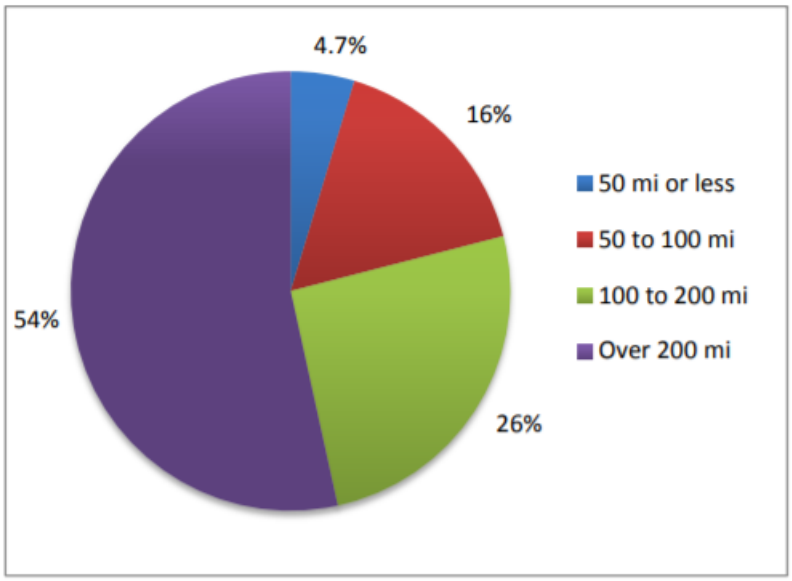
18. CARB must provide adequate off ramps to drayage fleets.

For many of the same reasons stated in the prior section, the entirety of the Class 8 drayage fleet will have significant barriers to electrification. First, drayage trucks have been mislabeled as uniformly "short haul". A 2013 survey of approximately 1,000 respondents servicing the Ports of Los Angeles and Long Beach conducted by CALSTART found that more than half of respondents indicated that key performance parameters that electric vehicle must achieve are: 1) necessary range (200+ miles), and 2) vehicle must have the capability to be used on all delivery routes. [23]

[22] Russell Group Ltd, *Long Beach and Los Angeles Port Delays may disrupt US holiday season* (08/31/2021). https://www.russell.co.uk/ProductStories/1672/long-beach-and-los-angeles-port-delays-may-disrupt-us-holiday-season

[23] Papson, Andrew and Michael Ippoliti, Key Performance Parameters for Drayage Trucks Operating at the Ports of Los Angeles and Long Beach, CALSTART (11/15 /2013) https://calstart.org/wp-content/uploads/2018/10/I-710-Project_Key-Performance-Parameters-for-Drayage-Trucks.pdf

Figure 4. Survey Results: Minimum Acceptable Distance Before Refueling



CALSTART 2013.

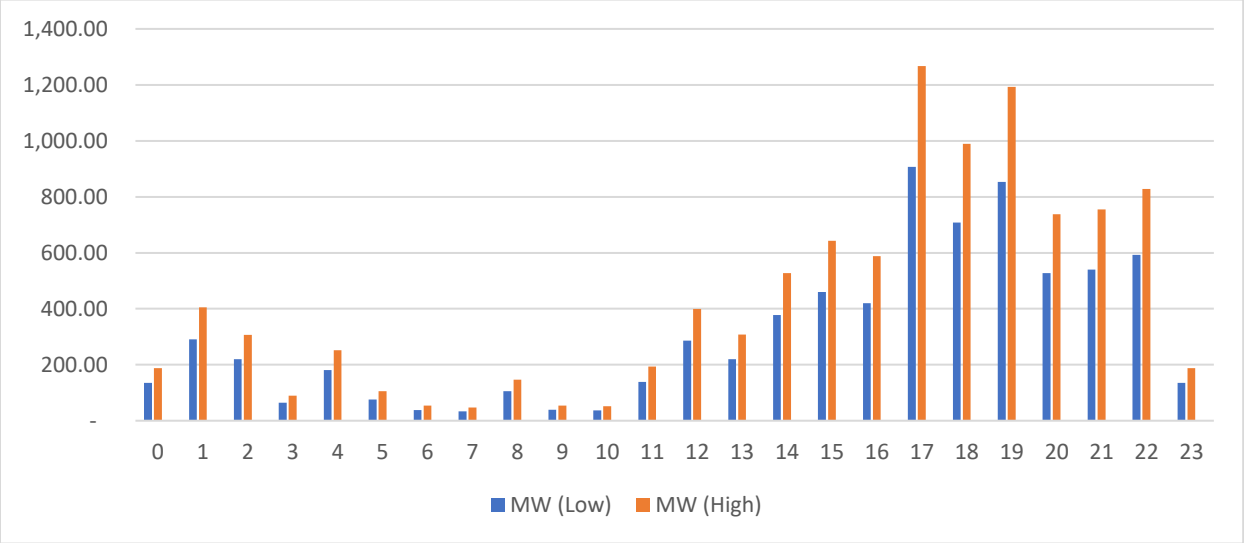
Drayage trucks servicing the Port of Oakland likely have significantly greater mileage requirements given the need to service Reno (400+ mile round trip) and the Southern Central Valley (500+ mile round trip).

Additionally, charging infrastructure requirements for the drayage fleet will be difficult to meet.

EMFAC2017 estimates that 16,081 Drayage Trucks (T7 POLA Category) will operate in the South Coast Basin in 2035, accruing 3,149,475 miles per day. Assuming an energy efficiency of 2 to 2.8 kWh/mile, the Drayage fleet will create an average daily demand of 6,299 to 8,819 MWh. We estimate a plausible peak daily demand of at least 7,384 to 10,318 MWh based on 2019's POLA container volume peak in July which was 17.2% higher than the 2019 monthly average.[24]

At 7,384 to 10,318 MWh, using CEC's HEVI-Load hourly demand assumptions, we can expect highest demand between 5:00 p.m. to 10:00 p.m. with an estimated peak hourly demand of 907 to 1,267 MW at 5 p.m. This will intersect with on-peak Time of Use rates.[25]

[24] The Port of Los Angeles, 2019 Port of Los Angeles Container Statistics, (accessed October 2022). https://www.portoflosangeles.org/business/statistics/container-statistics/historical-teu-statistics-2019
[25] Southern California Edison, *Electric Vehicle Rates for Businesses* (accessed October 2022). https://www.sce.com/business/rates/electric-car-business-rates/business/rates/electric-car-business-rates



CALSTART's 2013 survey indicated that 65% of survey respondents did not have on-site diesel fueling. An unknown percentage of those respondents also indicated use of on-site mobile refueling ("wet hosing"). Therefore, it is reasonable to expect that the majority of drayage trucks will primarily rely upon retail charging, in addition to other mixes of retail charging, on-site depot charging, and opportunity charging at trip end-points.

To approximate what a retail charging location may look like, we will use information contained in an environmental impact report for an existing Flying J truck stop in Jurupa Valley. The project description is as follows:

The Project is a proposal to develop an approximately 11.95 gross-acre property to accommodate a Flying J Travel Center, which is proposed to operate 24 hours per day, seven days per week. Vehicular access to the site would be provided by one right in/right out driveway connecting with Etiwanda and two driveways connecting with Riverside Avenue. See the attached Figure 3, Proposed Site Plan.

The Travel Center would include the following amenities:

- *Vehicular fueling facilities offering 12 diesel truck lanes and 16 gas lanes for passenger vehicles*
- *A 15,220-square foot building with the following:*
    - *Driver's Lounge*
    - *Restrooms, showers for rent, and public laundry facilities*
    - *Convenience Store (that would not include sales of alcoholic beverages for off-site consumption)*
    - *Deli*

- *Drive-thru fast food restaurant*

- *Parking spaces to accommodate 104 trucks, 22 bobtails (trucks without a trailer), and 69 passenger vehicles*
- *Truck Scale*
- *Underground diesel fuel and gasoline storage tanks*
- *100-foot high pylon sign along the northern boundary*

Assuming the diesel lanes were replaced 1-for-1 with 200 to 350 kW chargers and the 126 parking spots were able to accommodate 50 kW charging with no loss of capacity to accommodate the charging infrastructure, this site could conceivably provide up to 2.4 to 4.2 MW capacity of faster, opportunity charging and up to 6.3 MW capacity of slower capacity charging to parked vehicles. At over 10 MW possible demand, this location would likely trigger upstream utility infrastructure upgrades.

There is also limited private truck parking, generally. Caltrans indicates there are 3,001 privately operated truck parking spaces by 28 truck stops in Los Angeles, Riverside and San Bernardino County, one-third of which are located in Coachella and Barstow, which will not be utilized by a local drayage fleet:[26]

- 167 spots in Los Angles
- 353 spots Riverside (230 in Coachella)
- 2481 spots in San Bernardino (730 in Barstow)

Assuming all parking spots provided 50 kW capacity chargers, the total would reach 150 MW of slower capacity charging to parked vehicles. If all 28 locations provided 10 charging lanes at 200 to 350 kW, this would total 56 to 98 MW.

Anecdotally, station developers indicate they are more likely to develop charging infrastructure in ways that do not require upstream utility infrastructure upgrades which can add significant cost and push construction timeframes out by as much as 7 to 10 years. The generally accepted target seems to be projects that are at or near 2-3 MW. This means that placing more than ten 200 to 350 kW capacity chargers at any charging location, be it retail, on-site or at a freight facility may trigger significant additional costs and delays.

To meet the estimated charging needs of the drayage fleet, it can be reasonably assumed that several hundreds of these locations would need to be built out. 300 to 450 sites would need to be

[26] Caltrans, Truck Stops - California, Arizona, Nevada, Oregon (accessed October 2022). https://dot.ca.gov/programs/traffic-operations/legal-truck-access/truck-stops-removed

available to meet peak demand at 100% utilization. And, as noted in the prior section, opportunity charging at today's speeds would eliminate 25% to 44% of a driver's available work hours.

The Port of Long Beach (POLB) recently hired the consulting firm Starcrest to do an assessment of the electrical infrastructure necessary to support the drayage trucks servicing the port and came to similar conclusions about the scale of charging necessary and issues surrounding opportunity charging with today's charging rates saying "in the near term, it is reasonable to lean towards overnight charging and to minimize, or even forego, opportunity-charging stations until technology improves".[27]

Based on this assessment, POLB estimates it could build a maximum capacity of approximately 22 MW worth of charging which could take well into the 2030's to complete. This is a far cry from the 1.2 GW possible demand from Southern California's drayage fleet.

Table 20: Projected Added Electrical Load for Tier I Sites

Site	Minimum Added Electrical Load (MW)	Maximum Added Electrical Load (MW)	Grid Impact
Pier A Way and Carrack Avenue	1.2	2.5	Not likely
Clean Energy Fuels	0.3	0.3	Not likely
Pier B Street and Carrack Avenue	8.5	9.8	Likely
Clean Truck Program Center	1.1	3.0	Not likely
Pier S West - Vacant	6	6.7	Likely
Total	**17**	**22**	

Minimum added electrical load is the opportunity charging scenario; the maximum electrical load is the overnight charging scenario.

It is clear that CARB should focus initial requirements solely on trucks where existing zero-emission vehicles can meet range requirements and who can charge overnight. However, even where such trucks exist, feedback from our membership suggests additional hurdles to be overcome. For instance, it is not uncommon for fleets to park drayage trucks in temporary lots on rented land as permitting of permanent truck parking is both difficult and expensive. It is highly unlikely that landowners of temporary truck parking will commit to an up to a decade-long, multi-million dollar process of installing multi-MW charging capacity. And given that the Port of Long Beach's assessment of charging build-out suggests it will take well into the 2030's to build out sufficient public charging infrastructure for 1,350 electric trucks, CARB must focus on both best possible use cases for zero-emission vehicles in the near-term when setting mandates or providing

[27] Starcrest Consulting Group, LLC, Fueling the Future Fleet: Assessment of Public Truck Charging and Fueling Near the Port of Long Beach, Port of Long Beach (September 2021). https://thehelm.polb.com/download/379/zero-emissions/12744/final-polb-charging-study-12-sep-2021.pdf

sufficient off-ramps for the acknowledged challenges fleets will face in meeting the new entry requirement.

CARB staff has already acknowledged that not all trucks under the high priority fleet rule will be able to be transitioned to zero-emissions. Therefore, we recommend that CARB include the daily mileage exemption process, with suggested revisions, to drayage fleets.

19. Total Cost of Ownership Discussion Document needs to be revised.

The following recommendations apply to the TCO Discussion Document.

Pg. G-9: "Long haul applications can be electrified through a combination of fuel cell technologies and battery-electric vehicles utilizing charging during rest breaks and in-between shifts."

The underlying Lawrence Berkeley National Labs study presupposes widespread availability of 500kW or Megawatt+ level retail charging. We do not believe CARB should cite this study to justify the above statement as no such charging infrastructure exists today or is likely to in the near future. Staff should, instead, analyze cost based on additional labor cost and foregone revenue based on currently available charging speeds or limits imposed by battery management systems, a realistic pace of build out to calculate additional drive time to available chargers, etc.

Pg. G-9: "This discussion document assumes that a single fleet will own and operate a truck for a significant portion of its life in California"

A range of operating years should be reflected. Operating years can have a significant impact on TCO. To provide a more comprehensive assessment, the analysis should be broaden to show impacts across a range of truck ownership periods.

Pg. G-13: Table 4.

We recommend CARB publish real world data on efficiency from pilot programs it has funded. CTA has reviewed efficiency data from the data logger of three Class 8 electric drayage trucks that indicates the real world efficiency of these vehicles has been 2.8kWh/mile. Additionally, manufacturer specifications for the eight Class 7/8 tractors eligible through HVIP average 2.5 kWh/mile. At a minimum, CARB should be performing a sensitivity analysis to represent a possible range of efficiency given the large discrepancy between 2.1 and 2.8kWh/mile.

Pg. G-14: Table 5

CARB should include further analysis on the price of ZE technologies as the figures on this table are lower than prices quoted for 2022-2023 delivery. For instance, member feedback would suggest that a Class 8 battery-electric day cab is being quoted at $375,000. That price is unlikely to fall to $202,000 by 2025.

Pg. G-15: "Taxes"

Tax impacts needs to be expanded to other fuels. While the analysis identifies sales tax impacts across the various categories of vehicle purchases, a similar tax analysis has not been included for the various fuels. In addition to excise and sales taxes associated with the purchase of diesel fuel (which appears to be included in the fuel price but not differentiated), the consumption of electricity can include an Electricity Consumption Tax (ECT), utility user taxes (UUT), and surcharges such as a Public Purpose Program (PPP) surcharge. These additional taxes/surcharges need to be identified and, where applicable, included as a line item in the TCO analysis.

Pg. G-15: "Fuel Costs"

As a supplement to the TCO analysis, a thorough analysis of the impact on fuel tax and fee revenue is needed. More than $1.50 of every gallon of diesel fuel sold in California goes to federal and state taxes and environmental-related fees. Federal and state excise taxes are the primary funding source for the state's road and bridge maintenance and construction while the sales tax contributes to the state's General Fund. Environmental fees such as the underground storage tank fee and state's Cap-and-Trade Program and Low Carbon Fuel Standard also receive funding from the purchase of diesel fuel. The impact on state funding for these programs, which will receive less funding as a result of shifting from diesel to other fuels absent comparable assessments, needs to be evaluated. Additionally, these taxes and fees should be removed or isolated in the TOC analysis to ensure consistent comparison to non-taxed/non-fee electricity or hydrogen. In addition, the LCFS costs associated with diesel, which was estimated to be $0.14 per gallon per credit price of $100 per metric ton in 2020 (CEC, Petroleum Market Advisory Committee Final Report, 2017) should be reflected as a LCFS line item rather than aggregated into the price of diesel.

Pg. G-16: "Electricity prices for depot charging are calculated using CARB's Battery-Electric Truck and Bus Charging Calculator and assumes a fleet of 20 vehicles using a managed charging strategy with the applicable rate schedule. Day cab tractors are assumed to be charged in a four-hour shift at night along with opportunity midday charging sessions at the depot. All other trucks are assumed to charge overnight."

This approach significantly underestimates cost. We recommend using the CEC's demand scenarios to better characterize potential charging patterns. These scenarios suggest there would be significant demand during peak rates.

Pg. G-17: "For retail charging, staff assumes the price for medium- and heavy-duty retail charging would be similar to current direct current fast charging costs for light-duty at $0.31/kWh."

Link provided indicates that retail prices are $.043/kWh. Furthermore, we recommend CARB do additional analysis on differences between light duty and medium and

heavy duty retail charging development. Light infrastructure is typically co-located with existing parking facilities. It's not unreasonable to assume that medium and heavy-duty retail locations will require significant land acquisitions to accommodate the footprint of larger vehicles.

Pg. G-20: Table 7

The MPG estimates for diesel and natural gas vehicles appear to be incorrect. Table 7 indicates fuel economy for diesel and natural gas vehicles will decrease after 2025. This runs counter to the fuel economy benefits purported by the federal Phase 2 GHG/Fuel Economy Standards.

Pg. G21: Low Carbon Fuel Standard Revenue

As previously discussed in these comments, it is not reasonable to assume that all trucks subject to the ACF will utilize owned, customer cited chargers. Therefore, it's not reasonable to assume that all benefits of LCFS credits will pass through to fleets. Staff should also analyze how changes to LCFS to allow for capacity credits for medium and heavy duty charging projects may impact credit pass-through.

Pg. G-28: "Because sleeper cab tractors are assumed to use publicly accessible retail charging, no infrastructure costs are modelled."

Costs for all infrastructure driven by the regulation should be analyzed. There is no such retail charging infrastructure at this time.

Pg. 30: "Residual Values"

"ZEVs are assumed to depreciate at the same rate as diesel powered vehicles." This statement contradicts the TCO analysis adopted under the ACT regulation which states "we estimated the residual value of a battery electric truck is one-half that of a diesel truck of the same age, and the residual value of a hydrogen fuel cell truck is one-fourth that of a diesel truck."

General Comments

Dwell time for charging and refueling should be included in the TCO calculation using a similar approach as was taken in NREL's TCO analysis.[28]

The financial impacts of vehicles being able to carry less freight should be included as described in a recent Argonne TCO analysis.[29]

[28] Hunter, Chad; Penev, Michael; Et. al., *Spatial and Temporal Analysis of the Total Cost of Ownership for Class 8 Tractors and Class 4 Parcel Delivery Trucks*, U.S. Department of Energy, National Renewable Energy Laboratory (September 2021). https://www.nrel.gov/docs/fy21osti/71796.pdf

[29] Burhan, Andrew; Gohlke, Davis; Et al., *Comprehensive Total Cost of Ownership Quantification for Vehicles with Different Size Classes and Powertrains*, U.S. Department of Energy, Argonne National Laboratory (April 2021). https://publications.anl.gov/anlpubs/2021/05/167399.pdf

CTA, ATA and our fleet advisors appreciate the efforts being made to analyze the far reaching impacts this technology transformation will have on the state's supply chain and trucking fleets. We cannot stress enough our concerns that the proposed regulation is a recipe for failure. Substantial revisions to the proposed regulation are needed to have a chance of success given the technology and infrastructure limitations. We urge you to take a proactive role in reshaping this proposed regulation and stand ready to work with the Board to discuss the challenges ahead and changes needed.

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