California Trucking Association
4148 E. Commerce Way * Sacramento, CA *95834
www.caltrux.org

American Trucking Associations
950 North Glebe Road, Suite 210 * Arlington, VA * 22203
www.truckline.com

January 13, 2016

Mr. Alex Santo
Mr. Jason Hill-Falkenthal
California Air Resources Board
1001 I Street
Sacramento CA 95812

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

RE: **Comments on the California Air Resources Board's Draft Technology Assessment: Engine/Powerplant and Drivetrain Optimization and Vehicle Efficiency**

The California Trucking Association (CTA) and the American Trucking Associations (ATA) are pleased to have the opportunity to review and comment on the California Air Resources Board's Draft Technology Assessment: Engine/Powerplant and Drivetrain Optimization and Vehicle Efficiency.[1] We appreciate staff's efforts in preparing the assessment and view the draft as a starting point for a discussion of these technologies. The following comments reflect the experience and viewpoint of the trucking industry as they pertain to these technologies and should be reflected in the assessment.

General Comment: Past experience with emerging technologies in heavy-duty engines has shown that warranty claims, where an operator takes a vehicle out of service to a maintenance facility to have a part under warranty replaced, tend to be higher during the initial years of introduction.

Based on warranty claims data required to be submitted to CARB, particulate filter-related warranty claims were at 35% during their initial year of introduction (2007), decreased to 18% during the second year and fell to 4% during the fifth year (2011, the last year of data provided). Similarly, SCR-related warranty claims were at 20% during their initial year of introduction (2010) and decreased to 10% during the second year (2011). Also of note is how other technologies were affected during the introduction of a new technology. For example, warranty claims for engine/ECM/other components increased from 22% prior to the introduction of particulate filters to 90% during the first year this technology was introduced.

This data highlights the fact that additional warranty, maintenance and downtime costs result when new or significantly altered technologies are introduced. Based on operational cost data collected from

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

motor carriers, the cost of repair and maintenance accounts for 6-9% of the marginal cost of operating a truck.[2] The assessment should be expanded to include a discussion of how emerging technologies can create additional warranty, maintenance and downtime costs based on the data available.

P. A-4: Waste heat recovery ("WHR") was explored as a potential fuel efficiency technology under the U.S. Department of Energy's SuperTruck initiative – a program developed to advance the fuel efficiency of tractor-trailers by 50% over baseline models. The SuperTrucks equipped with WHR were developed and unveiled by heavy-duty manufacturers in project demonstration vehicles funded through federal and private sector sources. However, these prototype trucks are currently not production-ready and therefore have not been thoroughly tested across the challenging and widely varied duty-cycles that exist in the trucking industry. Our member companies have clearly expressed their desire to only purchase technologies that are thoroughly tested, verified, affordable, and proven to be both durable and affordable

EPA assumed WHR technology will cost $10,523 in 2021.[3] Figures derived from the DOE SuperTruck program ranged from $7,200 - $15,000. Because WHR is not currently in the market, the actual costs remain unknown. Some OEMs state that the agencies' costs are actually higher than this figure while another OEM says it is over-inflated. This wide-ranging pricing uncertainty should raise a cautionary flag as WHR is the highest cost menu item under the current heavy heavy-duty engine technology listings under EPA's Phase 2 proposal.

P. A-34: The assessment identifies the role lighter weight materials can play in advancing fuel efficiency. In contrast, the use of stronger materials and additional fuel saving components (i.e., aerodynamic devices, hybridization, auxiliary power units, etc.) can quickly overcome the gains of light-weighting. It is estimated that emissions regulations, fuel economy features, and driver amenities have added about 1,000 pounds to a tractor over the last decade.[4]

This trade-off is further illustrated by the recent NHTSA proposed rulemaking pertaining to rear impact (under-ride) guards.[5] The proposal estimates upgraded rear impact guards add approximately 50 lb of weight increase to a trailer which reduced overall fuel economy. NHTSA is still evaluating an additional petition to improve side under-ride and front over-ride guards for all trucks and will issue a separate decision on these issues at a later date. The assessment should provide some balance to the light-weight discussion by including how other environmental and safety initiatives can offset these benefits.

P. A-35: Low rolling resistance tires ("LRRTs") need to have improved wear rates such that our industry is not adversely impacting the environment by putting more casings into landfills and increasing natural resource use in manufacturing their replacements. The industry commonly sees a 40% reduction in useful life and a 20% reduction in casing life resulting from LRRTs. For example, wide-base single tires

[2] American Transportation Research Institute, An Analysis of the Operational Cost of Trucking: 2015 Update (September 2015).
[3] U.S. Environmental Protection Agency and Department of Transportation National Highway Traffic Safety Administration, *ibid*.
[4] Trucking Efficiency, *Confidence Report: Lightweighting Executive Summary* (August 2015).
[5] Department of Transportation, National Highway Traffic Safety Administration, *Notice of Proposed Rulemaking, Rear Impact Guards, Rear Impact Protection* (December 2015).

have shown poor tread wear in the tighter turning conditions of urban operations.[6] When measuring efficiency improvements, it should be done with consideration of cradle-to-grave costs and consequences.

Tire rolling resistance must also be tailored to each vehicle subcategory. This especially holds true with respect to Class 4-6 vocational vehicles. SmartWay tire verification focuses on in-use highway applications – not vocational operations. Class 6 tires currently have a heavy-rub band on the sidewall to prevent sidewall damage largely caused by excessive scrubbing against curbs during urbanized hauls. Thicker sidewalls help maintain casing integrity and affords fleets the ability to get close to four subsequent retreads. LRRTs typically do away with thicker side bands to lower tire weight (in the range of 30%) and get better fuel economy test track results. Unfortunately, fleets do not deliver goods on test tracks and even the best drivers have contact with curbs throughout their delivery schedules.

Further reducing tire rolling resistance can result in the trade-off of shorter useful lives and fewer retread opportunities. It takes 23 gallons of oil to manufacture a new tire and only 8 gallons to retread – a statistic that cannot be ignored in undertaking both carbon and fuel use analyses. If better tire rolling resistance levels can be achieved while maintaining heavy-rub bands needed for greater casing integrity and durability, both CTA and ATA would be in a better position to support vocational tire requirements.

Finally, many vocational applications need to go off-road at construction sites, mining operations, landfills, and similar locales. LRRTs do not satisfy customer needs for adequate traction in these environments. CTA and ATA request that CARB ensure the independent study of new generation LRRTs in advance of their entry into the marketplace to assess safety, traction, and availability.

P. A-37: The assessment only discusses the use of automatic tire inflation systems ("ATIS"). Tire pressure monitoring systems ("TPMS") provide similar benefits but at a lower cost. A recent study on truck and tire inflation systems indicates that both ATIS and TPMS are being utilized in fleet operations. As of 2012, approximately 33% and 10% of surveyed fleets utilize ATIS and TPMS respectively on their trailers.[7] Roughly 1% of tractors used ATIS. Operators are well aware of the increased fuel consumption, maintenance costs, downtime, and safety concerns associated with operating heavy-duty vehicle with under-inflated tires. These concerns over time have been significant given the historic volatility of diesel prices, the competitive nature of the industry, shipper pressures to reduce costs, and the rising costs of liability.

TPMS tends to be overlooked since they require user interaction to inflate tires to appropriate pressures. A misguided assumption is that drivers "may" continue to operate a vehicle with underinflated tires. However, in light of continual pressures on fleets to reduce total costs of operation in order to remain competitive and profitable, TPMS is a viable technology option. In fact, the Federal Motor Carrier Safety Administration published the results of a field test of TPMS and ATIS on two fleets

[6] Committee to Assess Fuel Economy Technologies for Medium- and Heavy-Duty Vehicles, National Research Council, Transportation Research Board, *Technologies and Approaches to Reducing Fuel Consumption of Medium- and Heavy-Duty Vehicles* (2010).
[7] North American Council for Freight Efficiency, *Tire Pressure Systems Confidence Report* (August 2013).

that were considered to have good tire maintenance.[8] The test revealed that both TPMS and ATIS delivered a 1.4% improvement in fuel economy.

Today, TPMS is much more advanced than the first generation of TPMS that was tested by FMCSA which just delivers alerts to the driver in the cab through an in-cab display. Second generation TPMS (TPMS 2.0 systems) are integrated with telematics and GPS so that the tire data and alerts are sent from vehicles and delivered to a fleet's operations and maintenance department. By providing the fleet with the location and visibility of its tire problems, dispatch can provide instructions to the driver to handle developing tire problems immediately and maintenance is aware of the exact nature of these issues when the vehicle arrives at the fleet's location. With the reports these systems provide the fleet, problem tires are attended to before the vehicle sets out on its next trip, thereby dramatically reducing in-route breakdowns and optimizing the percentage of time tires are run properly inflated. In essence, a fleet is able to build its entire tire maintenance program around this technology and drastically improve its ongoing tire inflation maintenance. Therefore this technology has an even greater effect on fuel consumption and greenhouse gas emissions than the TPMS 1.0 systems which were proven to deliver 1.4% improvement in fuel economy by the FMCSA. As a result, the assessment should include TPMS as a technology option.

P. A-39: Single-axle 6x2 drive tractors are widely used in European trucking operations and have been for some time. For U.S. regional fleets that make a lot of deliveries, it is often not the best technology choice because of curb cuts and other uneven terrain features that can expose the truck to traction issues.

CTA and ATA member companies have not universally endorsed such technology. Recent surveys indicate current market penetration rates of new line-haul 6x2 tractor sales are only in the range of 2%.[9] According to member companies, reasons for the current low level of adoption include limitations to highway applications, less flexibility, lower residual rates when switching to vocational applications, traction issues, driver dissatisfaction, tire wear and spec'ing, legality of their use, and driver acceptance. While recent improvements in traction control systems can automatically shift weight for short periods of time from the non-driving axle to the driving axle during low-traction events, concerns remain over the impacts to highways caused by such shifting of weight between axles.

"Non-liftable" 6x2 axles in the states of North Dakota, Kansas, Indiana, Pennsylvania, Connecticut, Massachusetts, and New Hampshire are currently prohibited. "Liftable" 6x2 axles are legal across the country with the possible exception of Utah. Utah had required that lift axles be steerable. However, it is our understanding that state officials have agreed to revise their language to ensure their legality. Many carriers also conduct cross-border operations with Canada. 6x2 axle configurations are illegal in the province of British Columbia and face regulatory restrictions in other provinces as well. Fleet owners must remain vigilant to deploy 6x2 technologies only to jurisdictions that permit their use.

---

[8] Brady, Stephen; Van Order, Deborah; Sharp, Asa, *Advanced Sensors and Applications: Commercial Motor Vehicle Tire Pressure Monitoring and Maintenance*, U.S. Department of Transportation, Federal Motor Carrier Safety Administration (February 2014).

[9] North American Council for Freight Efficiency, Confidence Findings on the Potential of 6x2 Axles (January 13, 2014).

6x2 axle configurations can restrict future resale markets by limiting the types of applications where these types of configurations can be used. Residual values of equipment are critical for fleets in making their purchasing decisions. Constricting after-market resale opportunities for initial purchasers of equipment will extend the payback periods on 6x2s, making them less cost-effective in many applications. Additional study of the operational and regulatory challenges associated with 6x2 technology applications should be added to the assessment.

P. A-41: Diesel auxiliary power units (APUs) are one of several alternatives to operating the main engine for ancillary power and cab comfort. And while APUs provide year-round comfort and fuel savings, as opposed to heat- or air conditioning-only systems, they tend to be at the higher end of the cost spectrum. The assessment does not reflect the state's requirements for additional emissions controls on this technology and their impact on the cost and use of this technology.

California currently requires diesel APUs to be equipped with particulate filters when used on trucks with 2007 and newer engines. And while these filters are available, use has been limited primarily due to the additional cost and maintenance. Carriers who rely on APUs for fuel savings throughout the United States tend to forego their use in California in order to comply with the state's unique filter requirements. This practice reduces the overall fuel savings benefit from diesel APUs.

Currently battery-powered APUs are another option. However, depending on a number of factors, including period of operation, ambient temperature, power demand, etc., this option may or may not meet a carrier's ancillary power and cab comfort requirements during federally-mandated rest periods. By increasing the cost of one of the most common idle reduction technologies, diesel APUs, solutions to reduce idling have become more limited.

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

Respectfully,

Chris Shimoda
Director of Policy
California Trucking Association

Mike Tunnell
Director, Energy and Environmental Affairs
American Trucking Associations