August 27, 2020

The Honorable Mary Nichols
Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Support for Heavy-duty Engine and Vehicle Omnibus Rulemaking

Dear Chairwoman Nichols and Members of the Board,

Environmental Defense Fund (EDF) strongly supports the Air Resources Board's (ARB) proposed Heavy-duty Engine and Vehicle Omnibus Rulemaking, which is expected to prevent nearly 3,900 deaths, more than 1,300 hospitalizations and 1,800 emergency room visits, with statewide health benefits of $36.8 billion, over eight times the cost. The proposal constitutes the largest reduction in ozone-forming oxides of nitrogen (NOx) emissions in California's State Strategy for the State Implementation Plan (SIP), leading to reductions in ground-level ozone (smog) and harmful secondary particulate matter. It would have the largest benefits in areas near heavy truck traffic – more often home to people of color and lower income populations who suffer disproportionately from mobile source pollution. The proposed standards are feasible and cost-effective and, together with the Advanced Clean Truck (ACT) rule, will help transition California and the nation toward a zero emitting heavy-duty fleet.

EDF fully supports these elements of the proposal:

- More protective NOx standards that are 75 percent below current standards beginning in 2024 and 90 percent below current standards in 2027
- A new low load and speed test cycle to assure that emissions are reduced in all driving modes, including those that occur in or near neighborhoods exposed to high truck traffic
- Updated particulate matter (PM) emissions standards to prevent backsliding
- Extension of vehicle warranty and useful life to improve durability
- Updated compliance procedures that more fully capture in-use emissions

EDF also asks that the Board:

- Eliminate the provision that allows emissions credits earned in the ACT program to also count toward compliance with the proposed Omnibus regulation, which would result in a decrease in much needed emissions reductions.

1. California needs substantial NOx reductions to save lives and meet health-based ozone standards

According to the American Lung Association's annual State of the Air report, 150 million people – nearly half of all Americans – live in counties with unhealthy levels of ozone or particle pollution, and many of the hardest hit communities are in California.[1] The South Coast and San Joaquin Valley are the only two areas in the nation designated as "extreme" nonattainment for the federal health-based ozone standard and the San Joaquin Valley has the highest fine particulate levels in the nation.[2] Southern California has the nation's worst smog and is falling farther out of compliance with national health-based standards as pollution levels have increased in recent years (before COVID-19).[3] As a result, the area saw a 10 percent increase in deaths attributable to ozone pollution from 2010 to 2017.[4] And communities of color and disadvantaged communities suffer disproportionately from California's dirty air. Large reductions in health-harming NOx emissions are needed to help bring large parts of the state into attainment with the health-based ozone standard and reduce the impact on vulnerable communities.

Heavy-duty trucks and buses are the leading source of ozone-forming NOx emissions in California and are responsible for nearly a quarter of all NOx emissions nationwide.[5] Even with criteria and greenhouse gas emissions standards in place for heavy-duty highway vehicles, they continue to emit a third of statewide NOx, a quarter of statewide diesel particulate matter, and significant climate pollution and air toxics, all of which contribute to serious public health problems.[6] In order for the South Coast to meet the 2008 health-based ozone standard by 2031, NOx emissions from heavy-duty trucks and buses will need to be cut by roughly 85 percent.[7]

We applaud ARB's leadership in adopting the first-ever zero emissions vehicle (ZEV) program for heavy-duty trucks and buses in our nation. The Advanced Clean Trucks (ACT) rule will

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[1] American Lung Association. 2020. State of the Air. http://www.stateoftheair.org/assets/SOTA-2020.pdf
[2] U.S. EPA. Nonattainment Areas for Criteria Pollutants (Greenbook). https://www.epa.gov/green-book
[3] American Lung Association. 2020. State of the Air 2020, California: Los Angeles. http://www.stateoftheair.org/city-rankings/states/california/los-angeles.html
[4] Cromar, K., Gladson, L., and Ewart, G. 2019. Trends in Excess Morbidity and Mortality Associated with Air Pollution above American Thoracic Society–Recommended Standards, 2008–2017. *Ann Am Thorac Soc*, 16(7):836-845. https://pubmed.ncbi.nlm.nih.gov/31112414/
[5] EPA. 2017 National Emissions Inventory (NEI) Data. https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data
[6] California Air Resources Board. 2020. Public Hearing to Consider the Proposed Heavy-duty Engine and Vehicle Omnibus Regulation and Association Amendments, Staff Report: Initial Statement of Reasons ("ISOR").
[7] https://ww2.arb.ca.gov/sites/default/files/2020-08/HD_NOx_Omnibus_Fact_Sheet.pdf?utm_medium=email&utm_source=govdelivery

reduce carbon dioxide pollution by 2.9 million metric tons in 2040 and reduce NOx emissions by 28 tons per day.[8] The transition to a fully electric transportation system is critical to mitigate climate pollution and reduce the health burden on Californians. However, it is also imperative that the state address the tailpipe emissions from fossil fuel heavy-duty trucks and buses for as long as they continue to be manufactured. California has an opportunity to continue its leadership in advancing clean vehicle technology while addressing the pressing need for cleaner air in communities suffering from dangerous pollution levels.

2. Heavy-duty truck and bus pollution disproportionately harm communities near roadways

Transportation pollution does not impact communities equally – those living and working near heavily trafficked roadways suffer the greatest harms, and many are communities of color and disadvantaged populations. Heavy-duty highway vehicles contribute significantly to elevated concentrations of many pollutants near major roadways, and the risks associated with roadside exposure to these pollutants are a serious public health concern.[9] Hundreds of studies over multiple decades have found that exposure to vehicle pollution causes adverse health impacts in utero, in infants and children, and in adults.[10] In 2010, the Health Effects Institute published a major review of this evidence and concluded that traffic pollution causes asthma attacks in children and may cause a wide range of other effects including: the onset of childhood asthma, impaired lung function, premature death, death from cardiovascular diseases and cardiovascular morbidity. [11]

The number of people living "next to a busy road" may include 30 to 45 percent of the urban population in North America.[12] In Southern California, more than 1.2 million people live within

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[8] https://ww3.arb.ca.gov/regact/2019/act2019/30dayattc.pdf

[9] See e.g., American Lung Association website, Living Near Highways and Air Pollution. https://www.lung.org/our-initiatives/healthy-air/outdoor/air-pollution/highways.html. EPA. 2014. *Near Roadway Air Pollution and Health: Frequently Asked Questions*, EPA-420-F-14-044. https://nepis.epa.gov/Exe/ZyPDF.cgi/P100NFFD.PDF?Dockey=P100NFFD.PDF

[10] *See, e.g.*, Riley, S., Wallace, J., & Nair, P. 2012. Proximity to Major Roadways is a Risk Factor for Airway Hyper-Responsiveness in Adults. *Can. Respir. J., 19*(2):89-95. McConnell, R. et al. 2010. Childhood Incident Asthma and Traffic-Related Air Pollution at Home and School. *Envtl. Health Perspect.,118*(7):1021-6. Huynh, P. et al. 2010. Residential Proximity to Freeways is Associated with Uncontrolled Asthma in Inner-City Hispanic Children and Adolescents, *J. Allergy (Cairo).* Chang, J. et al. 2009. Repeated Respiratory Hospital Encounters Among Children with Asthma and Residential Proximity to Traffic. *Occup. Envtl. Med., 66*(2):90-8. Salam, M.T., Islam, T, & Gilliland, F.D. 2008. Recent Evidence for Adverse Effects of Residential Proximity to Traffic Sources on Asthma. *Curr. Opin. Pulm. Med., 14*(1):3-8.

[11] Health Effects Institute Panel on the Health Effects of Traffic-Related Air Pollution. 2010. *Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects.* Health Effects Institute: Boston. Because much new science has been published since 2010, the HEI Board of Directors appointed a new expert HEI Panel in 2018 to review the traffic-related air pollution and health literature. The findings will be published as an HEI Special Report in summer 2021.

[12] *Id.*

500 feet of a freeway.[13] This is despite the fact that, citing the risk to public health near roadways, the state of California recommends avoiding placing homes, schools, daycares, playgrounds or medical facilities within 500 feet of a freeway or high-traffic road.[14]

The health risks of near roadway pollution are disproportionately high for people of color and lower income neighborhoods, because these groups constitute a higher percentage of the population near major roadways.[15] A recent study by the Union of Concerned Scientists found that Blacks, Latino Americans, Asian Americans and lower income communities are exposed to substantially more air pollution from highway vehicles than any other demographic in California.[16] On average, Blacks and Latino Americans in California are exposed to fine particulate pollution that is 43 percent and 39 percent higher, respectively, than exposure for white Californians.

California's elevated pollution levels add to the already existing health disparities that racial and ethnic communities in the United States face, including higher rates of chronic disease and premature death.[17] EPA's most recent literature review of the science related to the health and welfare effects of particle pollution concluded that Blacks and lower income populations are at a greater risk for health impacts from fine particulates.[18] Blacks and Latino Americans tend to live in places where they are exposed to greater levels of air pollution, including near high emitting facilities and major roadways.[19] And numerous studies have found that Blacks have a higher risk of premature death from ozone and particle pollution than Whites.[20, 21] The risks associated with

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[13] American Lung Association. 2020. State of the Air. http://www.stateoftheair.org/assets/SOTA-2020.pdf
[14] ARB. April 2005. *Air Quality and Land Use Handbook: A Community Health Perspective*. https://ww3.arb.ca.gov/ch/handbook.pdf
[15] Gregory M. Rowangould. 2013. A census of the US near-roadway population: Public health and environmental justice considerations. *Transportation Research Part D 25*, 59–67. https://www.sciencedirect.com/science/article/pii/S1361920913001107.
[16] Union of Concerned Scientists. 2019. *Inequitable Exposure to Air Pollution from Vehicles in California*, Fact Sheet. https://www.ucsusa.org/resources/inequitable-exposure-air-pollution-vehicles-california-2019
[17] National Academies of Sciences. 2017. *Communities in Action: Pathways to Health Equity*. https://www.nap.edu/catalog/24624/communities-in-action-pathways-to-health-equity
[18] U.S. EPA. 2019. *Integrated Science Assessment (ISA) for Particulate Matter, Final Report*. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-19/188.
[19] Nardone A, Casey JA, Morello-Frosch R, Mujahid M, Balmes JR, Thakur N. 2020. Associations between historical residential redlining and current age-adjusted rates of emergency department visits due to asthma across eight cities in California: an ecological study. *Lancet Planet Health*. 4(1):e24-e31. Miranda ML, Edwards SE, Keating MH, Paul CJ. 2011. Making the environmental justice grade: The relative burden of air pollution exposure in the United States. *Int J Environ Res Public Health*. 8: 1755-1771. Ihab Mikati, Adam F. Benson, Thomas J. Luben, Jason D. Sacks, Jennifer Richmond-Bryant. April 2018. Disparities in Distribution of Particulate Matter Emission Sources by Race and Poverty Status, *American Journal of Public Health* 108, no. 4: pp. 480-485. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5844406/
[20] Kioumourtzoglou MA, Schwartz J, James P, Dominici F, Zanobetti A. 2016. PM2.5 and mortality in 207 US cities: Modification by temperature and city characteristics. *Epidemiology*, 27: 221-227. Di Q, et al. 2017. Air Pollution and Mortality in the Medicare Population. *N Engl J Med*, 376:2513-2522.
[21] Bell ML, Dominici F. 2008. Effect modification by community characteristics on the short-term effects of ozone exposure and mortality in 98 US communities. *Am J Epidemiol*. 167: 986-997

air pollution during pregnancy, including preterm birth and low birth weight, are highest in Black women.[22] A large examination of particle pollution-related mortality nationwide found that lower income consistently was associated with an increase in the risk of premature death from fine particulate pollution.[23] Low neighborhood income has also been associated with an increase in air pollution-related asthma emergency department visit rates in children.[24] Additionally, the relationship between ozone level and mortality is stronger among populations with higher unemployment.[25]

3. Near roadway air monitors highlight heavy truck pollution

Commercial diesel trucks impose an especially heavy toll on California neighborhoods along their routes. A 2017 study used Google street view vehicles equipped with fast-response measurement devices to repeatedly sample every street in a 30-km^2 area of Oakland, CA, developing the largest urban air quality data set of its type.[26] The collected data showed that transportation-related air pollution (black carbon and NOx) was much higher on a freeway that's a designated truck route (I-880) compared to another freeway in the same city where trucks are prohibited (I-580). According to the data, concentrations of black carbon along I-880 were roughly 60 percent higher than average concentrations along I-580, concentrations of nitrogen dioxide (NO2) were 50 percent higher, and concentrations of nitric oxide (NO) were double. The study also reported higher pollutant concentrations on city-designated truck routes than on other surface streets.

Another study near the Port of Oakland that used a web of black carbon monitors also found that black carbon levels measured along truck routes were higher compared to measurements at most other sites, including those near industrial facilities, near other highways and on residential streets.[27] These patterns point to a localized diesel-fueled mobile source influence associated with large diesel trucks, leading to potential cumulative exposure effects near roadways. And these elevated pollution levels have major health implications. County health data from 2016 shows that people who grow up near the I-880 freeway in Oakland have more hospital visits due

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[22] Bruce Bekkar, MD, Susan Pacheco, MD, Rupa Basu, PhD et. al. 2020. Association of Air Pollution and Heat Exposure with Preterm Birth, Low Birth Weight, and Stillbirth in the US. *JAMA Netw Open*.;3(6):e208243. https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2767260?utm_source=For_The_Media&utm_medium=referral&utm_campaign=ftm_links&utm_term=061820

[23] Zeger SL, Dominici F, McDermott A, Samet J. 2008. Mortality in the Medicare population and chronic exposure to fine particulate air pollution in urban centers (2000-2005). *Environ Health Perspect*. 116: 1614-1619.

[24] O'Lenick, CR et al. 2017. Assessment of neighborhood-level socioeconomic status as a modifier of air pollution-asthma associations among children in Atlanta. *J Epi Comm Health*. 71(2):129-136.

[25] Bell ML, Dominici F. 2008. Effect modification by community characteristics on the short-term effects of ozone exposure and mortality in 98 US communities. *Am J Epidemiol*. 167: 986-997.

[26] Joshua S. Apte et. al. 2017. High-Resolution Air Pollution Mapping with Google Street View Cars: Exploiting Big Data, *Environ. Sci. Technol.* 51, 12, 6999-7008.

[27] Julien J. Caubel et. at. 2019. A Distributed Network of 100 Black Carbon Sensors for 100 Days of Air Quality Monitoring in West Oakland, California, *Environ. Sci. Technol.* 53, 13, 7564-7573.

to asthma and live shorter lives than people who grow up near I-580, indicating that proximity to more heavy-duty truck pollution could impact health outcomes.[28]

This evidence points to the need for additional measures to curb the health-harming air pollution from heavy-duty vehicles. Advanced aftertreatment technology has brought significant tailpipe reductions over the last few decades. But these studies highlight that California still needs significant reductions in NOx emissions to adequately protect communities that live near major roadways and to meet health-based ozone standards.

4. Proposed NOx standards are feasible

EDF fully supports ARB's proposed model year 2024 NOx and PM standards and the 2027 NOx standard on existing regulatory cycles. EDF also supports the proposed NOx standard on the new low load and speed test cycle that will ensure emissions are reduced in all driving modes, including those that occur in or near residential neighborhoods exposed to high truck traffic. These more protective standards will significantly reduce NOx emissions and prevent PM emissions from backsliding.

ARB staff has demonstrated the technical feasibility of both the 2024 and 2027 proposed NOx standards through several years of extensive development and testing in partnership with the Southwest Research Institute (SwRI).[29] The development and testing, together with related work by manufacturers, show that the proposed 2024 standards can be met using a combination of improved engine calibration, the newest configuration of after-treatment devices and urea injection. And the 0.02 g/bhp-hr NOx standard proposed for model year 2027 and subsequent years can be achieved by adding cylinder deactivation - a technology widely used in passenger vehicles.[30]

While testing has seen NOx emissions deteriorate slightly above the proposed 2027 standard as the test engine is approaching its useful life, SwRI has identified three additional approaches that engine manufacturers can pursue to decrease emission deterioration. These approaches increase the efficiency of the NOx after-treatment devices to reduce NOx emissions below the proposed standard, allowing for future deterioration. Moreover, engine manufacturers still have six years to improve the NOx control system before compliance in 2027, ample time to address emission deterioration.

The proposed standards will have no adverse impact on carbon dioxide (CO_2) emissions or fuel consumption.[31] Past heavy-duty diesel NOx standards resulted in an increase in fuel consumption

[28] http://www.acphd.org/media/441336/maps2016.pdf
[29] ISOR at ES-12.
[30] ISOR at III-12 to III-27.
[31] ISOR at V-5.

and CO_2 emissions,. SwRI has shown that this tradeoff can be prevented. SwRI evaluated several engine modifications that could prevent an increase in fuel consumption while simultaneously reducing NOx. SwRI down-selected cylinder deactivation as the most practical technology that helps improve engine efficiency and reduce CO_2. Cylinder deactivation also increases exhaust temperature, which reduces CO_2 by improving NOx catalyst efficiency, especially at low speed and low load conditions where current after-treatment systems have been less effective due to low exhaust temperature. Thus, cylinder deactivation helps achieve a 90 percent reduction in NOx emissions under most driving conditions with no increase in CO_2 emissions or fuel consumption.

To put the challenge of meeting the proposed standards into perspective, the last revision of the NOx standard for 2010 heavy-duty diesel engines was one of the most technology forcing emission standards ever adopted by EPA and ARB. Compliance required development of a completely new catalyst working in concert with newly developed particulate filters, a urea dosing system that had to closely track the amount of engine-out NOx in the tailpipe that varies greatly under different driving conditions and integration of an advanced and complex engine exhaust gas recirculation system – all while maintaining minimal impact on fuel consumption. The heavy-duty diesel engine manufacturers stepped up to this unprecedented challenge and successfully met the 2010 NOx standards. The proposed 2027 NOx standards do not compare to the technological challenge they faced with 2010 NOx standards. The testing data and available technologies provide a rigorous foundation for achieving these new standards. .

5. Proposed standards are cost beneficial and cost effective

In addition to being feasible, the proposed standards are cost beneficial. According to ARB staff's thorough assessment, the monetized health benefits of the NOx emissions reductions are eight times greater than the costs of compliance, primarily as a result of the significant prevention of nearly 3,900 premature deaths.[32] The lifecycle cost increase of buying a new, cleaner diesel truck meeting the 0.02 g/bhp-hr proposed standard ranges from about 5 to 9 percent, depending on the truck size and model year, which we believe will not be a barrier to most businesses purchasing new trucks.[33] Overall, the cost effectiveness of the proposed rulemaking is $5.45 per pound of NOx reduced, which falls within the range of previously adopted ARB regulations and is also in the range of stationary source NOx reduction regulations adopted by NESCAUM.[34]

[32] ISOR at V-11, Table V-4 and IX-49, Table IX-33.
[33] ISOR at ES-15 and 16, Tables ES-7, ES-8.
[34] ISOR at IX-50, Figure IX-2.

Based on the data and analyses in the ISOR, EDF believes the proposed emission standards and procedures are imperative, feasible and cost beneficial. EDF urges to Board to adopt the proposed standards and procedures.

6. EDF supports proposal to extend warranty and useful life

EDF fully supports the proposed extension of the emissions warranty and useful life to better reflect the long life of trucks. An extended emissions warranty benefits truck owners and air quality. Warranties encourage owners to seek emission related repairs to their trucks, which reduces the number of high emitters on the road. Equally important, the cost of providing an extended warranty incentivizes engine manufacturers to improve the durability of engines and emission controls and doing so provides a cost and reputational advantage over competitors who do not. Additionally, staff research has found that without extended warranties many California fleets are experiencing significant vehicle downtime, and therefore increased costs, as a result of parts failure.[35] Extended warranties could also prevent tampering and mal-maintenance as such an action would void a warranty and not make economic sense.[36]

Currently, the emissions warranty for heavy-duty diesel trucks is 5 years/100,000 miles, whichever comes first. Surveys show that high use heavy-duty engines are used for up to 855,000 miles before being rebuilt or replaced.[37] Therefore, the warranty provides little benefit as it can expire in the first few years of operation, covering only 12 percent of expected lifetime mileage. In contrast, the current emission warranty for passenger vehicles, which is 15 years/150,000 miles for ultra-low emission (SULEV) passenger vehicles, covers about 75 percent of the average lifetime miles of a passenger car in California.[38] In 2018, ARB adopted to increase heavy-duty truck warranties, effective with the 2022 model year, to cover about a third of lifetime mileage.[39] The current proposal increases the warranty period to 65 to 70 percent of lifetime mileage, depending on the class of truck, and puts the warranty coverage more in line with the current passenger car warranty period, as shown below.

Warranty Periods for HDD engines and Comparison to Passenger Vehicles

Model Year	**Status**	**HD Warranty as % of Lifetime Miles[1]**			**Warranty Years**
		HHD	**MHD**	**LHD**	
Thru 2021	Current	12	23	31	5
2022-26	Adopted	41	35	34	5
2027-30	**Proposed**	**53**	**51**	**46**	**7**
2031 on	**Proposed**	**70**	**65**	**64**	**10**

[35] ISOR at II-14
[36] ISOR at II-16
[37] ISOR at II-15
[38] https://ww2.arb.ca.gov/resources/fact-sheets/california-vehicle-and-emissions-warranty-periods
[39] ISOR at I-32, Figure I-3

		Car	**LD Truck**		
SULEV	Current	75	65		15

[1]HD lifetime miles based on MacKay; 200K and 228K for PC and LDT based on 2004 ARB study.

Notwithstanding the warranty period comparison with passenger vehicles, the extended warranty becomes more important as trucks meeting the proposed low NOx standard become more dependent on exhaust after-treatment systems to assure compliance. While failure of engine related emission components often affects engine performance which encourages repair, failure of exhaust emission control systems may not. Thus, even with onboard diagnostic (OBD) monitoring, there is an economic incentive to ignore or defer repairs due to high costs. The extended warranty will remove this cost barrier and help assure timely emission-related repairs are made.

EDF urges the Board to adopt the extension of the emissions warranty as proposed because it will incentivize repair of high emitting trucks and encourage engine manufacturers to increase the durability of emission control systems, decreasing emissions.

7. EDF supports updated compliance procedures to fully capture in-use emissions

For passenger vehicles, in-use compliance requirements complement pre-sale certification requirements to help ensure that emission control continues through the vehicle's life. Programs like Smog Check and OBD are designed to identify individual vehicles with worn or defective emission controls that cause emissions to be well above certification standards. Other programs, like warranty reporting and recall, focus on systemic in-use deficiencies that affect a specific model of vehicle. These programs have been in place for decades and contribute to lower in-use emissions from passenger vehicles.

For heavy trucks, a smoke inspection program of individual trucks helps find those with high PM emissions, similar to the light-duty Smog Check. However, effective in-use programs to identify truck engines with defective or poorly designed emission control systems, and then require their redesign, do not exist. It is the engine, not the truck, that is certified for emissions. Therefore, determining if a heavy-duty truck is in compliance with certified emission standards requires removing the entire engine from the in-use truck and testing it on an engine dynamometer. Currently ARB does not have the test equipment to do this type of testing. And even if it did, the engine removal and testing is time consuming and costly, meaning few engines could be tested annually, compared to the large number of passenger vehicles ARB tests in-use. To overcome the practical problem of replicating the certification test on in-use trucks, an in-use test called the not-to-exceed (NTE) was developed in the late 1990s requiring engine manufacturers to periodically test a sample of their in-use trucks. Unfortunately, the test did not work well, with insufficient valid emissions data being recorded. The in-use warranty reporting program

designed to identify when a significant number of faulty emission parts was returned to the engine manufacturer also had its shortcomings. The recently adopted Real Assessment Emission Logging (REAL) that requires vehicles to collect and store on-board the truck NOx data from sensors did not require reporting the results to ARB. The staff agrees "the current HDIUT program is in need of a major overhaul to ensure it is controlling emissions during real-world operation."[40]

The staff proposal will help rectify these programs by making improvements to pre-sale durability testing, improvements to warranty reporting, reporting of REAL NOx data, and adoption of a new, more effective in-use compliance test called the EU Moving Average Window to replace the ineffective NTE test. These and other revisions will help improve the heavy-duty in-use testing program. In addition, the new Riverside lab will soon have an increased capability to measure on-road emissions using portable emission measurement systems (PEMS), and if necessary, verify results with its heavy-duty engine and chassis test beds at the new lab.

EDF supports the effort of the staff to improve the heavy-duty in-use compliance program. An emission standard without a good compliance program cannot be fully effective. EDF urges the Board to adopt all the specific improvements proposed by staff.

We also note that more opportunities to further improve the in-use compliance program lie ahead. As trucks use and improve the accuracy of on-board sensors that can directly measure tailpipe emissions, real time emission data can be stored in a truck's computer and periodically transmitted to regulatory agencies, providing a true picture of the real world impact of truck operation on air quality and an evaluation of the effectiveness of technology and regulations to control truck emissions. Real world CO_2 truck emissions could also be recorded. This would substantially strengthen the current ARB/EPA GHG regulation.

8. Board must eliminate provision allowing NOx credit trading with ACT program

EDF strongly urges the Board to eliminate the proposed provision that would allow trucks subject to the proposed low NOx regulation to claim NOx credits based on model year 2024 and newer zero emission trucks sold in compliance with the separate ACT rule. The zero emission trucks sold to comply with the ACT regulations provide real NOx and PM emission reductions that will help attain ozone NAAQS in California. Allowing these same zero emission trucks to also generate NOx credits that can be transferred and used to help heavy-duty combustion engines comply with the proposed low NOx rule is essentially double counting and would result in fewer emission reductions than otherwise achievable by the low NOx rule. Such a provision

[40] ISOR at II-11.

would result in thousands of new trucks sold in California with higher actual emissions because they can avoid complying with the proposed low NOx standards.

As an example, consider the NOx credits generated by zero emissions trucks sold between 2024 and 2030 in the volumes required to meet the ACT rule. These credits could allow over 12,000 new Class 8 diesel tractors to continue to be sold beginning in the 2027 model year while complying with the less protective 2024 standard, emitting over twice the amount of NOx allowed by the 2027 NOx standards.[41] There would be sufficient credits so that no Class 8 diesel tractor sold in 2027 would have to comply with the lower 2027 standard. Between 2027 and 2030, NOx credits would be sufficient to allow 60 percent of expected diesel Class 8 sales to continue to emit at the lower 2024 NOx standard.[42]

We recommend deleting the NOx credit provision from the proposed rule. The zero emission NOx credit provision would double count NOx emissions reductions and allow thousands of heavy-duty combustion engines to delay compliance with the proposed low NOx emission standards. This undercuts district and state efforts to achieve the significant NOx emission reductions needed to meet the NAAQS for ozone. The Board has already rejected the double counting of zero emission trucks in the passenger vehicle GHG and ACT rules. A manufacturer can use a zero emission Class 2b or 3 chassis certified truck to comply with either rule, but not both, thus avoiding double counting the emissions reductions. Likewise, the Board should reject allowing double counting of NOx emissions in the proposed low NOx rule.

Additionally, the credit provision is not needed to make compliance with the proposed NOx standards feasible. SWRI has demonstrated through testing that both the 2024 and 2027 standards can be met with available software and hardware improvements. A greater motivation to exceed the ACT zero emission sales volume requirement already exists, which is allowing excess sales in early years to offset the larger sales requirements in future years.

EDF would support restructuring the proposed rulemaking to provide NOx credits as an incentive for zero emission trucks sold prior to the implementation of the ACT rule (model years 2022-2023) because the sale of these trucks would be voluntary and not required by an ARB regulation. These credits could be used through the end of the 2026 model year and then sunset.

EDF strongly urges the Board to finalize the proposed NOx and PM standards expeditiously to reduce pollution afflicting the millions of people in California living in areas with unhealthy air

[41] Manufacturers of Emission Controls Association analysis.
[42] Manufacturers of Emission Controls Association analysis.

and to improve protections for the vulnerable communities suffering a disproportionate burden due to heavy truck traffic on nearby roads and highways.

Sincerely,

Tom Cackette
Chet France
Hilary Sinnamon
Consultants to Environmental Defense Fund