COMMENTS OF STATES AND CITIES SUPPORTING EPA'S PROPOSED GREENHOUSE GAS EMISSIONS STANDARDS FOR HEAVY-DUTY VEHICLES—PHASE 3

June 16, 2023

Docket ID: EPA-HQ-OAR-2022-0985
via regulations.gov

INTRODUCTION

Our States and Cities[1] hereby submit these comments in response to the Environmental Protection Agency's ("EPA") notice of proposed rulemaking: Greenhouse Gas Emissions Standards for Heavy-Duty Vehicles—Phase 3, 88 Fed. Reg. 25,926 (Apr. 27, 2023) ("Proposal"). We support EPA's proposal to strengthen its greenhouse gas ("GHG") standards for model year 2027 heavy-duty vehicles, and to promulgate new GHG standards for model years 2028 through 2032. But we urge EPA to finalize standards more stringent than the preferred alternative in the proposal—specifically to finalize standards that could produce levels of technological deployment and public protection equivalent to California's Advanced Clean Trucks ("ACT") Rule. We also urge EPA to finalize increasingly stringent standards through model years 2033 to 2035, and to continue to support technological advancement and deployment on par with ACT when doing so. Such standards are feasible nationwide, including in States that have not adopted ACT, and such standards are needed to address the harmful effects heavy-duty vehicles have on health and welfare in our States and Cities. Finally, we request that EPA not make the proposed change to the definition of "U.S.-directed production volume" because doing so risks undercutting the protection EPA's standards should provide, especially in areas where EPA (rather than state) standards apply. If EPA does make the proposed definitional change, it should not be effective until the first model year (e.g., 2027) for which EPA promulgates more stringent standards.

The transportation sector is the largest source of GHG emissions in the United States, and heavy-duty vehicles are the second-largest contributor within that sector. Reducing GHG emissions from heavy-duty vehicles is thus an essential element of addressing the growing climate emergency already impacting our States and Cities and the people who live in them. Scientists project climate change-related impacts will continue to worsen and will disproportionately impact historically marginalized communities. Heavy-duty vehicles are also a significant source of non-GHG pollutants that contribute to ambient concentrations of ozone, particulate matter, and air toxics. These pollutants are linked to premature death, respiratory

[1] The States of California, Connecticut, Hawaii, Illinois, Maine, Maryland, Minnesota, New Jersey, New York, North Carolina, Oregon, Rhode Island, Vermont, Washington, and Wisconsin; the People of the State of Michigan; the Commonwealths of Massachusetts and Pennsylvania; and the Cities of Chicago, Los Angeles, and New York.

illness including childhood asthma, cardiovascular problems, and other adverse health impacts. Lower income communities and communities of color are disproportionately harmed by these emissions because they are more likely to live, work, or go to school in or near areas with high heavy-duty vehicle activity, such as ports, highways, railyards, and distribution centers.

The Proposal's preferred alternative would set progressively more stringent GHG emissions standards for numerous vocational vehicles and tractor subcategories for model years 2027 through 2032, and, if finalized, would achieve significant reductions in GHG and non-GHG emissions. But the technologies necessary to meet more stringent standards already exist and are being adopted at a rate that far surpasses EPA's prior projections and EPA's projections here. At the same time, the costs to deploy these technologies are reasonable (indeed, electrification technologies will save consumers money over time), and those costs can reasonably be projected to fall within the timeframe relevant to these standards. We urge EPA to base its standards for model years 2027 through 2032 on a more robust and realistic projection of zero-emission vehicles ("ZEVs") in the heavy-duty sector and other technological advances in this sector, and to issue standards increasing in stringency through model year 2035.

BACKGROUND

I. FACTUAL BACKGROUND

A. Reducing GHG Emissions from Heavy-Duty Vehicles Is A Necessary Part of Tackling the Growing Climate Emergency

The Sixth Assessment Report of the Intergovernmental Panel on Climate Change ("IPCC Report") confirms the widespread and irreversible impacts caused by anthropogenic climate change.[2] Annual mean temperatures across North America have trended upward since 1960.[3] Nine of the United States' ten warmest years on record have occurred since 1998, while worldwide, all ten of the warmest years on record have occurred since 2005.[4] Indeed, April 2023 was the fourth-warmest April on record, with the second-highest ocean temperatures of *any*

[2] IPCC, *2022: Summary for Policymakers* [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)] ("Summary for Policymakers"). In: *Climate Change 2022: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3-33, doi:10.1017/9781009325844 at 9, 20 ("Sixth Assessment").

[3] *Id*. at 1936 (Sixth Assessment).

[4] U.S. Environmental Protection Agency, *Climate Change Indicators: Weather and Climate*, https://www.epa.gov/climate-indicators/weather-climate (last updated Aug. 1, 2022).

month on record.[5] There is a "virtually certain" chance that 2023 will rank among the ten warmest years on record, with a 93 percent chance it will rank among the top five.[6]

As temperatures rise, threats to public health and the environment in our States and Cities continue to mount. The IPCC Report emphasizes the importance of limiting warming, ideally to 1.5 degrees Celsius,[7] although even this level of warming would pose unavoidable risks to humans and ecosystems.[8] The transportation sector is the largest source of GHG emissions in the United States, with heavy-duty vehicles being the second-largest contributor within that sector. Reducing GHG emissions from heavy-duty vehicles is thus an essential element of addressing the growing climate emergency already impacting our residents. Our comments focus on the following climate impacts with economic, health, and societal damage in our States and Cities: wildfire damage, flooding and drought, melting of snowpack and diminishing water supply, and sea-level rise.

1. Increased Risk of Wildfire Damage

Rising temperatures combined with drier conditions are increasing the risk of wildfires.[9] By engendering warm and dry conditions,[10] climate change has contributed to more extreme wildfires in North America.[11] Consistent with this projection, the 2020 wildfire season was unprecedented—wildfires in Colorado burned more than 665,000 acres,[12] and historic wildfires burned 10.2 million acres across California, Oregon, and Washington.[13] California is uniquely vulnerable to wildfires because it has a short rainy season with significant plant growth in the winter followed by dry periods that turn the plant growth into potential fuel sources, making these areas highly fire-prone.[14] Indeed, a major commercial insurer cited wildfire risk as the

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[5] National Oceanic and Atmospheric Administration, *April 2023 was Earth's fourth warmest on record* (May 12, 2023), https://www.noaa.gov/news/april-2023-was-earths-fourth-warmest-on-record ("NOAA").

[6] NOAA, supra note 5.

[7] Summary for Policymakers, supra note 2, at 13–15, 19–20.

[8] *Id.* at 13–17 (Summary for Policymakers).

[9] U.S. Global Change Research Program 2018: *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA,

1515 pp. doi: 10.7930/NCA4.2018 ("Fourth National Climate Assessment"); Zachary A. Holden, et al., *Decreasing fire season precipitation increased recent western US forest wildfire activity*, 115 PNAS E8349, E8349 (Sept. 4, 2018), https://www.pnas.org/doi/epdf/10.1073/pnas.1802316115 ("[D]eclines in summer precipitation and wetting rain days have likely been a primary driver of increases in wildfire area burned.").

[10] Sixth Assessment, supra note 2, at 1948 (Ch. 14).

[11] *Id.* at 1939 (Sixth Assessment).

[12] John Ingold, *Five charts that show where 2020 ranks in Colorado wildfire history*, The Colorado Sun (Oct. 20, 2020), https://coloradosun.com/2020/10/20/colorado-largest-wildfire-history/.

[13] Adam B. Smith, *2020 U.S. billion-dollar weather and climate disasters in historical context*, Climate.gov (Jan. 8, 2021), https://www.climate.gov/print/837056.

[14] Scott Stephens et al., *Prehistoric Fire Area and Emission from California's Forests, Woodlands, Shrublands and Grasslands*, 251 Forest Ecology and Mgmt. 205, 205 (2007); Eric Kaufman, *Climate and Topography,* in ATLAS OF

reason it recently stopped accepting applications for homeowners insurance in California.[15] The places at greatest risk of wildfire damages are in the "Wildland-Urban Interface," "where houses and wildland vegetation meet or intermingle,"[16] and California has more homes in this Interface than any other state.[17] Increasing wildfires also endanger electrical transmission and distribution assets in Northern California, where critical power lines cross highly fire-prone areas.[18] Warming has also led to longer fire seasons.[19] Since the 1970s, wildfire season in the Western U.S. has extended from five months to over seven months long.[20] In the coming decades, climate change is projected to further increase fire activity across North America.[21]

These massive wildfires have broad impacts across our States and Cities. The 2020 wildfires—which conservatively cost an estimated $16.5 billion[22]—put half a million Oregonians under evacuation warnings or orders,[23] led to the displacement of about 100,000 people in California,[24] and killed 46 people in California, Oregon, and Washington.[25] The particulate matter produced by wildfires is hazardous to human health and disruptive to daily activities,[26] disrupting education in California due to cancelled classes for 1.1 million students[27] and reducing test scores, leading to reduced long-term future earnings.[28] This public health concern grows as the frequency and intensity of wildfires increase and is not limited to States where the wildfires are burning. The rising heat from the wildfires takes particulate matter and

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THE BIODIVERSITY OF CALIFORNIA 12 (2003); Jon Keeley, *Fire in Mediterranean Climate Ecosystems – A Comparative Overview*, 58 Isr. J. of Ecology & Evolution 123,124 (2012).

[15] Juliana Kim, *State Farm has stopped accepting homeowner insurance applications in California*, NPR (May 28, 2023), https://www.npr.org/2023/05/28/1178648989/state-farm-home-insurance-california-wildfires-inflation.

[16] Volker Radeloff et al., *Rapid Growth of the US Wildland-Urban Interface Raises Wildfire Risk*, 115 Proc. Nat'l Acad. Sci. 3314, 3314 (2018).

[17] U.S. Fed. Emergency Mgmt. Admin., *Wildland-Urban Interface: A Look at Issues and Resolutions* 10 (2022).

[18] Larry Dale, *Assessing the Impact of Wildfires on the California Electricity Grid* iv (2018).

[19] Sixth Assessment, supra note 2, at 1948.

[20] U.S. Department of Agriculture, *Wildfire*, https://www.climatehubs.usda.gov/taxonomy/term/398 (last accessed May 26, 2023).

[21] Sixth Assessment, supra note 2, at 1948 (Ch. 14).

[22] *Id*.; Nat'l Oceanic & Atmospheric Admin., *Billion-Dollar Disasters: Calculating the Costs*, https://www.ncdc.noaa.gov/monitoring-references/dyk/billions-calculations (last visited June 13, 2023).

[23] Associated Press News, *Latest: 500,000 people in Oregon forced to flee wildfires* (Sept. 10, 2020), https://apnews.com/article/kate-brown-fires-us-news-wa-state-wire-ca-state-wire-8e4e0818146a72c713de625e902f9962.

[24] World Meteorological Organization, *State of the Global Climate 2020* 36 (2021), https://library.wmo.int/doc_num.php?explnum_id=10444 (last visited June 16, 2023).

[25] Smith, *supra* note 13.

[26] Daniel Jacob and Darrel Winner, *Effect of Climate Change on Air Quality*, 43 Atmospheric Envtl. 51, 60 (2009).

[27] Ricardo Cano, *School Closures from California Wildfires This Week Have Kept More than a Million Kids Home*, CalMatters (Nov. 15, 2018), https://calmatters.org/environment/2018/11/school-closures-california-wildfires-1-million-students/.

[28] Jeff Wen & Marshall Burke, *Lower Test Scores from Wildfire Smoke Exposure*, 5 Nature Sustainability 947, 951-52 (2022).

toxic gases in the smoke into the jet stream, which can carry those hazardous substances thousands of miles and cause harmful air pollution across the country. During the 2020 wildfire season and again in July of 2021, smoke from wildfires burning on the West Coast caused New York City to experience some of the worst air quality in the world.[29] And in June 2023, New York City was once again blanketed in smoke, resulting in the highest measurements of 2.5 micron particles since recording began in 1999.[30] The combination of fierce wildfires in Canada and airflow patterns prompted the U.S. National Weather Service to issue air quality alerts for most of the Atlantic seaboard.[31]

2. Increased Risk of Severe Flooding and Severe Drought

Warmer temperatures also contribute to the severity of flooding experienced by our States and Cities. High-intensity rainfall (and other extreme weather events) create flooding risks[32] and heavy precipitation can overwhelm water control infrastructure.[33] In three events in summer 2022 alone, streets and homes in Dallas Fort-Worth were flooded after 18 hours of heavy precipitation, causing hundreds of car crashes and other water-related emergencies;[34] Death Valley, California received nearly a year's worth of rain in three hours,[35] causing the loss of a critical portion of a water system, the Emergency Operations Building, and over 600 feet of the water main;[36] and the St. Louis metropolitan area experienced its most intense rainfall since 1874, causing catastrophic flash flooding.[37] California also experiences intense floods from "atmospheric rivers"—narrow, intense bands of moist air that transport large amounts of water vapor towards Earth's poles.[38] California's mountain ranges force this warm moist air upwards,

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[29] *See, e.g.*, Oliver Milman, *New York air quality among worst in world as haze from western wildfires shrouds city*, The Guardian (Jul. 21, 2021), https://www.theguardian.com/us-news/2021/jul/21/new-york-air-quality-plunges-smoke-west-coast-wildfires.

[30] Aatish Bhatia, Josh Katz, & Margot Sanger-Katz, *Just How Bad was the Pollution in New York?*, N.Y.Times (June 9, 2023), https://www.nytimes.com/interactive/2023/06/08/upshot/new-york-city-smoke.html.

[31] Tyler Clifford, *US East Coast blanketed in veil of smoke from Canadian fires*, Reuters (June 8, 2023), https://www.reuters.com/business/environment/us-states-under-air-quality-alerts-canadian-smoke-drifts-south-2023-06-07/.

[32] *Id.* at 1962 (Sixth Assessment); Kiana Courtney et al., *Rising Waters: Climate Change Impacts and Toxic Risks to Lake Michigan's Shoreline Communities*, Environmental Law and Policy Center (2022), https://elpc.org/wp-content/uploads/2022/08/ELPCRisingWatersReport_2022.pdf.

[33] *Id.* at 1952 (Sixth Assessment).

[34] Associated Press, *Heavy rain floods streets across the Dallas-Fort Worth area* (August 22, 2022), https://www.npr.org/2022/08/22/1118928105/dallas-fort-worth-texas-flooding.

[35] Jennette Jurado & Nico Ramirez, *Death Valley Experiences 1,000 Year Rain Event*, National Park Service (Aug. 7, 2022), https://www.nps.gov/deva/learn/news/death-valley-experiences-1-000-year-rain-event.htm.

[36] *Id.*

[37] Samuel Oakford, John Muyskens, Sarah Cahlan & Joyce Sohyun Lee, *America Underwater: Extreme floods expose the flaws in FEMA's risk maps*, The Washington Post (Dec. 6, 2022), https://www.washingtonpost.com/climate-environment/interactive/2022/fema-flood-risk-maps-failures/.

[38] Michael Dettinger, *Climate Change, Atmospheric Rivers, and Floods in California – A Multimodel Analysis of Storm Frequency and Magnitude Changes*, 47 J. Am. Water Res. Ass'n 514, 515 (2011).

causing the water vapor to fall as rain.[39] These particular California topographic features render the atmospheric rivers devastating to local communities in the state.[40]

Warmer temperatures also contribute to the severity of drought experienced by our States and Cities. In 2022, Massachusetts experienced significant or critical drought conditions across the entire state, leading to drought-induced fires, water restrictions, and water quality and availability impacts on private wells and water-dependent habitats across the state.[41] Since early 2020, the southwestern United States has experienced one of the most severe long-term droughts of the past 1,200 years, triggered by multiple seasons of record low precipitation and near-record temperatures.[42] Drought also afflicted the Pacific Northwest in 2020, caused by the mountain snowpack melting quickly rather than gradually into the foothills and plateau.[43] Droughts in the western United States have caused substantial economic and environmental damage.[44] California is particularly vulnerable to the increased risk of drought as warming temperatures "lead[] to more precipitation falling as rain rather than snow, faster melting of winter snowpack, greater rates of evaporation, and drier soils."[45] Between September 2019 and August 2022, California experienced the driest three-year stretch on record.[46]

Both droughts and floods will become more intense as the Earth warms, which may result in, among other impacts, the degradation of water supply security,[47] ecological vulnerabilities,[48] and water quality impairment.[49] This threat is becoming increasingly dramatic on the Colorado

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[39] *See* U.S. Nat'l Weather Serv., *Orographic Lifting*, https://forecast.weather.gov/glossary.php?letter=o (last visited Oct. 31, 2022).

[40] Thomas Corringham et al., *Atmospheric Rivers Drive Flood Damages in the Western United States*, 5 Sci. Advances 1, 3 (2019).

[41] Massachusetts Drought Status (Sept. 8, 2022), http://bit.ly/3hKCnwR (last visited Nov. 28, 2022); Press Release, Mass. Exec. Off. of Energy & Env't Aff., *Massachusetts Continues to Experience Drought Conditions* (July 21, 2022), http://bit.ly/3Vi0RfS.

[42] *Climate Change Impacts on Agriculture and Food Supply*, U.S. Environmental Protection Agency, https://www.epa.gov/climateimpacts/climate-change-impacts-agriculture-and-food-supply#37foot (last updated Dec. 13, 2022).

[43] Rebecca Lindsay, *Drought emerges across the Pacific Northwest in spring 2020*, Climate.gov (May 26, 2020), https://www.climate.gov/news-features/event-tracker/drought-emerges-across-pacific-northwest-spring-2020.

[44] Sixth Assessment, supra note 2, at 1953.

[45] Gabriel Petek, California Legislative Analyst's Office, *What Can We Learn From How the State Responded to the Last Major Drought?* 2 (May 2021).

[46] U.S. Nat'l Oceanic and Atmospheric Admin., *Climate at a Glance Statewide Time Series: California Precipitation*, https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/statewide/time-series/4/pcp/36/8/1895-2022?base_prd=true&begbaseyear-1895&endbaseyear=2022 (last visited Jan. 8 2023); *see also* Rachel Becker, *Four in a Row: California Drought Likely to Continue*, CalMatters (Sep. 28, 2022), https://calmatters.org/environment/2022/09/california-drought-likely-to-continue/.

[47] *Public Health*, Drought.gov, https://www.drought.gov/sectors/public-health (last visited Jan. 30, 2022).

[48] Shelley D. Crausbay et al., American Meteorological Soc'y, *Defining Ecological Drought for the Twenty-First Century* 2545 (Dec. 2017).

[49] *Id.* at 1953 (Sixth Assessment).

River, where key reservoirs have been pushed to their limits.[50] Indeed, Arizona recently announced that it would not approve new housing construction in the Phoenix metropolitan area due to a limited supply of groundwater.[51] If reservoir levels continue to fall, the water supply of 25 million Americans in Arizona and California faces increasing risk.[52]

Most of California's precipitation occurs as snow, so water availability depends on the mountain snowpack,[53] which supplies approximately 30 percent of California's annual water demand.[54] Rising atmospheric temperatures decrease that snowpack, regardless of precipitation changes.[55] Indeed, California's water management systems have been built around the natural reservoir of the snowpack, which will melt earlier and faster in higher temperatures. Projections show that carry over storage—the volume of water in reservoirs before the start of the wet season in late fall—in California's two largest reservoirs, Shasta and Oroville, will decline by about one-third by the end of the century.[56] Reductions in snowpack and river flow may require the state to invest in expensive new water resources such as water desalination or other alternative solutions.[57]

3. Sea Level Rise

Climate change causes sea level rise in two primary ways: 1) by melting ice sheets and glaciers, and 2) by warming seawater, which consequently expands.[58] In the past three decades, rates of sea level rise have accelerated along most North American coasts.[59] Sea level rise has caused flooding, erosion, and infrastructure damage along the western Gulf of Mexico and the southeast US coasts,[60] and is even more dangerous in combination with dynamic processes like

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[50] Joshua Partlow, *Disaster scenarios raise the stakes for Colorado River negotiations*, The Washington Post (Dec. 17, 2022), https://www.washingtonpost.com/climate-environment/2022/12/17/colorado-river-crisis-conference/.

[51] Christopher Flavelle & Jack Healy, *Arizona Limits Construction Around Phoenix as Its Water Supply Dwindles*, N.Y. Times (June 1, 2023), https://www.nytimes.com/2023/06/01/climate/arizona-phoenix-permits-housing-water.html.

[52] *Id.*

[53] Moetasim Ashfaq et al., *Near-term Acceleration of Hydroclimatic Change in the Western U.S.*, 118 J. Geophysical Res.: Atmospheres 10,676, 10,676 (2013).

[54] Cal. Dep't of Water Res., *Early Winter Storms Provide Much-Needed Sierra Snowpack* (Dec. 30, 2021), https://water.ca.gov/New/News-Releases/2021/Dec-21/DWR-12-30-21-Snow-Survey.

[55] James Thorne et al., *The Magnitude and Spatial Patterns of Historical and Future Hydrologic Changes in California's Watersheds*, 6 Ecosphere 1, 17 (2015); *see also* Leah Fisher and Sonya Ziaja, *California's Fourth Climate Assessment Statewide Summary Report* 57 (2018), https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf.

[56] Fisher and Ziaja, *supra* note 55 at 57.

[57] Patrick Gonzalez et al., 2018: Southwest. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [D.R. Reidmiller et al., (eds.)] at 1101, 1112.

[58] Sea Level, NASA Global Climate Change, https://climate.nasa.gov/vital-signs/sea-level/ (last accessed May 23, 2023).

[59] Sixth Assessment, supra note 2, at 1936–37.

[60] *Id.* at 1950 (Sixth Assessment).

storm surge flooding and ocean acidification.[61] California's 3,500-mile coastline is particularly susceptible to the dangers of sea-level rise, with even typical tides and storms producing extreme high-water events. Projected sea level rise will likely cause severe economic disruption and damage to the nearly 27 million Californians—more than any other State in the nation—who live in a coastal county.[62] Projections show that somewhere between 31 to 67 percent of Southern California beaches may be lost by 2100.[63] By the middle of the century, flooding from rising sea levels and storms is likely to make billions of dollars of coastal property unusable.[64] In a worst case scenario of 6.6 feet of sea level rise combined with a 100-year storm, the resultant flooding in Southern California could affect a quarter of a million people, $50 billion worth of property, and $39 billion worth of buildings.[65] A projected sea level rise of 0.9 meters by 2100 would place 4.2 million people at risk of inundation in US coastal cities.[66]

For all these reasons, reducing GHG emissions from heavy-duty vehicles—the second largest source of GHGs within the transportation sector in the United States—is a critical step in tackling the climate emergency.

B. Tighter GHG Standards Will Also Help Reduce Non-GHG Emissions and Help States to Attain and Maintain Federal Air Quality Standards

Heavy-duty vehicles are also a significant source of air pollutants that contribute to ambient concentrations of ozone, inhalable particulate matter ($PM_{2.5}$), and air toxics.[67] Exposure to ozone and $PM_{2.5}$ has serious health effects and is associated with increased risk of premature deaths, emergency room visits, and hospital stays.[68] A range of adverse respiratory effects are linked to these pollutants such as asthma, respiratory inflammation, and decreased lung function and growth.[69]

In particular, $PM_{2.5}$ poses serious health risks as the fine particles can lodge deep into the lungs and possibly enter into the bloodstream, causing irregular heartbeat, heart attacks, as well as increased risk of lung cancer.[70] Recent evidence also suggests a causal relationship between $PM_{2.5}$ exposure and a host of other negative health impacts, including male and female reproductive and developmental effects from long-term exposure (i.e., fertility, pregnancy, and

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[61] Fourth National Climate Assessment, at 324.

[62] U.S. Nat'l Oceanic and Atmospheric Admin., *Fast Facts: Economics and Demographics*, https://coast.noaa.gov/states/fast-facts/economics-and-demographics.html (last visited Oct. 31, 2022).

[63] Fisher and Ziaja, supra note 55 at 9.

[64] Fourth National Climate Assessment, supra note 9, at 330.

[65] *Id.*

[66] Sixth Assessment, supra note 2, at 1963 (Ch. 14).

[67] 88 Fed. Reg. at 26,047.

[68] *Id.* at 26,049-51.

[69] *Id*.

[70] Control of Air Pollution from Aircraft Engines: Emission Standards and Test Procedures, 87 Fed. Reg. 6324, 6331 (Feb. 3, 2022).

birth outcomes), metabolic effects from long-term and short-term exposure, and nervous system effects from short-term exposure.[71] Heavy-duty engine emissions also contribute to ambient levels of air toxics, [72] such as benzene, formaldehyde, acetaldehyde, and naphthalene, which are known or suspected to cause cancer and other serious health effects.[73]

The Clean Air Act ("CAA") requires EPA to set and regularly review and revise federal health-based ambient air quality standards for "criteria pollutants," including $PM_{2.5}$, NOx, and ground-level ozone.[74] These National Ambient Air Quality Standards ("NAAQS") aim to protect the health of their residents from air pollution resulting from emissions of criteria air pollutants. The NAAQS for ozone, established in 2015 and retained in 2020, is an 8-hour standard with a level of 70 parts per billion, although EPA recently announced that it may reconsider the previous administration's decision to retain the ozone NAAQS.[75] EPA is also implementing the previous 8-hour ozone standard, set in 2008 at a level of 75 parts per billion. For $PM_{2.5}$, there are two NAAQS that were set in 1997, revised in 2006 and 2012, and retained in 2020[76]: an annual standard (12.0 micrograms per cubic meter) and a 24-hour standard (35 micrograms per cubic meter).

Depending on whether the air quality in an area meets the NAAQS for a particular pollutant, EPA designates the area as being in "attainment" or "nonattainment." EPA further classifies areas that are in nonattainment according to the severity of their air pollution problem, and areas with more severe pollution levels are given more time to meet the standard while being subject to more stringent control requirements under State Implementation Plans.

As of May 31, 2023, there were 34 ozone nonattainment areas for the 2008 ozone NAAQS[77] and 47 ozone nonattainment areas for the 2015 ozone NAAQS.[78] Sixteen of the 8-

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[71] *Id*.

[72] McKeon, Thomas P. et al. (2021) Environmental Science and Pollution Research, *Environmental exposomics and lung cancer risk assessment in the Philadelphia metropolitan area using ZIP code–level hazard indices*, vol. 28, 31758–31769, 31764; Cancer & Environment Network of Southwestern Pennsylvania, *National Air Toxics Assessment and Cancer Risk in Allegheny County Pennsylvania* (updated May 2021), https://www.catf.us/wp-content/uploads/2021/07/NATA-Factsheet-Final-May-2021.pdf.

[73] 88 Fed. Reg. at 26,054-58.

[74] 42 U.S.C §§ 7408-7409.

[75] *See* U.S. Environmental Protection Agency, *Ozone National Ambient Air Quality Standards (NAAQS)*, https://www.epa.gov/ground-level-ozone-pollution/ozone-national-ambient-air-quality-standards-naaqs (last accessed June 16, 2023); U.S. Environmental Protection Agency, *EPA to Reconsider Previous Administration's Decision to Retain 2015 Ozone Standards*, https://www.epa.gov/ground-level-ozone-pollution/epa-reconsider-previous-administrations-decision-retain-2015-ozone (last accessed June 16, 2023).

[76] On June 10, 2021, EPA announced that it will reconsider the previous administration's decision to retain the PM NAAQS. *See* Press Release, EPA, EPA to Reexamine Health Standards for Harmful Soot that Previous Administration Left Unchanged (June 10, 2021), https://www.epa.gov/newsreleases/epa-reexamine-health-standards-harmful-soot-previous-administration-left-unchanged.

[77] U.S. Environmental Protection Agency, Green Book, 8-Hour Ozone (2008) Nonattainment Area Summary, https://www3.epa.gov/airquality/greenbook/hnsum.html (last accessed June 16, 2023).

[78] U.S. Environmental Protection Agency, Green Book, 8-Hour Ozone (2015) Nonattainment Area Summary, https://www3.epa.gov/airquality/greenbook/jnsum.html (last accessed June 16, 2023).

hour ozone nonattainment areas are located in California and the only two extreme nonattainment areas in the nation are located in the South Coast Air Basin and San Joaquin Valley of California.[79] Indeed, for the South Coast Air Basin to meet the federal ozone standards, overall NOx emissions need to be reduced by 70 percent from today's levels by 2023, and approximately 80 percent by 2031.[80] The New York Metropolitan area (CT-NJ-NY) ozone nonattainment area failed to reach attainment by the deadline for serious nonattainment of the 2008 ozone NAAQS and was re-classified to severe nonattainment status for that NAAQS.[81] And Wisconsin has three remaining nonattainment areas for the 2015 ozone NAAQS, all located downwind of some of the largest intermodal operations in the country.[82] Many areas of the country are also currently in nonattainment for the $PM_{2.5}$ NAAQS standards, and as of May 31, 2023, more than 31 million people live in $PM_{2.5}$ (2006) nonattainment areas.[83]

Substantial emission reductions are critically necessary given the extraordinary challenges that California faces to attain and maintain ozone and $PM_{2.5}$ NAAQS and, thereby, protect public health. And, as noted, other States need to reduce these emissions in order to protect their residents. Reducing emissions from heavy-duty vehicles sold nationwide will help all states attain and maintain NAAQS for these pollutants, particularly since vehicles sold in one State can, and are, driven in or through others. According to California's Emission FACtors ("EMFAC") 2017 emissions inventory model, almost a million heavy-duty vehicles operate on California roads each year and contribute 31 percent of all statewide NOx emissions.[84] Heavy-duty vehicles are responsible for 32 percent of mobile source NOx emissions in the South Coast Air Basin.[85] Medium and heavy-duty vehicles are responsible for 52 percent of the NOx and 45 percent of the $PM_{2.5}$ emitted by on-road vehicles in New York. Heavy-duty vehicles play an important role in the transport of goods for interstate commerce and frequently cross state borders.[86] Therefore, stringent federal standards would assist states—including those with state regulatory programs applicable to in-state sales—attain and maintain the NAAQS.

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[79] 2016 State Strategy for the State Implementation Plan for Federal Ozone and PM2.5 Standards (State SIP Strategy), https://ww2.arb.ca.gov/resources/documents/2016-state-strategy-state-implementation-plan-federal-ozone-and-pm25-standards.

[80] California Air Resources Board (CARB), Staff Report, Initial Statement of Reasons for Omnibus Rule at II-2 (June 23, 2020), https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2020/hdomnibuslownox/isor.pdf (Omnibus ISOR).

[81] 87 Fed. Reg. 60,926 (Oct. 7, 2022).

[82] Letter from State of Wisconsin to EPA Regional Administrator re: Attainment Planning for the 2015 Ozone National Ambient Air Quality Standard (Dec. 30, 2022), https://dnr.wisconsin.gov/sites/default/files/topic/AirQuality/AttainmentPlanLetter12302022.pdf.

[83] U.S. Environmental Protection Agency, Green Book, PM-2.5 (2006) Nonattainment Area Summary, https://www3.epa.gov/airquality/greenbook/rnsum.html (last accessed June 16, 2023).

[84] Omnibus ISOR at ES-1.

[85] CARB presentation, Measures for Reducing Emissions from On-Road Heavy-Duty Vehicles (June 3, 2021), http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/heavy-duty-trucks-presentations-06-03-21.pdf?sfvrsn=8.

[86] *See* Omnibus ISOR at ES-17.

C. The Impacts of Climate Change and Poor Air Quality Disproportionately Harm Environmental Justice Communities

1. Environmental Justice Communities Disproportionately Bear the Burden of Climate Change Impacts

The climate change impacts discussed above will continue to disproportionately fall on environmental justice communities.[87] Indeed, environmental justice communities already experience more severe climate impacts and are more vulnerable as the climate crisis worsens.

Severe harms from rising temperatures are already a reality for many environmental justice communities. The last nine years have been the nine hottest on record, and that trend is only expected to continue.[88] Members of environmental justice communities tend to work in occupations with increased exposure to extreme heat, such as the agricultural, construction, and delivery industries.[89] Farmworkers die of heat-related causes at 20 times the rate of the rest of the U.S. civilian workforce.[90] Since 2005, the first year California began tracking the number of heat-related fatalities, 36 percent of California's heat-related worker deaths have been of farmworkers.[91] Similarly, although construction workers comprise only 6 percent of the national workforce, they account for 36 percent of heat-related deaths.[92]

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[87] Environmental justice is defined by EPA as the "fair treatment and meaningful involvement of all people regardless of race, color, national origin or income with respect to development, implementation, and enforcement of environmental laws, regulations and policies." EPA, EPA-300-B-1-6004, EJ 2020 Action Agenda: The U.S. EPA's Environmental Justice Strategic Plan for 2016-2020, at 1 (Oct. 2016). For the purpose of this comment, the term "environmental justice community" refers to a community of color or community experiencing high rates of poverty that due to past and or current unfair and inequitable treatment is overburdened by environmental pollution, and the accompanying harms and risks from exposure to that pollution, because of past or current unfair treatment.

[88] Press Release, Nat'l Aeronautics & Space Admin., *NASA Says 2022 Fifth Warmest Year on Record, Warming Trend Continues* (Jan. 12, 2023), https://www.nasa.gov/press-release/nasa-says-2022-fifth-warmest-year-on-record-warming-trend-continues; Valérie Masson-Delmotte et al., Intergovernmental Panel on Climate Change, *AR6 Climate Change 2021: The Physical Science Basis*, SPM-10 (2021), https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf.

[89] *See, e.g.*, Juley Fulcher, *Boiling Point: OSHA Must Act Immediately to Protect Workers From Deadly Temperatures*, Public Citizen (Jun. 28, 2022), https://www.citizen.org/article/boiling-point/; Union of Concerned Scientists, *Too Hot to Work: Assessing the Threats Climate Change Poses to Outdoor Workers* (2021), https://www.ucsusa.org/sites/default/files/2021-09/Too-Hot-to-Work_9-7.pdf, at 3; Ariel Wittenberg, *OSHA Targets Heat Threats Heightened by Climate Change*, E&E News: Greenwire (Oct. 26, 2021), https://www.eenews.net/articles/osha-targets-heaththreats-heightened-by-climate-change/.

[90] *See* Union of Concerned Scientists, *Farmworkers at Risk: The Growing Dangers of Pesticides and Heat* (2019), https://www.ucsusa.org/sites/default/files/2019-12/farmworkers-at-risk-report-2019-web.pdf, at 4 (citing Centers for Disease Control and Prevention, *Heat-Related Deaths Among Crop Workers—United States, 1992–2006*, https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5724a1.htm (last updated June 19, 2008)).

[91] Teniope Adewumi-Gunn & Juanita Constible, *Feeling the Heat: How California's Workplace Heat Standards Can Inform Stronger Protections Nationwide*, Natural Resources Defense Council (2022), https://www.nrdc.org/sites/default/files/feeling-heat-ca-workplace-heat-standards-report.pdf.

[92] Xiuwen Sue Don et al., *Heat-Related Deaths Among Construction Workers in the United States*, 62 Am. J. Indus. Med. 1047-57 (2019).

At home, environmental justice communities suffer disproportionate impacts from extreme heat because they are more likely to lack air conditioning, tree canopy, and greenspace. Environmental justice communities have less access to air conditioning to cool down, and are less able to pay the utility bills required to run air conditioning units or fans.[93] In urbanized environments, pavement, cement, and other non-vegetated areas contribute to the heat island effect, in which built environments retain heat, causing daytime temperatures to be 1° to 6° F hotter than rural areas and nighttime temperatures to be as much as 22° F hotter.[94] The heat island effect is inequitably distributed—it is most extreme in lower-income communities and communities of color.[95] Contributing to this effect is the lack of tree canopy and greenspace in environmental justice communities, often due to lower historical and ongoing investment in these communities. Indeed, tree canopy and greenspace is highly correlated with historical redlining practices, in which federal housing policy directed investment away from "risky" lower-income communities and especially communities of color.[96] Moreover, an EPA report found that individuals with lower incomes and individuals of color are 11 to 16 percent and 8 to 14 percent, respectively, more likely to live in areas with the highest projected increases in premature mortality from extreme heat.[97]

In addition, flooding and drought from extreme weather events already disproportionately affect environmental justice communities, and the inequity will only grow as climate impacts worsen. Due to disinvestment, environmental justice communities often lack sufficient infrastructure to control flooding or ensure steady clean water supplies.[98] They also suffer from more severe impacts, such as contaminated water from pollutant flows during floods and increased concentration of contaminants during droughts.[99] EPA has also determined that

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[93] State of California, *Fourth Climate Change Assessment, Climate Justice Report* (2018), https://resourceslegacyfund.org/wp-content/uploads/2018/09/Climate-Justice-Report-4CCCA-v.4-00455673xA1C15.pdf ("California Climate Justice Report"), at 39-40, 45; Allison Crimmins, et al., *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment*, U.S. Global Change Research Program (2016), https://health2016.globalchange.gov/low/ClimateHealth2016_FullReport_small.pdf ("USGCRP Study"), at 252.

[94] *See* EPA, *Heat Island Effect*, https://www.epa.gov/heatislands (last updated May 1, 2023); California Environmental Protection Agency, *Understanding the Urban Heat Island Index*, https://calepa.ca.gov/climate/urban-heat-island-index-for-california/understanding-the-urban-heat-island-index/ (last visited May 24, 2023).

[95] EPA, *Heat Islands and Equity*, https://www.epa.gov/heatislands/heat-islands-and-equity (last updated Dec. 12, 2022); USGCRP Study, *supra* n.93, at 252.

[96] Dexter Locke et al., *Residential Housing Segregation and Urban Tree Canopy in 37 US Cities*, 1 npj Urban Sustainability 15, 3-4 (2020); Ian Leahy & Yaryna Serkez, *Since When Have Trees Existed Only for Rich Americans?*, N.Y. Times: Op. (July 4, 2021), https://www.nytimes.com/interactive/2021/06/30/opinion/environmental-inequity-trees-critical-infrastructure.html.

[97] EPA, *Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts* (2021), https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability_september-2021_508.pdf, at 36.

[98] Lily Katz, *A Racist Past, a Flooded Future: Formerly Redlined Areas Have $107 Billion Worth of Homes Facing High Flood Risk—25% More Than Non-Redlined Areas*, Redfin (2021), https://www.redfin.com/news/redlining-flood-risk/; California Climate Justice Report, *supra* n.93, at 41-42; USGCRP Study, *supra* n.93, at 253-54.

[99] USGCRP Study, *supra* n.93, at 158-74.

individuals with lower incomes are more likely to live in areas with the highest projected land losses from sea level rise inundation and are more likely to face substantial traffic delays due to climate-driven changes in high-tide flooding.[100] These individuals are less able to afford flood insurance and less likely to qualify for emergency relief and other safety net programs.[101]

The above impacts especially apply to tribal communities. Due to land dispossession and forced migration, tribal communities are more exposed to extreme heat and more likely to rely on local water sources that are less resilient to drought and are more contaminated.[102] Beyond those impacts, tribal communities also suffer cultural harms from the decimation or alteration of local ecosystems and species of particular meaning to cultural practices.[103] These cultural resources have intrinsic value, and they are also critical to tribal community identity and group cohesion, which translates into direct health benefits.[104] Moreover, degradation of these cultural resources threatens traditional ecological knowledge, such as particularized understanding of local ecosystems, agriculture, and sustainable practices, that can help limit the impacts of climate change.[105] Tribal communities with sovereign land holdings are also more vulnerable to climate impacts because they are unable to relocate.[106]

Furthermore, environmental justice communities, including tribal communities, are already environmentally overburdened due to greater existing pollution exposure.[107] This disadvantage manifests in higher rates of chronic disease, premature death, and other adverse public health outcomes.[108] Compounding the problem, residents of environmental justice communities also have less access to health care, as they are less likely to have health insurance and less likely to be able to afford necessary tests and procedures, and local health care facilities are poorly staffed and equipped.[109] Consequently, residents of environmental justice

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[100] *Climate Change and Social Vulnerability in the United States*, *supra* n.97, at 49, 59.

[101] *See, e.g.*, University of California – Merced, Community and Labor Center, *Disaster Response: The Planada Flood, Federal Policy Gaps, and Unmet Community Needs* (2023), https://clc.ucmerced.edu/sites/clc.ucmerced.edu/files/page/documents/disaster_response_0.pdf.

[102] Justin Farnell, et al., *Effects of land dispossession and forced migration on Indigenous peoples in North America*, Science 374 (2021); USGCRP Study, *supra* n.93, at 254.

[103] State of California, *Fourth Climate Change Assessment, Summary Report from Tribal and Indigenous Communities within California* (2018), https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-010_TribalCommunitySummary_ADA.pdf, at 19.

[104] *Id.* at 19.

[105] *Id.* at 13-16.

[106] Farnell, *Effects of land dispossession and forced migration on Indigenous peoples in North America*, *supra* n.102.

[107] California Climate Justice Report, *supra* n.93, at 40-41.

[108] *Id.*; USGCRP Study, *supra* n.93, at 253.

[109] Samantha Artiga et al., *Health Coverage by Race and Ethnicity, 2010-2021*, Kaiser Family Foundation (2022), https://www.kff.org/racial-equity-and-health-policy/issue-brief/health-coverage-by-race-and-ethnicity/; Benjamin Sommers, et al., *Beyond Health Insurance: Remaining Disparities in US Health Care in the Post-ACA Era*, 95 The Milbank Quarterly 1 (2017).

communities are less able to withstand climate impacts that further damage their health, such as increased local smog conditions.[110]

In addition to being more vulnerable to the impacts of climate change, environmental justice communities endure structural disadvantages that blunt their ability to adapt to a changing climate. Environmental justice communities have less access to financial resources, such as income and wealth, which are critical to climate resilience.[111] More financial resources equate to more mobility, more ability to spend (on utilities, health care, home adaptation, etc.) to reduce climate harms, and more safeguards (such as insurance) in the event of extreme climate events.[112] Environmental justice communities also have higher rates of limited English proficiency, which can reduce access to climate resilience programs and increase vulnerability in extreme climate events due to an inability to understand public health information.[113]

2. Air Pollutant Emissions from Heavy-Duty Vehicles Disproportionately Impact Environmental Justice Communities

Air pollutant emissions from heavy-duty trucks also disproportionately endanger residents of environmental justice communities by exposing them to harmful air pollution that causes significant health impacts. Heavy-duty trucks concentrate their emissions along transportation corridors and near ports and warehouses.[114] Communities located near this infrastructure are disproportionately lower-income and communities of color and typically face industrial pollution cumulatively with truck emissions.[115] For example, EPA modeling has shown that race and income are significantly associated with living near truck routes nationally, even when controlling for other factors.[116] EPA research has also indicated that people of color are more likely to live within 300 feet of major transportation facilities and go to school within 200 meters

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[110] California Climate Justice Report, *supra* n.93, at 40-43.

[111] *Id.* at 39.

[112] *Id*.

[113] *Id.* at 43; USGCRP Study, *supra* n.93, at 106.

[114] 87 Fed. Reg. at 17,452; *see also* Anastasia Montgomery et al., *Simulation of Neighborhood-Scale Air Quality With Two-Way Coupled WRF-CMAQ Over Southern Lake Michigan-Chicago Region*, Advancing Earth Space and Science (2023), https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2022JD037942.

[115] EPA Memorandum, *Estimation of Population Size and Demographic Characteristics among People Living Near Truck Routes in the Coterminous United States* (Feb. 16, 2022), EPA-HQ-OAR-2019-0055-0982, at 11-12, Fig. 3, 17-19, Fig. 9 (finding that individuals living near major truck routes are more likely to be people of color and lower-income); *see also* Michelle Meyer and Tim Dallmann, The Real Urban Emissions Initiative, *Air quality and health impacts of diesel truck emissions in New York City and policy implications* (2022), at 7 Fig. 5 (concluding that Black and Latino individuals in New York City are disproportionately exposed to $PM_{2.5}$ along freight corridors); South Coast Air Quality Management District, *Final Socioeconomic Assessment for Proposed Rule 2305 – Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program and Proposed Rule 316 – Fees for Rule 2305* (May 2021), at 3-7 (determining that individuals living near warehouses in the logistics-heavy South Coast Air Quality Management District are more likely to be people of color, lower-income, and exposed to high pollution levels).

[116] EPA-HQ-OAR-2019-0055-0982, supra n.115, at 20-24.

of the largest roadways.[117] Likewise, a comprehensive study by the South Coast Air Quality Management District—which covers Los Angeles and the Inland Empire, the largest logistics hub nationwide—found that communities located near large warehouses scored far higher on California's environmental justice screening tool, which measures overall pollution and demographic vulnerability.[118] That study concluded that, compared to the South Coast basin averages, communities in the South Coast basin near large warehouses had a substantially higher proportion of people of color; were exposed to more diesel particulate matter; had higher rates of asthma, cardiovascular disease, and low birth weights; and had higher poverty and unemployment rates.[119]

As the South Coast Air Quality Management District study demonstrates, and as many others corroborate,[120] residents of environmental justice communities near warehouses, transportation hubs, and other logistics infrastructure suffer from health effects due to exposure to NOx and associated heavy-duty truck emissions. These issues are particularly acute in our States, which proudly generate a majority of the nation's economic activity associated with the logistics industry, yet also bear its detrimental environmental impacts. Major ports in some of our States handled 57 percent of all container traffic nationwide in 2020, including the three megaports of Los Angeles, Long Beach, and New York and New Jersey, which together accounted for 43 percent of all container traffic.[121] Additionally, Chicago's central location makes it a national leader in intermodal transit.[122] Reflecting historical redlining,[123] the

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[117] Chad Bailey, *Demographic and Social Patterns in Housing Units Near Large Highways and other Transportation Sources* (2011), EPA-HQ-OAR-2019-0055-0126, at 3.

[118] South Coast Air Quality Management District, *supra* n.115, at 4-5.

[119] *Id*. at 5-7.

[120] *See, e.g.*, Gaige Hunter Kerr, et al., *COVID-19 Pandemic Reveals Persistent Disparities in Nitrogen Dioxide Pollution* 118 Proc. Nat'l Acad. Sciences 30 (2021); Mary Angelique G. Demetillo, et al., *Space-Based Observational Constraints on NO_2 Air Pollution Inequality from Diesel Traffic in Major US Cities*, Geophysical Research Letters 48 (2021); Paul Allen, et al., *Newark Community Impacts of Mobile Source Emissions: A Community-Based Participatory Research Analysis* (2020); Maria Cecilia Pinto de Moura, et al., Union of Concerned Scientists, *Inequitable Exposure to Air Pollution from Vehicles in Massachusetts* (2019); Iyad Kheirbek, et al., *The Contribution of Motor Vehicle Emissions to Ambient Fine Particulate Matter Public Health Impacts in New York City: a Health Burden Assessment*, 15 Env't Health 89 (2016).

[121] Data from the Bureau of Transportation Statistics, Container TEUs (Twenty-foot Equivalent Units) (2020), https://data.bts.gov/stories/s/Container-TEU/x3fb-aeda/ (ports of Baltimore, Boston, Long Beach, Los Angeles, New York and New Jersey, Oakland, Seattle, and Tacoma combined for 23.493 million TEUs, 57% of 41.24 million TEUs total nationwide; ports of Long Beach, Los Angeles, and New York and New Jersey combined for 17.62 million TEUs, 43% of 41.24 million TEUs).

[122] Chicago Metropolitan Agency for Planning, *The Freight System: Leading the Way* (2017), at 16.

[123] Beginning in the 1930s, federal housing policy directed investment away from "risky" communities of color. Nearly all of the communities adjacent to the three megaports (the Ports of Los Angeles, Long Beach, and New York and New Jersey) and the intermodal terminals in Chicago were coded red, signifying the least desirable areas where investment was to be avoided. *See* University of Richmond Digital Scholarship Lab, Mapping Inequality, https://dsl.richmond.edu/panorama/redlining/#loc=12/33.748/-118.272&city=los-angeles-ca (Los Angeles, CA), https://dsl.richmond.edu/panorama/redlining/#loc=14/40.678/-74.004&city=brooklyn-ny (Brooklyn, NY), https://dsl.richmond.edu/panorama/redlining/#loc=13/40.704/-74.068&city=hudson-co.-nj (Hudson County, NJ),

communities near these ports are overwhelmingly comprised of residents with lower-incomes and people of color who disproportionately suffer exposures and health impacts from pollution from heavy-duty truck engine emissions. Data from the census tracts surrounding the Ports of Los Angeles and Long Beach exemplify these inequalities:

Community of San Pedro[124]

Census Tract	Hispanic	Black	Diesel PM	Asthma	Poverty
6037296500	71.2%	11.5%	80th	91st	88th
6037296210	87%	6%	99th	94th	88th
6037296220	65.3%	12.8%	97th	94th	93rd
6037297110	64.3%	11.1%	99th	94th	97th
6037297120	67.9%	5.6%	97th	94th	72nd

Community of Wilmington

Census Tract	Hispanic	Black	Diesel PM	Asthma	Poverty
6037294302	86.1%	4.4%	98th	82nd	72nd
6037294900	87.6%	3.2%	100th	81st	93rd
6037294820	96.7%	0.9%	99th	83rd	97th
6037294830	93.5%	3.4%	100th	83rd	91st
6037294701	90.3%	4.9%	99th	83rd	91st
6037294620	93.2%	1.5%	45th	83rd	85th
6037294120	92.5%	3.2%	84th	83rd	78th

Community of Long Beach

Census Tract	Hispanic	Black	Diesel PM	Asthma	Poverty
6037572800	30.8%	32.9%	86th	85th	100th
6037572900[125]	68.7%	5.8%	98th	82nd	89th
6037573003[138]	45.5%	5.4%	75th	89th	70th
6037575401	80.5%	9.4%	64th	97th	98th
6037575801	74.5%	10.8%	99th	94th	93rd
6037575803[138]	72.4%	8.1%	99th	96th	95th
6037575901[138]	50.6%	19.9%	99th	86th	86th
6037575902[138]	35%	15.4%	99th	87th	71st

https://dsl.richmond.edu/panorama/redlining/#loc=13/40.627/-74.233&city=union-co.-nj (Union County, NJ), https://dsl.richmond.edu/panorama/redlining/#loc=12/41.854/-87.772&city=chicago-il (Chicago, IL).

[124] Data from CalEnviroScreen 4.0, California Office of Environmental Health Hazard Assessment, https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40. Metrics for diesel particulate matter exposure, asthma rates, and poverty are the census tract's percentile ranking as compared to all census tracts in California, demonstrating that these census tracts are among those with the greatest pollution exposure, detrimental health impacts, and lowest incomes statewide. The raw data for these percentile rankings are available on the CalEnviroScreen 4.0 website.

[125] Several of the census tracts in Long Beach also have substantial Asian populations: 6037572900 (18%), 6037573003 (20.8%), 6037575803 (7.6%), 6037575901 (7.5%), 6037575902 (6.9%), 6037576001 (20.2%).

6037576001[138]	12.7%	13.7%	98th	85th	22nd

Logistics hubs demand extensive networks of highways and warehouses to move and store cargo via millions of truck trips annually. Aggravating historical injustices, highways and warehouses are disproportionately sited in environmental justice communities whose residents, like those of port communities, suffer higher levels of pollution exposure from heavy-duty trucks than do whiter and higher-income communities. Data demonstrate that the census tracts in California with the highest levels of ozone, $PM_{2.5}$, and DPM exposure are communities of color bordering such logistics thoroughfares—Highway 99 in the San Joaquin Valley and Highways 10 and 60 in the Inland Empire:

Census Tracts in California with Highest Levels of Ozone, $PM_{2.5}$, and Diesel PM Exposure[126]

Census Tract	Location	People of Color	Ozone	$PM_{2.5}$	Diesel PM
6065041408	Riverside	78.1%	91st	92nd	97th
6071002109	Ontario	73.2%	91st	96th	93rd
6071003301	Fontana	91.6%	97th	93rd	94th
6065040303	Jurupa Valley	79.3%	95th	94th	97th
6029003113	Bakersfield	80.4%	94th	100th	96th
6029001801	Bakersfield	57.3%	94th	100th	95th
6029002812	Bakersfield	72.5%	94th	100th	96th
6029002813	Bakersfield	76.6%	94th	100th	95th

Accordingly, achieving emissions reductions from heavy-duty trucks is a critical step to begin dismantling historical patterns of environmental injustice burdening communities near ports, highways, and warehouses.

II. LEGAL BACKGROUND

A. Statutory and Regulatory Framework

Section 202(a) of the CAA requires EPA to set emission standards for air pollutants from new motor vehicles or new motor vehicle engines that the Administrator has found "cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare."[127] Standards under section 202(a) shall take effect "after such period as the Administrator finds necessary to permit the development and application of the requisite

[126] Data from CalEnviroScreen 4.0, *see supra* n.137. The eight census tracts shown here are examples of the 29 census tracts in California that rank above the 90th percentile statewide for exposure to ozone, fine particulate matter, and diesel particulate matter, all of which are communities in Bakersfield or the Inland Empire near major logistics thoroughfares.

[127] 42 U.S.C. § 7521(a).

technology, giving appropriate consideration to the cost of compliance within such period."[128] Therefore, in establishing or revising emission standards promulgated under section 202(a), EPA must consider issues of technological feasibility, compliance cost, and lead time.[129]

EPA can and does consider the development and application of a range of technologies, including zero-emission technologies.[130] Section 216(2) defines "motor vehicle" as "any self-propelled vehicle designed for transporting persons or property on a street or highway,"[131] an expansive definition that reflects Congress's intent not to limit standards to vehicles running on any particular fuel, power source, or system of propulsion.[132] Moreover, section 202(a) authorizes EPA to set emission standards by reference to both "future advances" and "presently available" technologies that could be applied more broadly,[133] and directs EPA to apply its standards to vehicles that "are designed as complete systems," as well as those that "incorporate" additional "devices" to "prevent or control pollution."[134] Thus, the agency's section 202(a) standards can be technology forcing. Indeed, the D.C. Circuit has long recognized that, "Congress expected the Clean Air Amendments to force the industry to broaden the scope of its research—to study new types of engines and new control systems."[135]

B. Existing Federal Greenhouse Gas Emissions Standards for Heavy-Duty Vehicles and Engines

EPA has regulated GHG emissions from the heavy-duty sector under CAA section 202(a) since 2011, when EPA and the National Highway Traffic Safety Administration finalized their respective parts of the Phase 1 Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles. Among other things, the Phase 1 GHG Standards regulated CO2 emissions for highway heavy-duty vehicles and heavy-duty vehicle engines for model years 2014 through 2018.[136] The program "offered flexibility allowing manufacturers to attain the standards through a mix of technologies and the option to participate in an emissions credit averaging, banking, and trading program."[137]

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[128] *Id.* § 7521(a).

[129] 88 Fed. Reg. 25,926, 25,949 (Apr. 27, 2023) (citing 76 Fed. Reg. 57,129 (Sept. 15, 2011); 81 Fed. Reg. 73,478, 73,512 (Oct. 25, 2016)).

[130] 88 Fed. Reg. at 25,948-51.

[131] 42 U.S.C. § 7550(2).

[132] 88 Fed. Reg. at 25,948.

[133] *NRDC v. EPA*, 655 F.2d 318, 328, 330 (D.C. Cir. 1981) (cleaned up); 42 U.S.C. § 7521(a)(2).

[134] 42 U.S.C. § 7521(a)(1).

[135] *Int'l Harvester Co. v. Ruckelshaus*, 478 F.2d 615, 635 (D.C. Cir. 1973).

[136] 76 Fed. Reg. 57,106 (Sept. 15, 2011).

[137] 87 Fed. Reg. 17,414, 17,432 (Mar. 28, 2022) (describing prior regulatory programs addressing heavy-duty vehicles).

In 2016, EPA and the National Highway Traffic Safety Administration finalized their respective parts of the Phase 2 GHG and fuel efficiency program for heavy-duty vehicles, which again included performance-based standards for highway heavy-duty vehicles and heavy-duty engines.[138] EPA's standards for most vehicles and engines commenced in model year 2021, will increase in stringency in model year 2024, and will culminate in model year 2027.[139] EPA based its Phase 2 GHG standards on technologies currently available in 2016, as well as technologies that were still under development or not yet widely available; however, EPA specifically did not consider heavy-duty ZEV technologies as an available emission-reduction strategy for the sector.[140] This failure to consider heavy-duty ZEV technologies was a departure from its practice of considering these technologies in other rulemakings under section 202(a). In its "Tier 2" criteria pollutant standards for light-duty vehicles, for example, EPA incentivized manufacturers to adopt ZEV technologies by including such vehicles in the fleet average.[141] And EPA continued this approach in its "Tier 3" standards for light-duty vehicles,[142] among others.

In March 2022, EPA proposed a rule titled "Control of Air Pollution From New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards" (Heavy-Duty NOx Proposal).[143] While the proposed rule primarily sought to strengthen criteria pollutant emission standards for heavy-duty engines, the agency also sought comment on whether the Phase 2 GHG standards should be strengthened for certain model year 2027 vehicles in the heavy-duty sector based on the better-than-anticipated deployment of zero-emitting vehicles in certain heavy-duty vehicle classes such as buses and delivery vans. Many of these States and Cities commented on the proposal—supporting EPA's general methodology for updating the Phase 2 GHG standards, but encouraging EPA to base its update on a more robust projection of ZEVs in the heavy-duty sector that reflects multiple States' ZEV mandates and market conditions that increasingly favor heavy-duty ZEVs.[144] The States and Cities further encouraged EPA to prioritize new GHG standards for the heavy-duty sector as a whole, based on proven, cost-effective ZEV technology.[145]

[138] 81 Fed. Reg. 73,478 (Oct. 25, 2016).

[139] *Id.*

[140] 87 Fed. Reg. at 17,432-433.

[141] 65 Fed. Reg. 6698, 6746 (Feb. 10, 2000).

[142] 79 Fed Reg. 23,414, 23,454, 23,471 (Apr. 28, 2014).

[143] 87 Fed. Reg. 17,414 (Mar. 28, 2022).

[144] Comments of California et al., Docket No. EPA-HQ-OAR-2019-0055 (May 16, 2022).

[145] *Id.*

C. Changed Circumstances Support Increasing the Stringency of the Federal GHG Standards for Heavy-Duty Vehicles

The current Proposal would tighten the Phase 2 GHG standards for certain classes of heavy-duty vehicles for model year 2027. It would also set progressively more stringent GHG emissions standards for numerous vocational vehicles and tractor subcategories for model years 2028 through 2032. As these States and Cities noted in their 2022 comments on the Heavy-Duty NOx Proposal, and as EPA acknowledges here, there have been significant changes in the heavy-duty vehicle landscape since the Phase 2 GHG standards were finalized. For example, evidence demonstrating that ZEV technologies are technologically feasible across this sector much sooner than EPA projected in 2016, the development of fuel-cell electric vehicle technology, and increased adoption of existing and cost-effective emission control technologies in conventional heavy-duty vehicles.[146]

1. Evidence Suggests Robust Zero-Emission Vehicle Adoption Rates in the Heavy-Duty Sector

Heavy-duty electrification technologies already exist today, and sales of these electric vehicles are expected to grow significantly in the coming years due to municipal, state, and national policies, manufacturer commitments, and growing industry demand.

As of 2019, when the California Air Resources Board ("CARB") promulgated its Advanced Clean Trucks ("ACT") regulations, discussed in more detail below, nearly one hundred models of zero-emission trucks and buses were commercially available in California, with many more projected to be added to the market in the near future.[147] As of 2022, the number of models available in the United States was closer to 200 and that number continues to grow.[148] Original equipment manufacturers have made robust projections about the future of ZEVs in this sector. These manufacturers project that between 50 to 70 percent of their heavy-duty truck sales will be ZEVs by 2030 and 100 percent by 2040:

- Navistar's executives expect 50 percent heavy-duty ZEV sales by 2030 and 100 percent electric vehicle ("EV") or fossil free by 2040;[149]

[146] 88 Fed. Reg. at 25,939-25,948.

[147] ACT ISOR at ES-2.

[148] ZETI Data Explorer, https://globaldrivetozero.org/tools/zeti-data-explorer/ (last accessed June 9, 2023); *see also* 88 Fed. Reg. at 25,961 (describing over 170 models produced by over 60 manufacturers that cover a broad range of applications, including school buses, transit buses, straight trucks, refuse haulers, vans, tractors, utility trucks, and others, available to the public through model year 2024).

[149] Alan Ohnsman, *Big Rigs Going Electric As Navistar, Cummins, Daimler Rev Up Next-Generation Trucks*, Forbes.com (May 13, 2022), https://www.forbes.com/sites/alanohnsman/2022/05/13/big-rigs-going-electric-as-navistar-cummins-daimler-rev-up-next-generation-trucks/?sh=60de4269419d.

- Daimler Truck has stated ZEVs will make up 60 percent of its sales by 2030 and 100 percent of sales by 2040;[150]

- Volvo Trucks set a global target of 50 percent of all new trucks sales to be battery or fuel cell electric in 2030, and 100 percent by 2040;[151] and

- PACCAR predicts electric vehicle production in the U.S. will ramp up exponentially in the coming years to 100 percent by 2040.[152]

And businesses that purchase heavy-duty vehicles are creating a robust demand for these vehicles—with many major companies making significant commitments in recent years towards electrifying their heavy-duty fleets. Some examples include:

- Walmart has committed to a 100 percent zero-emission vehicle fleet globally, including long-haul trucks, by 2040;[153]

- Amazon has pledged that half of its deliveries globally will be carbon neutral by 2030,[154] and has purchased 100,000 battery-electric delivery vans with an eye towards that goal;[155]

- DHL Group has committed to a 60 percent electric last-mile delivery fleet by 2030 globally;[156]

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[150] Nick Carey, *Daimler Truck 'all in' on green energy as it targets costs*, Reuters (May 20, 2021), https://www.reuters.com/business/autos-transportation/daimler-truck-all-in-green-energy-shift-targets-costs-2021-05-20/.

[151] Seth Clevenger, *Volvo Trucks Outlines Next Steps Toward Carbon-Free Transport Vision*, Transport Topics (Oct. 24, 2021), https://www.ttnews.com/articles/volvo-trucks-outlines-next-steps-toward-carbon-free-transport-vision; *see also* Volvo Group North America, *Volvo Lights: Bringing Battery-Electric Freight Trucks to Market* (May 18, 2022), https://cdn.lightsproject.com/collateral/volvo-lights-lessons-learned-guidebook.pdf.

[152] Global Commercial Vehicle Drive to Zero, *Analysis of Public Sales Commitments of Medium- and Heavy-Duty Vehicle Manufacturers and Expected Volumes* (Dec. 2021) at 8, https://globaldrivetozero.org/site/wp-content/uploads/2021/12/OEM-Analysis-Paper_December_2021.pdf.

[153] Jason Mathers, Environmental Defense Fund, *Walmart commits to 100% zero-emission trucks by 2040, signaling electric is the future* (Sept. 22, 2020), https://blogs.edf.org/energyexchange/2020/09/22/walmart-commits-to-100-zero-emission-trucks-by-2040-signaling-electric-is-the-future/.

[154] Karen Weise & Neal E. Boudette, *Can Anyone Satisfy Amazon's Craving for Electric Vans?*, New York Times (Jan. 18, 2022), https://www.nytimes.com/2022/01/18/technology/amazon-electric- vans.html.

[155] Press Release, Amazon, *Amazon's electric delivery vehicles from Rivian roll out across the U.S.* (July 21, 2022), https://www.aboutamazon.com/news/transportation/amazons-electric-delivery-vehicles-from-rivian-roll-out-across-the-u-s.

[156] Press Release, DHL, *How DHL Is Embracing Electric Vehicles (EVs) For a Greener, Sustainable Future* (July 21, 2022), https://www.dhl.com/discover/en-sg/logistics-advice/sustainability-and-green-logistics/reasons-dhl-embraces-electric-vehicles.

- FedEx has projected that battery-powered vehicles will make up half of all of its van purchases by 2025, and 100 percent by 2030;[157]

- Ingka Group (parent company of Ikea) has committed to 100 percent zero-emission customer deliveries and services by 2025 globally;[158]

- PepsiCo has committed to reducing its direct emissions by 75 percent by 2030, which includes a wide-scale rollout of electric vehicles for its vehicle fleet;[159] towards this goal, FritoLay (a division of PepsiCo) announced it will deploy over 700 electric delivery vehicles in the United States by the end of 2023;[160]

- Sysco Co. committed to electrify 35 percent of its fleet by 2030, and signed a letter of intent in 2022 to deploy up to nearly 800 battery electric Class 8 tractors by 2026;[161]

- And a significant number of companies, including Bayer, Biogen, ClifBar, DeLoitte, Genentech, GlaxoSmithKline, HP Inc., Lyft, and Siemens have joined the EV100 coalition, whereby they commit to fully electrify their fleets by 2030.[162]

Indeed, in a comprehensive analysis of class 2b-8 fleet announcements, the Environmental Defense Fund found that there had been a nearly 8,500 percent increase in zero-emission deployments and commitments in commercial fleets in the United States between 2017 and 2022, with investments made by over 280 entities.[163]

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[157] Press Release, FedEx, *Charging Ahead: FedEx Receives First All-Electric, Zero-Tailpipe Emissions Delivery Vehicles from BrightDrop* (Dec. 17, 2021), https://newsroom.fedex.com/newsroom/global/brightdropev600.

[158] Press Release, Ingka, *Ingka Group accelerates towards 100% zero emission cars and vans* (Nov. 10, 2021), https://www.ingka.com/news/ingka-group-as-a-member-of-ev100-signs-global-declaration-on-accelerating-the-transition-to-100-zero-emission-cars-and-vans/.

[159] PepsiCo, *Climate Change Action Strategy*, https://www.pepsico.com/our-impact/esg-topics-a-z/climate-change (last accessed June 14, 2023).

[160] Press Release, Frito-Lay, *Frito-Lay Expedites 2040 Net-Zero Emissions Goal with Over 700 Electric Delivery Vehicles* (April 20, 2023), https://www.fritolay.com/frito-lay-expedites-2040-net-zero-emissions-goal-with-over-700-electric-delivery-vehicles.

[161] Jason Morgan, *How Sysco Corp. plans to deploy 800 battery electric Class 8 trucks (and that's just the beginning)*, FleetEquipmentMag.com (Nov. 14, 2022), https://www.fleetequipmentmag.com/sysco-battery-electric-trucks/.

[162] *EV100 Members*, theclimategroup.org, https://www.theclimategroup.org/ev100-members (last accessed June 16, 2023); *see also Climate Group launches EV100+ to tackle world's most polluting road vehicles*, theclimategroup.org (Sept. 20, 2022), https://www.theclimategroup.org/our-work/press/climate-group-launches-ev100-tackle-worlds-most-polluting-road-vehicles.

[163] Environmental Defense Fund, *The ZEV future is here: An 8,500% increase in truck deployments, commitments is proof* (July 12, 2022), https://blogs.edf.org/energyexchange/2022/07/12/the-zev-future-is-here-an-8500-increase-in-truck-deployments-commitments-is-proof/; *see also* BYD, *More Game Day Cheers, Less Emissions: Anheuser-Busch Delivers New Era of Beer with Innovative Zero-Emission Fleet* (Feb. 11, 2022), https://en.byd.com/news/more-game-day-cheers-less-emissions-anheuser-busch-delivers-new-era-of-beer-with-innovative-zero-emission-fleet/ (explaining Anheuser-Busch's initial efforts to transition its entire long-haul dedicated fleet to zero-emission vehicles); BYD, *BYD and Einride Sign Largest-Ever Order for Heavy-Duty Battery*

In April 2023, EPA issued a Notice of Decision granting CARB's requested waivers of preemption under Section 209 of the CAA for several regulations governing heavy-duty vehicles in California, including the ACT regulations.[164] The ACT regulations aim to accelerate the widespread adoption of ZEVs in the medium- and heavy-duty vehicle sector,[165] and, to that end, set manufacturer ZEV sales requirements for vehicles with a gross vehicle weight rating ("GVWR") greater than 8,500 pounds, commonly referred to as medium- and heavy-duty vehicles.[166] ACT specifies that by 2035, zero-emission truck/chassis sales would need to be 55 percent of Class 2b – 3 truck sales, 75 percent of Class 4 – 8 straight truck sales, and 40 percent of truck tractor sales. California also received a waiver for its Zero Emission Airport Shuttle (ZEAS) regulation, which will accelerate the adoption of ZEV technology in California airport shuttles.[167] Under the ZEAS regulation, by December 31, 2027, at least 33 percent of each regulated airport shuttle fleet must be ZEVs.[168] By December 31, 2031, the requirement goes up to 66 percent, and by December 31, 2035, 100 percent of each fleet must be ZEVs.[169]

And California is far from the only state to implement policies promoting innovative technologies, including electrification in the medium- and heavy-duty vehicle sectors. To date, eight other states have adopted California's ACT regulations: Massachusetts, New Jersey, New

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Electric Trucks Outside of Asia (Feb. 22, 2022), https://en.byd.com/news/byd-and-einride-sign-largest-ever-order-for-heavy-duty-battery-electric-trucks-outside-of-asia/ (Swedish freight technology company Einride purchases 200 Class 8 electric trucks); Maersk, *Maersk orders 110 Volvo VNR Electric trucks for North America* (March 29, 2022), https://www.maersk.com/news/articles/2022/03/29/maersk-orders-110-volvo-vnr-electric-trucks-for-north-america (Maersk announces purchase of 110 electric Class 8 trucks).

[164] 88 Fed. Reg. 20,688 (April 6, 2023) (granting waivers of preemption under CAA Section 209 for California's Heavy-Duty Vehicle and Engine Emission Warranty Regulations and Maintenance Provisions, the Advanced Clean Trucks Regulation, the Zero Emission Airport Shuttle Regulation, and the Zero-Emission Power Train Certification Regulation).

[165] ACT ISOR at ES-1, V-1.

[166] The requirements specify percentages of ZEVs and near-zero emission vehicles (NZEVs). CARB Waiver Request Support Document for ACT, ZEAS, and ZEP Regulations (Dec. 20, 2021) at 2 & n.2 ("Waiver Request for ACT") (EPA-HQ-OAR-2022-0331-0003). ACT ISOR at ES-3, ES-4; Cal. Code Regs., tit. 13, §§ 1963, *et sec*. The ACT regulation implements the ZEV sales requirement through a "credit and deficit system," which allows manufacturers to "determine the vehicle types that are most cost effective for them to produce and to serve the [vehicle category] markets they choose and to make adjustments as the market expands." Manufacturers can generate a "ZEV credit" by "producing and selling a ZEV into California." Starting with the 2024 model year, truck manufacturers subject to the ACT regulation will "annually incur deficits based on the manufacturer's annual sales volume of on-road vehicles produced and delivered for sale in California." The deficits increase incrementally each year from model year 2024 (with required ZEV sales percentages ranging from 5% to 9% depending on weight class) to model years 2035 and beyond (ranging from 40% to 75%). For each model year, manufacturers must comply by retiring credits to offset their deficits. The ACT regulation also allows manufacturers to "bank" and trade credits. Manufacturers are subject to civil penalties if they fail to "retire an appropriate amount of ZEV . . . credits" and then fail to "make up those deficits" by the end of the next model year.

[167] ZEAS ISOR at ES-1.

[168] Waiver Request for ACT at 12.

[169] *Id.* at 12.

York, Oregon, Washington,[170] Vermont,[171] Colorado,[172] and Maryland.[173] In addition, 17 States and the District of Columbia have signed a Memorandum of Understanding establishing goals to support widespread electrification of the HD vehicle sector.[174] These states represent over 36 percent of the market for heavy-duty vehicles in the United States.[175]

Numerous state governments have also passed electric vehicle purchase mandates for state and local heavy-duty fleets, including California,[176] Connecticut,[177] Maine,[178] Maryland,[179]

[170] 88 Fed. Reg. at 25,939 n.77.

[171] Sierra Club, *Vermont Adopts Rules for Cleaner Cars and Trucks* (Dec. 1, 2022), https://www.sierraclub.org/vermont/vermont-adopts-rules-cleaner-cars-and-trucks.

[172] Colorado Department of Public Health and Environment, *Colorado adopts new measures to increase availability of zero-emission trucks that offer lower operating and fuel costs* (April 21, 2023), https://cdphe.colorado.gov/press-release/colorado-adopts-new-measures-to-increase-availability-of-zero-emission-trucks-that.

[173] The Maryland Department of the Environment is required to adopt regulations that incorporate by reference California's ACT regulations, taking effect starting with model year 2027. *See* Calstart, *By Paving the Way for Clean Trucks, Maryland Reaffirms Its Position as a Climate Leader*, https://calstart.org/calstart-applauds-maryland-for-adopting-clean-truck-legislation/ (last accessed June 16, 2023).

[174] Multi-State Medium- and Heavy-Duty Zero Emission Vehicle Memorandum of Understanding (July 2020), https://www.nescaum.org/documents/mhdv-zev-mou-20220329.pdf/.

[175] Claire Buysse et al., *Racing to Zero: The Ambition We Need for Zero-Emission Heavy-Duty Vehicles in the United States*, The International Council on Clean Transportation (ICCT) (Apr. 8, 2022), https://theicct.org/racing-to-zero-hdv-us-apr22/.

[176] California Code of Regulations Title 13, Section 2023.1 (By 2040, all public transit agencies must transition to 100% zero-emission bus fleets); California Public Resources Code 25722.5-25722.11, 25724 (By 2025, at least 15% of the state's fleet of new vehicles with a gross vehicle weight rating of 19,000 pounds or more must be zero-emission vehicles, and at least 30% must be by 2030).

[177] Connecticut General Statutes § 14-164o, Senate Bill 4, 2022 (Beginning January 1, 2035, school districts may only purchase zero-emission school buses; by 2040, all school buses in Connecticut must be zero emission. School districts in environmental justice communities must transition to zero-emission buses by January 1, 2030).

[178] Maine Revised Statutes Title 20-A M.R.S. § 5401(15-A) (by 2035, to the extent practicable 75% of school bus acquisitions must be zero-emission buses); P.L. 2022, ch. 693, § 3.

[179] Maryland Statutes, Transportation Code 7-406 (Beginning in 2023, the Maryland Transit Administration may only purchase zero emission buses for the state transit bus fleet.); Maryland Statutes, Environmental Code 2-1505 (Beginning in fiscal year 2025, county Boards of Education may only purchase zero-emission school buses unless certain conditions are met.).

Massachusetts,[180] New Jersey,[181] New York,[182] and Rhode Island.[183] Further, numerous states and localities have implemented programs that provide purchase incentives or price relief to spur the replacement of conventional heavy-duty vehicles with zero-emission or alternative fuel

[180] Executive Order 594, 2021 (By 2030, all vehicles with a GVWR of 14,000 lbs. or more must be ZEVs.); House Bill 5060, 2022; Session Law Chapter 448, Section 6A, 2016 (By December 21, 2030, all passenger buses purchased or leased by the Massachusetts Bay Transportation Authority must be ZEVs. By December 31, 2024, all passenger buses operated by the MBTA must be ZEVs.)

[181] New Jersey Statutes § 48:25-3 (10% of new buses purchased by the New Jersey Transit Corporation must be ZEVs by December 31, 2024, and 100% by December 31, 2032); New Jersey Statutes § 27:1B-22 (All buses purchased by the New Jersey Transit Corporation must be 1) equipped with improved pollution controls that reduce particular emissions, or 2) powered by a fuel other than conventional diesel. Qualifying vehicles include hybrid electric vehicles and fuel cell vehicles).

[182] New York Senate Bill 8006, 2022 (Beginning July 1, 2027, school districts entering new purchase or lease contracts may only purchase or lease zero-emission school buses powered by electricity or hydrogen.); Executive Order 22, 2022; Senate Bill 2838, 2022 (For state fleet medium- and heavy-duty vehicles, 10% must be ZEVs by 2026, 25% must be ZEVs by 2031; and 100% of MHDVs must be ZEVs by 2041.).

[183] Rhode Island Public Transit Authority, *Electric Bus Pilot Program*, https://www.ripta.com/electric-bus/ (Funds from the Volkswagen Mitigation Trust are being used to replace older diesel buses with all-electric, zero-emission buses.).

vehicles, including Alabama,[184] California,[185] Idaho,[186] Indiana,[187] Iowa,[188] Louisiana,[189] Maryland,[190] Michigan,[191] Nebraska,[192] New Jersey,[193] Utah,[194] and Washington.[195]

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[184] State of Alabama, Department of Economic and Community Affairs, Volkswagen Environmental Mitigation Trust Beneficiary Mitigation Plan (Feb. 28, 2019), https://adeca.alabama.gov/wp-content/uploads/Beneficiary-Mitigation-Plan.pdf (making grants available for the replacement of qualified medium- and heavy-duty vehicles, including freight trucks, port drayage trucks, buses, ferries, tugs, forklifts, and airport ground support equipment).

[185] Santa Barbara County Air Pollution Control District, Clean Air Grants for On-Road Vehicles, https://www.ourair.org/grants-for-on-road-vehicles/ (The Santa Barbara Air Pollution Control District offers grants for the replacement of existing heavy-duty vehicles with zero-emission or near-zero-emission vehicles.) (last accessed June 16, 2023).

[186] Idaho Department of Environmental Quality, Volkswagen and Diesel Funding, https://www.deq.idaho.gov/air-quality/improving-air-quality/volkswagen-and-diesel-funding/ (Funds from the Volkswagen Mitigation Trust and the Diesel Emissions Reduction Act grant are used to replace eligible vehicles or equipment with new engines, including in some cases electric engines, and to install EV supply equipment throughout Idaho.) (last accessed June 16, 2023).

[187] Indiana Department of Environmental Management, Volkswagen Environmental Mitigation Trust Program, https://www.in.gov/idem/airquality/volkswagen-mitigation-trust/ (Funds from the Volkswagen Mitigation Trust Agreement may be used to pay some or all of the cost to repower or replace eligible diesel-powered vehicles with new diesel, alternative fuel, or all-electric engines or vehicles.) (last accessed June 16, 2023).

[188] Iowa Department of Transportation, Diesel Emissions Reduction Act, https://iowadot.gov/dera/ (Part of Iowa's funds from the Volkswagen Mitigation Trust Agreement are used for projects that reduce diesel emissions, including diesel engine replacement with a zero-emission power source.) (last accessed June 16, 2023).

[189] Louisiana Department of Environmental Quality, Volkswagen Environmental Mitigation Trust, https://deq.louisiana.gov/page/louisiana-volkswagen-environmental-mitigation-trust (Funds from Louisiana's portion of the Volkswagen Mitigation Trust were provided for, among other purposes, all-electric repower or replacement of airport ground support equipment, forklifts, and port cargo handling equipment, and the purchase, installation, and maintenance of EV charging stations.) (last accessed June 16, 2023).

[190] Maryland House Bill 1391, 2022 (The Maryland Energy Administration is authorized to administer a program providing grants for the purchase of medium- and heavy-duty ZEVs, EV charging stations, or medium- and heavy-duty non-road equipment.).

[191] Michigan Department of Environment, Great Lakes, and Energy, Fuel Transformation Program, https://www.michigan.gov/egle/about/Organization/Materials-Management/fuel-transformation-program (This program offers grants for eligible on- and off-road vehicles and equipment, including school buses and medium- and heavy-duty trucks, that reduce NOx emissions, improve air quality, and increase adoption of zero emission or alternative fuel vehicles and equipment.) (last accessed June 16, 2023).

[192] Nebraska Department of Environment, Volkswagen Environmental Mitigation Trust Fund, http://deq.ne.gov/NDEQProg.nsf/OnWeb/AirVW (Funds from the Volkswagen Mitigation Trust have been used to replace diesel buses, including with electric buses; to replace diesel equipment, including with electric replacements; and to acquire and install EV charging stations.) (last accessed June 16, 2023).

[193] New Jersey School Boards Association, Grants Available to Replace Diesel Vehicles with Electric, https://www.njsba.org/news-publications/school-board-notes/july-13-2021-vol-xlv-no-1/grants-available-to-replace-diesel-vehicles-with-electric/ (The New Jersey Department of Environmental Protection offered funds to replace medium- and heavy-duty diesel vehicles with electric.) (last accessed June 16, 2023); New Jersey Economic Development Authority, New Jersey Zero-Emission Incentive Program (NJ ZIP), https://www.njeda.gov/njzip/ (offers vouchers for the purchase of new medium- and high-duty ZEVs registered in New Jersey) (last accessed June 16, 2023).

[194] Utah Department of Environmental Quality, Alternative Fuel Heavy-Duty Vehicle Tax Credit Program, https://deq.utah.gov/air-quality/incentive-programs-aq/alternative-fuel-heavy-duty-vehicle-tax-credit-program (income tax credits are available for the qualified purchase of a natural gas, electric, or hydrogen-electric heavy duty vehicle) (last accessed June 16, 2023).

Recent incentive programs and commitments made at the federal level further underscore the changing landscape for ZEVs in the heavy-duty sector since EPA finalized the Phase 2 GHG Standards. The International Council on Clean Transportation projects the Inflation Reduction Act ("IRA") alone will cause HD ZEV sales to increase significantly, from 10 percent sales for the business-as-usual case to roughly 25 percent of sales in 2030 with the IRA in place.[196] In November 2022 the Biden Administration added the United States as a signatory to the Global Memorandum of Understanding on Zero-Emission Medium- and Heavy-Duty Vehicles, which commits the United States to a goal of 100 percent zero-emission truck and bus sales by 2040, with an interim goal of 30 percent new sales by 2030,[197] commitments that the federal government confirmed in its Blueprint for Transportation Decarbonization.[198]

2. Significant Investments Are Being Made in Charging Infrastructure and Grid Reliability

There is substantial financial support to build out medium- and heavy-duty truck charging stations at both the national level and in our States and Cities. On the federal level, the Infrastructure Investment and Jobs Act includes $7.5 billion for grant programs administered by U.S. Department of Transportation ("DOT") for EV charging infrastructure to expand Alternative Fuel Corridors and a National Electric Vehicle formula grant program at the DOT to provide additional funding to states to support EV charging infrastructure.[199] The National Electric Vehicle Infrastructure ("NEVI") Formula Program is expected to help build EV chargers covering approximately 75,000 miles of highway across the country.[200] Many of the State Plans submitted through the NEVI Program address infrastructure needs for freight specifically.[201] Moreover, the INFRA Grants Program has $8 billion to award competitive grants for multimodal freight and highway projects of national or regional significance to improve the safety,

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[195] Revised Code of Washington §§ 82.16.0496, 82.04.4496 (Businesses are eligible to receive tax credits for purchasing new or used medium- and heavy-duty alternative fuel vehicles and installing alternative fueling infrastructure. Alternative fuels include electricity and hydrogen.).

[196] ICCT White Paper, *Analyzing the Impact of the Inflation Reduction Act on Electric Vehicle Uptake in the United States* (Jan. 31, 2023), https://theicct.org/publication/ira-impact-evs-us-jan23/.

[197] Global Commercial Vehicle Drive to Zero, Global Memorandum of Understanding on Zero-Emission Medium- and Heavy-Duty Vehicles, https://globaldrivetozero.org/mou-nations/ (last accessed June 16, 2023).

[198] U.S. Department of Energy, *The U.S. National Blueprint for Transportation Decarbonization: A Joint Strategy to Transform Transportation* (Jan. 2023), https://www.energy.gov/sites/default/files/2023-01/the-us-national-blueprint-for-transportation-decarbonization.pdf.

[199] Environmental Defense Fund, *Electric Vehicle Market Update* (April 2022), https://blogs.edf.org/climate411/files/2022/04/electric_vehicle_market_report_v6_april2022.pdf.

[200] International Energy Agency, *Global EV Outlook 2023*, https://iea.blob.core.windows.net/assets/dacf14d2-eabc-498a-8263-9f97fd5dc327/GEVO2023.pdf.

[201] *See, e.g.*, Mississippi Dep't of Transportation, *Mississippi Electric Vehicle Infrastructure Deployment Plan* (Aug. 1, 2022), https://www.fhwa.dot.gov/environment/nevi/ev_deployment_plans/ms_nevi_plan.pdf; Missouri Dep't of Transportation, *Missouri Electric Vehicle Infrastructure Deployment Plan* (Sept. 2022), https://www.fhwa.dot.gov/environment/nevi/ev_deployment_plans/mo_nevi_plan.pdf; Nebraska Dep't of Transportation, *State Plan for Electric Vehicle Infrastructure Deployment* (Aug. 1, 2022), https://www.fhwa.dot.gov/environment/nevi/ev_deployment_plans/ne_nevi_plan.pdf.

efficiency, and reliability of the movement of freight and people in and across rural and urban areas.[202] In November 2022, California committed $1 billion of funding to the development of charging infrastructure.

There is also substantial private investment in developing charging infrastructure in the United States, including both hydrogen and electric-vehicle charging stations. For example, Daimler, NextEra, and BlackRock announced a joint venture, and $650 million initial investment, to design, develop, install, and operate a nationwide charging network for medium- and heavy-duty battery electric vehicles and hydrogen fuel cell vehicles, construction of which is set for 2023.[203] And other private efforts to expand heavy-duty charging infrastructure are already underway.[204]

Our States and Cities do not anticipate significant concerns about the electrical grid's ability to support the additional energy needs created by vehicle electrification. A case study shows that in 2040, battery-electric truck energy needs represent 3 percent of electricity production in the United States in 2021; however, the International Council on Clean Transportation notes that a "3 [percent] increase in grid capacity will not necessarily be needed, since the existing infrastructure can be leveraged through demand management and minor distribution network upgrades."[205] There are also efforts underway by utilities and transmission organizations to put electrified vehicles to work for the grid. For example, the public power utilities in Austin, Texas conducted a pilot project with the US Department of Energy that

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[202] Global Commercial Vehicle Drive to Zero, *Global MOU Policy Tracker Dashboard*, https://globaldrivetozero.org/progress-dashboard/ (last accessed June 16, 2023).

[203] Ryan Kennedy, *Daimler, NextEra, and BlackRock to deploy nationwide US electric trucking network*, pv magazine (Jan. 31, 2022), https://pv-magazine-usa.com/2022/01/31/daimler-nextera-and-blackrock-to-deploy-nationwide-us-electric-trucking-network/.

[204] *See, e.g.*, *DTNA opens first heavy-duty electric truck charging site*, Fleet Owner (April 21, 2021), https://www.fleetowner.com/emissions-efficiency/press-release/21161913/dtna-opens-first-heavyduty-electric-truck-charging-site; Alan Adler, *Forum Mobility in $400M JV for electric truck infrastructure*, Freight Waves (Jan. 17, 2023), https://www.freightwaves.com/news/forum-mobility-enters-400m-joint-venture-for-electric-truck-infrastructure; *Navistar Forging Ahead on Electric-Truck Development*, Heavy Duty Trucking Truckinginfo (May 4, 2023), https://www.truckinginfo.com/10198173/navistar-forging-ahead-on-electric-truck-development; Michelle Lewis, *This EV charging depot can charge up to 96 electric semi-trucks at once*, electrek (June 13, 2023), https://electrek.co/2023/06/13/electric-truck-charging-oakland/; Seth Clevenger, *Navistar Expands Electric Truck Offerings*, Transport Topics (May 5, 2023), https://www.ttnews.com/articles/navistar-partners-quanta; *TeraWatt Developing I-10 Electric Corridor, the First Network of Electric Heavy-Duty Charging Centers*, Business Wire (Oct. 20, 2022), https://www.businesswire.com/news/home/20221020005252/en/TeraWatt-Developing-I-10-Electric-Corridor-the-First-Network-of-Electric-Heavy-Duty-Charging-Centers; Scooter Doll, *Schneider opens own depot in SoCal capable of charging 32 Freightliner electric trucks at once*, electrek (June 7, 2023), https://electrek.co/2023/06/07/schneider-opens-depot-socal-charging-32-freightliner-electric-trucks-california-ev/; Lisa Baertlein, *California's port truck-charging plan gets a jolt from big investors*, Reuters (April 17, 2023), https://www.reuters.com/business/autos-transportation/big-investors-amp-up-californias-port-truck-charging-plan-2023-04-17/.

[205] ICCT, *Charging Solutions for Battery-Electric Trucks* (Dec. 22, 2022), https://theicct.org/publication/charging-infrastructure-trucks-zeva-dec22/; *see also* Grid Modernization Laboratory Consortium, *Electric Vehicles at Scale – Phase I Analysis: High EV Adoption Impacts on the Western U.S. Power Grid* (July 2020), https://www.pnnl.gov/sites/default/files/media/file/EV-AT-SCALE_1_IMPACTS_final.pdf.

incorporated use of electric vehicles as a way to add stability to the power grid via vehicle-to-grib, or V2G, charging,[206] as has San Diego Gas and Electric.[207] Ultimately, the decisions needed to respond to a modest increase in energy demand required by increasing numbers of electric vehicles will take place at the state public utility commission, grid operator, and utility level, as they are appropriately situated to plan for and respond to those changes in demand. These are routine plans and adjustments that these entities make as a matter of course. Indeed, utilities may be uniquely well situated to make the "distribution level" updates, and "smart charging and pricing schemes" that will respond to the changing energy needs of increasing electric vehicles.[208] And, as EPA correctly notes, the power sector and its regulators have responded to much larger changes in demand—including from increased use of electrical equipment—over similar (or smaller) timeframes.[209]

3. Improvements are Expected in the Supply Chain of Critical Minerals

The States and Cities agree with EPA's assessment "that increased vehicle electrification in the United States will not lead to a critical long term dependence on foreign imports of minerals or components, nor that increased demand for these products will become a vulnerability to national security."[210] Both Congress and the Biden Administration have taken proactive steps to increase domestic production capacity for the five critical minerals used in the production of rechargeable batteries used in EVs. For example, the Infrastructure Investment and Jobs Act (P.L. 117-58) directs the Secretary of Energy to award over $6 billion in grants related to the research, supply, processing, and recycling of battery critical materials and minerals; [211] the Inflation Reduction Act (IRA) provides for a tax credit designed to accelerate EV battery production in the United States;[212] and the Biden Administration has committed to working with the European Union to "diversify[] critical mineral and battery supply chains."[213]

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[206] Austin Energy, Final Deliverable Reports, *Austin SHINES Research for the U.S. Dep't of Energy* (July 31, 2020), https://austinenergy.com/green-power/austin-shines/final-deliverable-reports.

[207] Robert Walton, *California OKs $100M SDG&E commercial EV charging plan, testing electric buses as grid assets*, Utility Dive (Aug. 16, 2019), https://www.utilitydive.com/news/california-oks-100m-sdge-commercial-ev-charging-plan-testing-electric-bu/561071/.

[208] ICCT, *Charging Solutions for Battery-Electric Trucks* (Dec. 22, 2022), https://theicct.org/publication/charging-infrastructure-trucks-zeva-dec22/, at 15.

[209] 88 Fed. Reg. at 25,983.

[210] 88 Fed. Reg. at 25,962.

[211] Congressional Research Service, *Critical Minerals in Electric Vehicle Batteries* (Aug. 29, 2022), https://crsreports.congress.gov/product/pdf/R/R47227.

[212] Public Law 117-169, 136 Stat. 1818 (Aug. 16, 2022).

[213] The White House, Joint Statement by President Biden and President von der Leyen (March 10, 2023), https://www.whitehouse.gov/briefing-room/statements-releases/2023/03/10/joint-statement-by-president-biden-and-president-von-der-leyen-2/.

Spurred both by public incentives, and "business opportunity" presented by "the need for increased domestic production capacity," private industry is also taking steps to increase domestic supply of critical minerals.[214] As of March 2023, "at least $45 billion in private-sector investment has been announced across the U.S. clean vehicle and battery supply chain."[215] This includes "new and expanded commercial-scale domestic facilities to process lithium, graphite and other battery materials, manufacture components, and demonstrate new approaches, including manufacturing components from recycled materials."[216] Companies, such as Volkswagen of America, Audi, and Toyota, have committed to developing recycling programs for end-of-life EV battery packs, which will recover more than 95 percent of the metals found in existing batteries.[217] These efforts aim to "create a circular supply chain for EV batteries in the United States that will eventually reduce the cost of batteries and offset the need for mining precious metals."[218] Particularly taking into consideration these investments in recycling programs, there are sufficient mineral resources to meet industry needs, both now and in the future.[219]

Moreover, the States and Cities find EPA's conclusions well supported that the cost to manufacture lithium-ion batteries has dropped significantly over the past several years and will continue to fall over time.[220] EPA correctly observed that costs for lithium-ion batteries will decrease as a result of manufacturers' announced plans to invest billions of dollars in battery

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[214] 88 Fed. Reg. at 25,962.

[215] U.S. Department of the Treasury, *Treasury Releases Proposed Guidance on New Clean Vehicle Credit to Lower Costs for Consumers, Build U.S. Industrial Base, Strengthen Supply Chains* (March 31, 2023), https://home.treasury.gov/news/press-releases/jy1379.

[216] U.S. Department of Energy, *Bipartisan Infrastructure Law Battery Materials Processing and Battery Manufacturing & Recycling Funding Opportunity Announcement* (Oct. 19, 2022), https://www.energy.gov/sites/default/files/2022-10/DOE%20BIL%20Battery%20FOA-2678%20Selectee%20Fact%20Sheets%20-%201_2.pdf; Jason Hidalgo, *Tesla to build $3.6 billion battery, electric semi truck manufacturing facility in Northern Nevada*, Reno Gazette Journal (Jan. 24, 2023), https://www.rgj.com/story/news/money/business/2023/01/24/tesla-to-build-3-6b-battery-electric-nevada-semi-truck-manufacturing-facility/69837346007/; Press Release, *Proterra Announces EV Battery Factory in South Carolina as Demand for Commercial Electric Vehicles Grows*, Proterra (Dec. 14, 2021), https://www.proterra.com/press-release/proterra-sc-battery-factory/; Lion Electric, *Lion Electric Inaugurates its Battery Manufacturing Factory for Medium and Heavy-Duty Vehicles*, prnewswire.com (April 17, 2023), https://www.prnewswire.com/news-releases/lion-electric-inaugurates-its-battery-manufacturing-factory-for-medium-and-heavy-duty-vehicles-301799083.html.

[217] Kirsten Korosec, *Volkswagen, Audi tap Redwood Materials to recycle old EV batteries in US*, TechCrunch.com (July 12, 2022), https://techcrunch.com/2022/07/12/redwood-materials-volkswagen-audi-ev-battery-recycling/; Rebecca Bellan, *Redwood Materials partners with Toyota to recycle batteries in US*, TechCrunch.com (June 21, 2022), https://techcrunch.com/2022/06/21/redwood-materials-partners-with-toyota-to-recycle-batteries-in-us/.

[218] *Id.* (*Redwood Materials*).

[219] Jessica Dunn, *Are There Enough Materials to Manufacture All the Electric Vehicles Needed* (Nov. 15, 2022), https://blog.ucsusa.org/jessica-dunn/are-there-enough-materials-to-manufacture-all-the-electric-vehicles-needed/.

[220] 88 Fed. Reg. at 25,930.

electric vehicle ("BEV") technology and development, as well as federal incentives in the Bipartisan Infrastructure Law (BIL) and IRA.[221]

And similar patterns are observed in the supply chain for fuel-cell electric vehicles, an alternative vehicle technology that can be used to meet stringent GHG emission standards, especially for long-haul trucks.[222] The technology for hydrogen-powered electric trucks is already available, with buy-in from industry,[223] and costs associated with these vehicles are expected to fall.[224] Moreover, businesses are investing in the manufacture of hydrogen to power these vehicles.[225]

DISCUSSION

I. EPA SHOULD STRENGTHEN THE PHASE 2 GHG STANDARDS FOR MODEL YEAR 2027 VEHICLES

As discussed above, the States and Cities agree that heavy-duty ZEVs are rapidly becoming an important presence within the heavy-duty vehicles sector, at rates far surpassing those projected in 2016 when EPA adopted the Phase 2 standards. EPA's proposal to recognize this and the availability of other technologies and tighten the MY2027 Phase 2 GHG standards accordingly is sound. The proposed approach preserves the environmental integrity of EPA's

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[221] *Id.*

[222] Thomas Walker, *Zero Emission Long-Haul Heavy-Duty Trucking*, Clean Air Task Force (Mar. 13, 2023), Executive Summary, https://www.catf.us/resource/zero-emission-long-haul-heavy-duty-trucking/.

[223] *See, e.g.*, Press Release, *Premiere: Volvo Trucks tests hydrogen-powered electric trucks on public roads*, Volvo (May 8, 2023), https://www.volvotrucks.com/en-en/news-stories/press-releases/2023/may/volvo-trucks-tests-hydrogen-powered-electric-trucks-on-public-roads.html; Today's Trucking, *AMTA orders Nikola Tre battery-electric, and hydrogen fuel cell trucks for demonstrations*, AMTA (Apr. 25, 2023), https://www.trucknews.com/sustainability/amta-orders-nikola-tre-battery-electric-and-hydrogen-fuel-cell-trucks-for-demonstrations/1003174531/; Press Release, Amazon, *Amazon adopts green hydrogen to help decarbonize its operations* (Aug. 25, 2022), https://www.aboutamazon.com/news/sustainability/amazon-adopts-green-hydrogen-to-help-decarbonize-its-operations; Lewin Day, *Toyota Gets OK From California to Sell Hydrogen-Electric Semi-Truck Powertrains* (Apr. 24, 2023), https://www.thedrive.com/news/toyota-gets-ok-from-california-to-sell-hydrogen-electric-semi-truck-powertrains; Michelle Lewis, *SEA Electric just added a hydrogen power option for electric trucks* (April 28, 2023), https://electrek.co/2023/04/28/sea-electric-just-added-a-hydrogen-power-option-for-electric-trucks/.

[224] IRENA, *Making the breakthrough: Green hydrogen policies and technology costs*, International Renewable Energy Agency (2021), Green hydrogen cost reduction (irena.org); Emily Beagle et al., *Fueling the Transition: Accelerating Cost-Competitive Green Hydrogen*, RMI.org (2021), https://rmi.org/insight/fueling-the-transition-accelerating-cost-competitive-green-hydrogen.

[225] Rod Walton, *Cummins starting up its first U.S. Hydrogen Electrolyzer Manufacturing site in the U.S.*, EnergyTech (Oct. 11, 2022), https://www.energytech.com/energy-efficiency/article/21252555/cummins-starting-up-first-us-hydrogen-electrolyzer-manfacturing-site-in-the-us; Airswift, *5 US Green hydrogen projects starting in 2023* (Feb. 7, 2023), https://www.airswift.com/blog/green-hydrogen-projects-usa; Kirsten Korosec, *Bosch to invest $200M in US fuel cell production for electric commercial trucks*, TechCrunch (Aug. 31, 2022); Press Release, *Toyota to Assemble Fuel Cell Modules at Kentucky Plant in 2023*, Toyota (Aug. 25, 2021), https://pressroom.toyota.com/toyota-to-assemble-fuel-cell-modules-at-kentucky-plant-in-2023/; *U.S. National Clean Hydrogen Strategy and Roadmap*, https://www.hydrogen.energy.gov/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf.

existing Phase 2 standards, in light of the expanding deployment of ZEV technologies, because those standards were premised on other emission-reduction technologies.[226]

It is rational and consistent with the CAA to update the Phase 2 GHG standards to reflect recent developments and to ensure the standards continue to demand technologically feasible and cost-effective emission reductions. Indeed, it would be "patently unreasonable" for EPA to ignore the "dramatic[]" changes in the regulated industry. *NRDC v. Herrington*, 768 F.2d 1355, 1408 (D.C. Cir. 1985). The CAA, in particular, is designed so that EPA may respond to "changing circumstances and scientific developments" and "forestall . . . obsolescence." *Massachusetts v. EPA*, 549 U.S. 497, 532 (2007). The projections that heavy-duty ZEVs will reach cost parity with, and then achieve cost advantage over, conventional heavy-duty engines within the next one to eight years is surely one such change,[227] as are the myriad developments described in the Proposal and above. It is therefore appropriate for EPA to forestall obsolescence here by adjusting the Phase 2 GHG standards to respond to technological developments, most notably increasing ZEV deployment in the heavy-duty sector. To that end, as discussed in more detail below, the States urge EPA to improve the accuracy of its update to the MY2027 Phase 2 GHG standards by ensuring the estimated heavy-duty ZEV penetration rate reflects other States' adoption of California's ACT regulations and other favorable market conditions for HD ZEVs, and increase the stringency of the final standards to provide protection levels, and thus technological deployment levels, equivalent to that of ACT.

II. EPA SHOULD ADOPT GHG STANDARDS FOR MODEL YEAR 2028 THROUGH 2032 THAT PROVIDE PROTECTIONS COMMENSURATE WITH CALIFORNIA'S ACT STANDARDS

While EPA's proposed standards would mark an important step in ensuring the heavy-duty vehicle sector continues to reduce its GHG emissions, the States and Cities urge EPA to consider more stringent standards, with values that would encourage at least the level of ZEV adoption as in California's ACT standards.[228] In light of the vast strides made and expected in the deployment of heavy-duty battery-electric vehicles, the development and adoption of fuel-cell electric vehicle technology, and increased adoption of existing and cost-effective emission control technologies in conventional heavy-duty vehicles, more stringent final standards are feasible and appropriate in the lead time provided. And, while further ZEV deployment is not the only way manufacturers can and will comply with more stringent GHG standards, the increasing use of ZEVs has numerous advantages, including the reduction of toxic and criteria pollution that already overburdens environmental justice communities located near highways,

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[227] 88 Fed. Reg. at 25,942; *see also* ICCT, *Purchase costs of zero-emission trucks in the United States to meet future Phase 3 GHG standards* (March 2023), https://theicct.org/wp-content/uploads/2023/03/cost-zero-emission-trucks-us-phase-3-mar23.pdf.

[228] 88 Fed. Reg. at 25,929.

railyards, distribution centers, and other sites that experience large volumes of heavy-duty vehicle traffic.

It is, thus, important that EPA correct its underestimation of the baseline heavy-duty ZEV penetration rates.[229] EPA's baseline should account for ZEV adoption rates resulting from compliance with the California ACT Rule, everywhere that Rule applies (including the eight other States who have adopted the ACT Rule: Massachusetts, New Jersey, New York, Oregon, Washington, Maryland, Vermont, and Colorado). EPA should also include the additional nine States and Districts that have signed a memorandum of understanding (MOU) to promote the adoption of heavy-duty ZEVs (the District of Columbia, Connecticut, Hawaii, Maine, Nevada, North Carolina, Pennsylvania, Rhode Island, and Virginia). At a minimum, EPA should adjust its reference case to reflect these actions and commitments, and other data projecting strong ZEV sales in the relevant time frame, including private sector actions and the BIL and IRA incentives that are incentivizing adoption of heavy-duty ZEVs.

The States and Cities urge EPA to then increase the stringency of the final standards to reflect the additional progress that is clearly feasible and cost-effective. When setting standards under section 202(a) of the CAA, EPA must "press for the development and application of improved technology rather than be limited by that which exists today." *Natural Resources Defense Council v. EPA*, 655 F.2d 318, 328 (D.C. Cir. 1981). Given the plans original equipment manufacturers have announced for ZEV sales in this sector, the indications from customers (including several very large ones) that they plan to buy those ZEVs in timeframes relevant here, and the public incentives already available, adoption of ZEVs in the heavy-duty sector are achievable at levels necessary to meet nationwide standards as protective as ACT. Indeed, the fact that original equipment manufacturers in the sector have asserted plans for ZEV sales far surpassing even ACT-required levels is instructive, as it demonstrates that the regulated industry has concluded there is sufficient time to develop and apply the technologies needed to comply with robust GHG standards within the applicable timelines, and that doing so is cost effective for their businesses. Moreover, EPA is now setting standards out to (at least) MY2032. That is more than ample lead time for any other manufacturers to prepare to deploy substantially more ZEV technologies, particularly since EPA forecasts 60 percent vocational and 40 percent tractor sales would be ZEVs in MY2032 under the standards we urge EPA to adopt.[230] In other words, manufacturers would retain ample room for a gradual transition to ZEV and other emission-reducing technologies, meaning, for example, that truck applications that are particularly hard to transition would not be rushed to do so.

It is vital that EPA recognize the availability, feasibility, and cost-effectiveness of these technologies and finalize more stringent standards, accordingly, in order to adequately respond to

[229] DRIA at 417 ("It is possible that EPA's reference case is underestimated, and adoption of ZEVs, and other technologies, will occur more rapidly than EPA predicts in this proposal.").

[230] 88 Fed. Reg. at 25,933.

the climate harms faced by our States and Cities, as discussed in detail above. "Elevated concentrations of GHGs have been warming the planet, leading to changes in the Earth's climate including changes in the frequency and intensity of heat waves, precipitation, and extreme weather events, rising seas, and retreating snow and ice. The changes taking place in the atmosphere as a result of the well-documented buildup of GHGs due to human activities are changing the climate at a pace and in a way that threatens human health, society, and the natural environment."[231] As EPA recognizes, the transportation sector is now the largest U.S. source of GHG emissions, with heavy-duty vehicles contributing 25 percent of the United States' transportation emissions.[232] Robust standards that maximize reductions in GHGs are a necessary component of the United States' strategy to prevent the most catastrophic of these climate harms.

The States and Cities are already experiencing grievous effects from climate change, which, as described above, are expected to significantly escalate without sharp reductions in GHG emissions.[233] Our residents have lost property, been displaced from homes, endured respiratory illness and other health impacts, and even been killed as a result of severe weather events exacerbated by climate change.[234] Rising average temperatures, shrinking mountain snowpacks, warmer and more severe storms, wildfires, and higher sea levels also harm our economies, infrastructure, and public services.[235] These impacts require long-term, resource-intensive adaptation planning and costly disaster response by all levels of government and the private sector. The U.S. Global Change Research Program's 2017-2018 *Fourth National Climate Assessment* projects more extreme-weather impacts due to climate change for every region of the United States, including major damage to agriculture, coastal industries, utility grids, transportation networks, air quality, and human health, from coastal flooding, heat waves, drought, and wildfires, as well as from the spread of tree-killing and disease-carrying pests.[236]

Significant GHG emission reductions are also essential to begin to reduce the inequitable burden disproportionately borne by communities with high poverty rates, communities of color,

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[231] Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards, 86 Fed. Reg. 74,434, 74,489 (Dec. 30, 2021); *see also* Summary for Policymakers, supra n.2 at 11 (surveying medium-to-high confidence attributions of extreme weather, wildfires, heat-related deaths, and ecosystem loss to greenhouse gas emissions from human activities).

[232] 88 Fed. Reg. at 25,952.

[233] Fourth National Climate Assessment, supra n.9 at 11-19 (summarizing ongoing and projected impacts to United States from climate change); *see also* Summary for Policymakers, supra n.2 at 11-22 (describing ongoing global climate change impacts and projecting near-, mid-, and long-term impacts, particularly from unpredictable cascading and compounded disruptions); *id.* at SPM-7, SPM-14 to 19 (finding reductions of GHGs is occurring too slowly to limit global warming to even 2°C and such a goal requires unprecedented accelerations in reductions).

[234] Fourth National Climate Assessment, supra n.9 at 82-83, 98-103, 115-62 (surveying national losses of coastal property and air quality deterioration and summarizing impacts to health, property, and ecosystems by U.S. region).

[235] Fourth National Climate Assessment, supra n.9 at 67-68, 70-72, 82-83, 85-91, 93-96.

[236] Fourth National Climate Assessment, supra n.9 at 11-19; see also *id.* at 102 (by shifting from a high-emissions scenario to a low-emissions scenario, "thousands of American lives could be saved and hundreds of billions of dollars in health-related economic benefits gained each year").

and indigenous peoples.[237] Under Executive Order 12,898, each federal agency has been directed, "to the greatest extent practicable and permitted by law" to "make achieving environmental justice part of its mission by identifying and addressing as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories . . . ."[238] Additionally, EPA recently committed to "make achieving environmental justice part of [its] mission[] by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts."[239] Action to reduce GHGs from all major-emitting sectors, including the heavy-duty vehicles sector, is imperative to tackling climate-change and minimizing the effect of climate change on at-risk communities.

III. EPA SHOULD ADOPT INCREASINGLY STRINGENT GHG STANDARDS FOR MODEL YEARS 2033 THROUGH 2035

In addition to adopting more stringent standards for model years 2027 through 2032, our States and Cities urge EPA to adopt standards in the final rule that continue out through model year 2035, following the demonstration of feasible protection and technology-levels in California's ACT Rule. That action is supported by the long-term commitments made by several of the major manufacturers, which have projected production of 100 percent ZEV by 2040. Moreover, the lead time for these years is substantial—more than adequate to further deploy key emission-reduction technologies, including ZEVs. Section 202(a) of the CAA authorizes EPA to rely on "future advances," in addition to "presently available" technologies.[240] And, particularly given the force of the climate crisis and the need to substantially reduce emissions as soon as possible, EPA should exercise that authority here to set increasingly stringent standards that drive technology development and deployment in feasible, but forceful, terms.

IV. EPA SHOULD NOT CHANGE THE DEFINITION OF "U.S.-DIRECTED PRODUCTION VOLUME," AND CERTAINLY SHOULD DO SO NO EARLIER THAN MODEL YEAR 2027

EPA has proposed to change its definition of "U.S.-directed production volume."[241] This term defines the geographic boundaries in which sales count toward manufacturers' compliance with EPA's heavy-duty GHG standards.[242] Under the current Phase 2 regulations, this term excludes "production volumes that are certified to different state emission standards," meaning that sales in California and the Section 177 States that have adopted California's ACT Rule

[237] *See* discussion supra at 11-17.

[238] 64 Fed. Reg. 7629 (Feb. 16, 1994).

[239] Exec. Order 14,008, § 219.

[240] *NRDC*, 655 F.2d at 328, 330 (cleaned up); 42 U.S.C. § 7521(a)(2).

[241] 40 C.F.R. §§ 1036.801, 1037.801.

[242] 88 Fed. Reg. at 26,009.

would not currently count toward compliance with EPA's Phase 2 standards. EPA seeks comment on whether it should change this definition so that EPA would count "total nationwide production volumes" toward compliance with its standards, "including vehicles certified to state emission standards that are different than" EPA's.[243]

Our States and Cities oppose this change. Congress intended EPA's standards to reduce harmful vehicular emissions, thereby protecting public health and welfare, through new vehicle sales *in States that have not adopted California's standards*. EPA's standards should be based on an assessment of technological development and applications manufacturers can make in those other States, and compliance should be determined accordingly. Certainly, EPA must consider the vehicles being produced for, and anticipated to be produced for, California and Section 177 States pursuant to those States' standards. That information is directly relevant to questions of technological feasibility and cost-effectiveness. This is so not because those vehicles facilitate compliance with EPA's standards, but because the ability to produce and use cleaner vehicles *anywhere* is one part of the picture of what may be feasible elsewhere. Thus, simply because EPA is "considering such production volumes in setting the stringency of the Phase 3 standards in this rulemaking," it does not logically follow that EPA should "allow[] inclusion of such production volumes in demonstrating compliance with" EPA's standards.[244]

Moreover, if EPA follows the path it has proposed here—changing the definition of "U.S.-directed production volume" beginning with MY2024, preserving the multiplier credits through MY2026, and finalizing its preferred alternative standards beginning in MY2027—EPA's standards will not protect the public health and welfare as the CAA requires. First, the timing of EPA's proposed definitional change would allow manufacturers to get credit for any ZEVs they sell to comply with state ACT regulations under EPA's existing Phase 2 standards for MY2024-2026 *which are not changing here*. In other words, EPA would make compliance significantly easier (perhaps even effortless) in States outside California and the Section 177 States in MY2024-2026, even though EPA has made no finding that manufacturers face challenges with the federal Phase 2 standards in those years (nor could EPA do so).

Second, and even worse, EPA would allow manufacturers to receive between 3.5 and 5.5 times the credit for any ZEVs they sell in ACT States for those three model years (2024-2026).[245] So, even by simply meeting their compliance obligations in ACT States, manufacturers will rack up enormous credit banks under EPA's program. Manufacturers could then use banked credits, rather than emissions reductions, to comply in later years, which would slow, rather than advance, progress.

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[243] *Id.* at 26,010.

[244] *Id.*

[245] Our States and Cities support the comments of others (including the California Air Resources Board) in urging EPA to end the multipliers earlier than MY2026.

Third, EPA's preferred alternative for MY2027 and beyond is not projected to provide the emissions benefits or to encourage technology-deployment levels equivalent to ACT. If EPA counts ACT compliance toward those weaker standards, it means the non-ACT States (including some joining this comment) can see technology deployment and public health protections at lower-than-average levels. If EPA sets a nationwide standard that it forecasts might result in 30 percent ZEVs nationally for vocational vehicle sales in MY2029, but ACT requires 40 percent in that same year,[246] the actual ZEV sales in the non-ACT States can clearly fall well below the 30 percent nationwide forecast. EPA's approach clouds how much protection EPA anticipates its standards will provide in non-ACT States (where those standards are the only protection) and fails to adequately serve the markets EPA's standards are intended to cover.

If EPA intends to finalize the proposed change to the definition of "U.S.-directed production volume," it should, at a minimum, mitigate these adverse outcomes by:

- Making the definitional change effective no sooner than the model year for which EPA revises its Phase 2 standards or promulgates new ones—i.e., MY2027, if EPA revises those standards through this rulemaking; and
- Finalizing standards that produce protections equivalent to ACT.

The first of these requests—delaying the effective date of the definitional change—comports with EPA's rationale for making the change at all. EPA says it is proposing this "revision [as] consistent with our intended approach of considering [national] production volumes in setting the stringency of the Phase 3 standards."[247] That rationale ties the revision of the definition to EPA's standard-setting in this rulemaking, meaning the definition should be revised, if at all, when standards are newly set—in other words, in MY2027 (at the earliest), not MY2024. EPA also points to what it describes as "potential difficulties surrounding manufacturers' long-term compliance planning (due to the uncertainty surrounding whether additional states may adopt the California ACT program in the future)."[248] EPA does not explain why any such "difficulties" are appropriate for *EPA* to address *in advance*, rather than for the *State* considering adoption of ACT *in the future* to address pursuant to its state law authority and the authority and requirements established in Section 177. EPA likewise does not explain how additional state adoptions would cause "difficulties" for manufacturer compliance with *EPA*'s standards if EPA's standards remained as they are—based on, and complied with through, what can be achieved in non-ACT States. In any event, if EPA's concern is about *long-term* planning for EPA's standards, there is no reason for this change to take effect in MY2024-2026, as EPA's standards for those years have been in place since 2016 and the current definition of "U.S.-directed production volume" has been in place even longer.

[246] 88 Fed. Reg. at 25,933.

[247] *Id.* at 26,010.

[248] *Id.*

The second request—finalizing standards more stringent than the preferred alternative—would ensure that EPA is not overstating the protectiveness of its own standards by effectively taking credit for protectiveness actually provided by States' adoption of ACT. As shown above, standards that produce benefits and technological-deployment levels at least equivalent to ACT are both feasible and needed nationwide. If EPA finalizes standards that stringent, it would obviate both the lack of transparency and the lack of sufficient public protection that otherwise results from EPA disclosing only nationwide technology levels, all the while aware that those levels need not be achieved in the areas for which EPA itself has regulatory responsibility.

In sum, our States and Cities do not see a need for EPA's proposed definitional change and urge EPA to leave the existing definition in place. In any event, manufacturers should get no credit—and certainly not multiplied credit—for vehicles sold in ACT States in model years for which EPA is making no change to its standards. Any such credits would only undermine the existing Phase 2 standards about which EPA has made no findings of infeasibility. And, if EPA proceeds with its definitional change (in MY2027 or later), it should do so only if it also makes its own standards stringent enough to provide transparent and sufficient benefits to the non-ACT States—i.e., by recognizing that ACT-like levels of technological deployment and protection are feasible nationwide.

V. EPA'S COST-BENEFIT ANALYSIS SUPPORTS THE PROPOSAL

Our States and Cities support EPA's use of the social cost of greenhouse gases ("SC-GHG") established in the Interagency Working Group on Social Cost of Greenhouse Gases' ("IWG") recently published Technical Support Document ("2021 TSD")[249] in evaluating the costs and benefits of the Proposal. Although the IWG is currently in the process of reviewing comments on how to improve and update the SC-GHG,[250] for now the interim value for SC-GHG established in the 2021 TSD represents the best available estimate of the long-term cost to society of increasing GHG emissions now.[251] Moreover, the SC-GHG does not dictate the outcome of any specific agency rulemaking, including this one. Here, EPA considers the SC-GHG in evaluating the costs and benefits of the Proposal, but nowhere suggests that those values will be determinative of its ultimate decision.[252]

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[249] Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimate Under Executive Order 13,990* (Feb. 2021), EPA-HQ-OAR-2021-0317-0005 (hereinafter, "2021 TSD").

[250] *See Notice of Availability and Request for Comment on "Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates Under Executive Order 13,990*," 86 Fed. Reg. 24,669, 24,670 (May 7, 2021).

[251] 88 Fed. Reg. at 26,075.

[252] *Id*.

A. EPA's Cost-Benefit Analysis Appropriately Relies on the Interim Value for the Social Cost of GHGs Established by the Interagency Working Group, Which Reflects the Best Available Science for Assigning a Monetary Value to the Impact of GHGs

As EPA appropriately describes, the interim value for the SC-GHG in the 2021 TSD is based on the SC-GHG established in a 2016 TSD, which was reached following a comprehensive, multi-year process of peer review and public comment. The IWG comprises economic and scientific experts from across the federal government.[253] Estimates of the SC-GHG are based on the best available, peer-reviewed literature and economic models.[254] These estimates were developed using the three leading climate models that link greenhouse gas emissions to physical changes and economic damages; each model has been published and extensively reviewed in the scientific literature.[255] The IWG has thoroughly and transparently discussed the models, inputs, and assumptions used, and has acknowledged the uncertainties of climate science.[256] The U.S. Government Accountability Office reviewed the IWG's process and concluded that the IWG:

> (1) Used consensus-based decision making; (2) relied largely on existing academic literature and models, including technical assistance from outside resources; and (3) took steps to disclose limitations and incorporate new information by considering public comments and revising the estimates as updated research became available.[257]

Courts have also accepted, and sometimes required, the use of the SC-GHG in valuing climate-change related impacts. The Seventh Circuit upheld the Department of Energy's ("DOE") use of the SC-GHG in evaluating the benefits of its refrigeration efficiency standards.[258] The Court concluded that DOE's use of the SC-GHG to conduct an assessment of the rule's environmental benefits was authorized by the Energy Policy and Conservation Act ("EPCA"),[259] which provided for consideration of "the need for national energy . . . conservation."[260] The Court also turned aside a variety of objections to the development and reliability of the SC-GHG, concluding that DOE had appropriately responded to those objections and determined that the SC-GHG could be used to assess environmental benefits.[261]

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[253] 2021 TSD, *supra* note 250 at 1, 10–12.

[254] *Id.* at 10–12.

[255] *Id.*

[256] *Id.* at 26–32.

[257] U.S. Gov't Accountability Off., *Regulatory Impact Analysis: Development of Social Cost of Carbon Estimates*, at 8 (July 2014), https://www.gao.gov/assets/gao-14-663.pdf.

[258] *Zero Zone, Inc. v. U.S. Dep't of Energy*, 832 F.3d 654, 678-80 (7th Cir. 2016).

[259] 49 U.S.C. §§ 32901–19.

[260] *Zero Zone, Inc.*, 832 F.3d at 677.

[261] *Id.*

Moreover, courts have rejected agency action for failure to consider the SC-GHG. For example, in *Center for Biological Diversity v. National Highway Traffic Safety Administration*, the Ninth Circuit held that the National Highway Traffic Safety Administration ("NHTSA") had acted arbitrarily and capriciously when it established vehicle efficiency standards under EPCA, without monetizing the benefits of greenhouse gas emissions reductions.[262] The Court rejected NHTSA's argument that the value of reducing greenhouse gas emissions was "too uncertain" to quantify.[263] The Court stressed that "while the record shows that there is a range of values, the value of carbon emissions reduction is certainly not zero."[264] Moreover, the Court observed that NHTSA had monetized the value of *other* uncertain benefits, including the reduction of criteria pollutants, crashes, and increases in energy security.[265]

Other courts have held that, if an agency quantifies the economic benefits of an action that could increase GHGs, it must also employ the SC-GHG to quantify the costs of increased emissions.[266] These court decisions recognize that the SC-GHG is a reliable and scientifically validated approach to monetizing climate change impacts that should be incorporated into federal decision-making. It is therefore appropriate for EPA to employ the SC-GHG in evaluating the benefits of the proposed rule.

B. EPA's Cost-Benefit Analysis Appropriately Relies on a Social Cost of GHGs that Takes Into Account a Global Perspective on Climate Change Impacts

Our States and Cities agree with EPA's recognition that the SC-GHG must take into account global, not just domestic impacts.[267] The consideration of global impacts is also fully within the authority of federal agencies. In *Zero Zone*, the Seventh Circuit specifically upheld DOE's consideration of global benefits, accepting DOE's explanation that "climate change involves a global externality, meaning that carbon released in the United States affects the climate of the entire world."[268]

In fact, ignoring global climate change impacts would be arbitrary and capricious. In *California v. Bernhardt*, the Northern District of California held that the Bureau of Land Management ("BLM") erred in evaluating only the domestic costs of increases in greenhouse gas emissions from BLM's repeal of regulations to reduce waste at natural gas wells.[269] The Court

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[262] 538 F.3d 1172, 1198–1203 (9th Cir. 2008).

[263] *Id.* at 1200.

[264] *Id.*

[265] *Id.* at 1202.

[266] *See Montana Envt'l Info. Ctr. v. U.S. Office of Surface Mining*, 274 F.Supp.3d. 1074, 1095–99 (D. Mt. 2017); *High County Conservation Advocates v. U.S. Forest Serv.*, 52 F.Supp.3d 1174, 1189–92 (D. Col. 2014).

[267] U.S. Environmental Protection Agency, Greenhouse Gas Emissions Standards for Heavy-Duty Vehicles: Phase 3, Draft Regulatory Impact Analysis ("RIA") at 437.

[268] *Zero Zone*, 832 F.3d at 679.

[269] 472 F.Supp.3d 574, 608–14 (N.D. Cal. 2020), *appeal pending* Docket Nos. 20-16794, 20-16801 (9th Cir.).

noted that "focusing solely on domestic effects has been soundly rejected by economists as improper and unsupported by science."[270] The Court concluded that BLM could not "construct a model that confirms a preordained outcome while ignoring a model that reflects the best science available."[271]

C. EPA Recognizes Some of the Limitations of the Interim Value for the Social Cost of GHGs that Underestimate the Costs of Climate Change, But It Should Engage in a Fuller Discussion of Those Limitations

In the Proposal, EPA recognizes that the interim value for SC-GHG established in the 2021 TSD likely underestimates the true cost of climate change impacts, both in its use of discount rates and in the assumptions made by the underlying climate models.[272] The undersigned States and Cities urge EPA to run additional evaluations with lower discount rates and expand its discussion of non-quantified impacts from climate change.

Previously, the States and Cities urged EPA to use lower discount rates (below 3 percent) in order to account for the long-term, intergenerational impacts of climate change. When there are important benefits or costs that affect multiple generations of the population, EPA and OMB allow for low but positive discount rates (e.g., 0.5 to 3 percent noted by U.S. EPA, 1 to 3 percent by OMB).[273] Further, as the IWG now recognizes, "the 3 percent discount rate used by the IWG to develop its range of discount rates is likely an overestimate of the appropriate discount rate."[274] Indeed, recent studies show support for a long-term discount rate of "no higher than 2 percent."[275]

We thus support EPA's proposal, in its External Review Draft of Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances (Draft Report), to use dynamic discount rates with three near-term target rates of 1.5 percent, 2 percent, and 2.5 percent.[276] We believe a near-term target rate of 1.5 percent is the most appropriate, because it

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[270] *Id.* at 613.

[271] *Id.* at 614.

[272] 88 Fed. Reg. at 26,075.

[273] RIA, *supra* note 267 at 436.

[274] 2021 TSD, *supra* note 250 at 17.

[275] *See* Tamma Carleton, et al., *Updating the United States Government's Social Cost of Carbon*, Energy Policy Institute at the University of Chicago, Working Paper No. 2021-04, at 23 (Jan. 2021), https://epic.uchicago.edu/wp-content/uploads/2021/01/BFI_WP_202104_Final.pdf; *accord* Expert Report, *The Use of the Social Cost of Carbon in the Federal Proposal "Safer Affordable Fuel-Efficiency (SAFE) Vehicles Rule,"* (attached to comments of California Air Resources Board on EPA Docket No. EPA-HQ-OAR-2017-0355), Maximilian Auffhammer, Oct. 24, 2018, at 12; Council of Economic Advisers, *Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate*, Issue Brief, at 3 (Jan. 2017),https://obamawhitehouse.archives.gov/sites/default/files/page/files/201701_cea_discounting_issue_brief.pdf.

[276] EPA External Review Draft of Report on the Social

Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances (Sept. 2022) (hereinafter, "Draft Report") at 60 (Table 2.4.2), EPA-HQ-OAR-2021-0317-1549.

incorporates a near-zero pure rate of time preference.[277] The Draft Report notes that "Ramsey (1928), for example, argued that it is 'ethically indefensible' to apply a positive pure rate of time preference to discount values across generations."[278] Individual human beings' preference for short-term over long-term benefits in the course of their own lifetimes should not be relevant to evaluating multigenerational impacts. We recommend that EPA identify as the most accurate SC-GHG estimates those estimates which include a pure rate of time preference of zero or near zero.

We also urge EPA to highlight the fact that the SC-GHG does not reflect significant damage categories that have not yet been monetized. Economists reviewing the SC-GHG models have extensively analyzed areas of damages that are not quantified or are otherwise underestimated.[279] As New York's evaluation of appropriate SC-GHG values observed, "[t]he [climate models] only partially account for, or omit, many significant impacts of climate change that are difficult to quantify or monetize, including ecosystems, increased fire risk, the spread of pests and pathogens, mass extinctions, large-scale migration, increased conflict, slower economic growth, and potential catastrophic impacts."[280] We have in previous comments, highlighted several areas of unquantified damages that are particularly important to the States. We will reiterate our discussion of two of those: (1) impacts from wildfires, and (2) loss of culturally and historically significant assets. Neither the Proposal nor the DRIA mentions that these impacts are omitted from the SC-GHG.

The climate models underlying the SC-GHG values do not account for impacts from wildfires, which include both health and economic effects.[281] Each year, millions of Americans suffer through lengthy episodes of extremely unhealthy air due to wildfires, as the wildfire season becomes lengthier and more destructive due to climate change. Indeed, the *Fourth National Climate Assessment* highlighted health risks from wildfires as a major consequence of climate change, stating that "[e]xposure to wildfire smoke increases the risk of respiratory disease and mortality… Wildfires are projected to become the principal driver of summertime $PM_{2.5}$ concentrations, offsetting even large reductions in emissions of $PM_{2.5}$ precursors."[282] It is

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[277] *Id.* at 54 ("The pure rate of time preference, ρ, is the rate at which the representative agent discounts utility in future periods due to a preference for utility sooner rather than later. The elasticity of marginal utility with respect to consumption, η, defines the rate at which the well-being from an additional dollar of consumption declines as the level of consumption increases.").

[278] *Id.* at 52.

[279] *See, e.g.*, Ruth DeFries, et al., *The missing economic risks in assessments of climate change impacts* (Sept. 2019), https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2019/09/The-missing-economic-risks-in-assessments-of-climate-change-impacts-2.pdf; Institute for Policy Integrity, *A Lower Bound: Why the Social Cost of Carbon Does Not Capture Critical Climate Damages and What that Means for Policymakers* (Feb. 2019), https://policyintegrity.org/files/publications/Lower_Bound_Issue_Brief.pdf; Peter Howard, *Omitted Damages: What's Missing from the Social Cost of Carbon*, at 30 (Mar. 13, 2014).

[280] Resources for the Future, *Estimating the Value of Carbon: Two Approaches*, at 3 (Oct. 2020, revised April 2021), *available at* https://media.rff.org/documents/RFF_NYSERDA_Valuing_Carbon_Synthesis_Memo.pdf.

[281] *See Lower Bound*, *supra* n.293, at 5; *Omitted Damages*, *supra* n.293, at 20, 30.

[282] *Fourth National Climate Assessment, supra* note 9, at 521–22.

reasonable to expect that any effort to account for SC-GHG would include such a high-profile effect of climate change.[283]

Another area of unquantified damages identified by the National Academy of Sciences is the "loss of goods and services that are not traded in markets and so cannot be valued using market prices," such as "loss of cultural heritage, historical monuments, and favored landscapes."[284] The Union of Concerned Scientists has identified many historic sites and landmarks at risk from climate change:

- Boston historic districts and Faneuil Hall, MA
- The Statue of Liberty and Ellis Island, NY and NJ
- Harriet Tubman National Monument, MD
- Historic Annapolis, MD
- Historic Jamestown, VA
- Fort Monroe National Monument, VA
- NASA's Coastal Facilities, FL and TX
- Cape Hatteras Lighthouse, NC
- Historic Charleston, SC
- Historic St. Augustine, FL
- Mesa Verde National Park, CO
- Bandelier National Monument, NM
- Cesar Chavez National Monument, CA.[285]

The loss of these unique sites would exceed the monetary value of the land upon which they are located. Landmarks such as these are not the only culturally and historically significant resources at risk. Climate change also, in many cases, threatens the cultural traditions of

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[283] *See* Peter Howard, *Flammable Planet: Wildfires and the Social Cost of Carbon* (2014), https://costofcarbon.org/files/Flammable_Planet__Wildfires_and_Social_Cost_of_Carbon.pdf.

[284] Nat'l Academy of Sciences, *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide*, at 152 (2017), *available at* https://nap.nationalacademies.org/catalog/24651/valuing-climate-damages-updating-estimation-of-the-social-cost-of.

[285] Union of Concerned Scientists, *National Landmarks at Risk: How Rising Seas, Floods, and Wildfires Are Threatening the United States' Most Cherished Historic Sites*, at 4–32, 36–40, 44 (2014).

Indigenous communities.[286] The DRIA mentions that climate change threatens tribal cultural resources, stating that "Native American Tribal communities possess unique vulnerabilities to climate change, particularly those impacted by degradation of natural and cultural resources,"[287] but does not mention that degradation of cultural resources is not captured by the SC-GHG.

We urge EPA to disclose that the SC-GHG does not take into account impacts to historically significant locations or to culturally significant resources; to consider those impacts in its evaluation of the benefits of the Proposal; and to acknowledge that these impacts are not accounted for in the SC-GHG and other variants of the SC-GHG. We note that OMB Circular A-4 calls on agencies to address such important non-monetized factors in cost-benefit analysis:

> A complete regulatory analysis includes a discussion of non-quantified as well as quantified benefits and costs. A non-quantified outcome is a benefit or cost that has not been quantified or monetized in the analysis. When there are important nonmonetary values at stake, you should also identify them in your analysis so policymakers can compare them with the monetary benefits and costs.[288]

We believe that the damage caused by the increased frequency and severity of wildfires, and the ongoing loss of culturally and historically significant resources, are important non-quantified costs of climate change, and that ameliorating such damages will be an important benefit of the Rule. For these reasons, we urge EPA to acknowledge and discuss significant "omitted damages," including damages from wildfire, and damages to culturally and historically important resources, whenever EPA refers to the SC-GHG in rulemaking.

CONCLUSION

For all of the reasons discussed above, our States and Cities urge EPA to expeditiously strengthen heavy-duty GHG standards for model years 2027 to 2032, and urge EPA to increase the stringency of its final standards—and extend the model years— as described above. Standards that protect public health and welfare and reflect technological deployment equivalent to ACT-levels are feasible and cost effective nationwide and will do more to satisfy Congress's objectives for Section 202(a)—that EPA address the harmful effects vehicles have on health and welfare in our States and Cities.

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[286] *See e.g.*, Carson Viles, *Tribal Climate Change Profile: First Foods and Climate Change* (Dec. 2011) ("Because of the vital role that first foods play in the physical, mental, and spiritual health of native communities, impacts from climate change on first foods may negatively affect tribal culture and livelihood."), http://www7.nau.edu/itep/main/tcc/docs/tribes/tribes_FirstFoodsCC.pdf

[287] RIA, *supra* note 267 at 394.

[288] OMB Circular A-4 (OMB, 2003) at 3.

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APPENDIX A

INDEX OF MATERIALS SUBMITTED TO THE RECORD RE: COMMENTS OF STATES AND CITIES SUPPORTING EPA'S PROPOSED GREENHOUSE GAS EMISSIONS STANDARDS FOR HEAVY-DUTY VEHICLES—PHASE 3

Docket ID: EPA-HQ-OAR-2022-0985

via regulations.gov

	Description
1	Intergovernmental Panel on Climate Change (IPCC), Climate Change 2022- Mitigation of Climate Change, Summary for Policymakers, Working Group II Contribution to the Sixth Assessment Report (2022), ISBN 978-92-9169-160-9, https://www.ipcc.ch/report/ar6/wg3/
2	IPCC, 2022: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, Full Report [H.-O. Pörtner, et al.,eds.)] Cambridge University Press, doi:10.1017/9781009325844
3	U.S. Environmental Protection Agency, Climate Change Indicators: Weather and Climate, (last updated Aug. 1, 2022), https://www.epa.gov/climate-indicators/weather-climate
4	NOAA, April 2023 was Earth's fourth warmest on record (May 12, 2023), https://www.noaa.gov/news/april-2023-was-earths-fourth-warmest-on-record
5	U.S. Global Change Research Program, Fourth National Climate Assessment, Volume II: Impacts, Risks, and Adaptation in the United States 241, D.R. Reidmiller et al. eds., (2018)
6	Zachary A. Holden, et al., Decreasing fire season precipitation increased recent western US forest wildfire activity (Sept. 4, 2018), 115 PNAS E8349, E8349
7	John Ingold, Five charts that show where 2020 ranks in Colorado wildfire history, The Colorado Sun (Oct. 20, 2020), https://coloradosun.com/2020/10/20/colorado-largest-wildfire-history/
8	Adam B. Smith, 2020 U.S. billion-dollar weather and climate disasters in historical context, Climate.gov (Jan. 8, 2021), https://www.climate.gov/print/837056.
9	Scott Stephens et al., Prehistoric Fire Area and Emission from California's Forests, Woodlands, Shrublands and Grasslands, 251 Forest Ecology and Mgmt. 205, 205 (2007), http://dx.doi.org/10.1016/j.foreco.2007.06.005
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13	Volker Radeloff et al., Rapid Growth of the US Wildland-Urban Interface Raises Wildfire Risk, 115 Proc. Nat'l Acad. Sci. 3314, 3314 (2018)
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