



Zeroing in on Healthy Air

A National Assessment
of Health and Climate Benefits
of Zero-Emission Transportation
and Electricity



About this Report

Zeroing in on Healthy Air finds that a widespread transition to zero-emission cars, trucks, buses and other vehicles, coupled with non-combustion, renewable energy resources would yield tremendous air quality, public health and climate benefits across the United States. To illustrate the potential benefits, a transition to 100 percent sales of light-duty passenger vehicles and medium-and heavy-duty vehicles were assumed over the coming decades, along with a transition to non-combustion electricity generation.

Zeroing in on Healthy Air builds off the 2020 Road to Clean Air report by the American Lung Association, and illustrates the potential scale of benefits to public health, air quality and climate change if the United States accelerates the course to a zero-emission transportation sector coupled with non-combustion renewable sources like wind and solar energy. While similar to the 2020 “Road to Clean Air” report on zero-emission transportation, this report stands alone. Updates to technical models, assumptions and methods do not allow for direct comparisons between “Road to Clean Air” and this new analysis.

The American Lung Association developed this project with the assistance and technical support of ICF Incorporated, LLC (ICF). Using a series of modeling tools, ICF provided estimated fleet characteristics and emissions profiles (US EPA MOVES2021 model, ICF’s custom fleet modeling), emissions associated with fuel and electricity generation (Argonne National Lab GREET Model, ICF’s custom IPM model) and health outcomes associated with changes in emissions (US EPA COBRA health model). ICF conducted a comprehensive analysis of the potential health and climate benefits of this transition as a consultant to the American Lung Association, which is solely responsible for the content this report. Additional details on the structure of the report, a full methodology and assumptions about future vehicle fleets, changes in the electric power grid and citations are detailed in the technical report document prepared by ICF for the American Lung Association. Available online at Lung.org/ev.





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Executive Summary

Zeroing in on Healthy Air is a report by the American Lung Association illustrating the public health urgency of policies and investments for transitioning to zero-emission transportation and electricity generation in the coming decades. These sectors are leading sources of unhealthy air in the United States. Today, over four in ten Americans — more than 135 million people — live in communities impacted by unhealthy levels of air pollution. Research demonstrates that the burdens of unhealthy air include increased asthma attacks, heart attacks and strokes, lung cancer and premature death. These poor health outcomes are not shared equitably, with many communities of color and lower income communities at greater risk due to increased exposure to transportation pollution. The transportation sector is also the largest source of greenhouse gas emissions that drive climate change, which threatens clean air progress and amplifies a wide range of health risks and disparities.

This report finds that a national shift to 100 percent sales of zero-emission passenger vehicles (by 2035) and medium- and heavy-duty trucks (by 2040), coupled with renewable electricity would generate over \$1.2 trillion in public health benefits between 2020 and 2050. These benefits would take the form of avoiding up to 110,000 premature deaths, along with nearly 3 million asthma attacks and over 13 million workdays lost due to cleaner air. This report calculates the emission reductions possible from shifting to vehicles without tailpipes, as well as eliminating fuel combustion from the electricity generation sector so that neither those living near roads or near electricity generation would be subjected to unacceptable doses of toxic air pollution. The report also highlights the fact that the shift to zero-emission transportation and electricity generation in the United States will yield avoided global climate damages over \$1.7 trillion.

By expediting investments and policies at the local, state and federal levels to reduce harmful pollution, all communities stand to experience cleaner air. Policies and investments must prioritize low-income communities and communities of color that bear a disproportionate pollution burden. State and local jurisdictions should act to implement policies as soon as possible, including in advance of the benchmarks used in this report's methodology. These actions are needed to achieve clean air, reduce health disparities and avoid even more dire consequences of climate change.

Zeroing in on Healthy Air

In the United States, transportation and electricity generation are leading sources of unhealthy air and the pollutants that cause climate change.

Those living near highways, ports, railyards, warehouses, and other transportation hubs are at greater health risk, as are those impacted by fuel refining, electricity generation and processes.

The widespread, rapid shift to zero-emission transportation and electricity generation is critical to healthy air, and can yield more than \$1.2 trillion in health benefits and 110,000 pollution-related deaths avoided over the coming decades along with over \$1.7 trillion in global climate benefits.



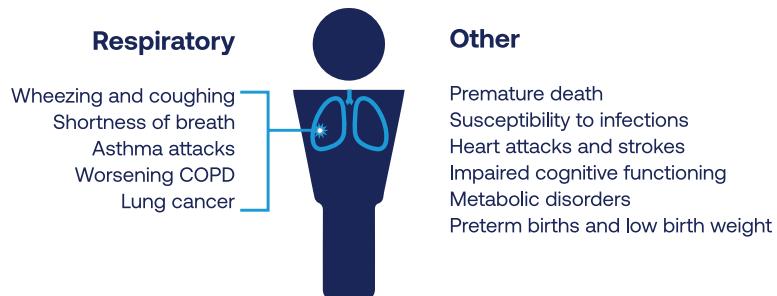


The Public Health Need for Zero Emissions

Air Pollution Remains a Major Threat to Americans' Health

Despite decades of progress to clean the air, more than 4 in 10 of all Americans — 135 million — still live in a community impacted by unhealthy levels of air pollution.ⁱⁱ Those impacted by polluted air face increased risk of a wide range of poor health outcomes as the result of increased ozone and/or particle pollution.ⁱⁱⁱ The adverse impacts of pollution from the transportation and electricity generation sectors are clear, and must be recognized as a threat to local community health, health equity and a driver of major climate change-related health risks. Even with certification to meet existing standards, it is clear that combustion technologies often generate far greater levels of pollution in the real world than on paper.

Air pollution can harm children and adults in many ways



“The shift to zero-emission transportation and electricity generation will save lives and generate massive health benefits across the United States. It is critical that we ensure these benefits are realized in the near term in communities most impacted by harmful pollution today.”

Harold Wimmer, American Lung Association President and CEO





Location Matters: Disparities in Exposure Burden

Exposure to pollution with its associated negative health consequences is dictated by where someone lives, attends school or works. In general, the higher the exposure, the greater the risk of harm. Many communities face disproportionate burdens due to pollution generated from production, transportation, refining and combustion of fuels along the transportation and electricity generating systems. Lower income communities and communities of color are often the most over-burdened by pollution sources today^{iv} due to decades of inequitable land use decisions and systemic racism.

The American Lung Association's State of the Air 2021 report illustrated the disparities in pollution burdens across the United States, noting that a person of color in the United States is up to three times more likely to be breathing the most polluted air than white people.^v All sources of harmful air and climate pollution must shift rapidly away from combustion and toward zero-emission technologies to ensure all Americans have access to the benefits of less-polluting technologies.

“Pollution from the transportation sector has been a long-standing obstacle to advancing environmental justice, as many communities of color and low-income families live near areas where pollution from vehicles and engines is abundant, and therefore experience disproportionate exposures to this pollution.”

US EPA
Transportation and Environmental Justice
Fact Sheet March 2022

“Rapidly eliminating emissions from the transportation and electricity generation sectors must be a national priority. The nationwide transition to electric vehicles is urgently needed to improve lung health and advance health equity.”

Harold Wimmer
American Lung Association President and CEO



For those living in close proximity to major transportation hubs like highways, ports, railyards or warehouses, tailpipe (or “downstream”) emissions yield an outsized risk to community health.



Similarly, “upstream” emissions from transportation fuels generate localized health burdens near oil and gas extraction sites, refineries and even local gas stations, all of which generate toxic air pollution and threaten community health.



Health of communities all along the electricity production system — from the extraction of fossil fuels such as coal, oil and gas, transportation of these fuels, and combustion at the power plant itself — can be adversely impacted.



Estimated Benefits of Zero-Emission Transportation and Electricity Generation

The combustion of fuels in the electricity generation and transportation sectors is a major contributor to the health and climate burdens facing all Americans. These sources of pollution also create significant disparities in pollution burdens and poor health, especially in lower-income communities and communities of color. The transition to non-combustion technologies is underway and must continue to accelerate to protect the health of communities today and across the coming decades. Key findings are presented below:

Pollution Reduction Benefits from Zero-Emission Transportation

Accelerating the shift to zero-emission transportation and non-combustion electricity generation will generate major reductions in harmful pollutants. Key pollutants included in this research are described below along with projected on-road pollution reductions with the shift to zero-emission technologies when compared with a modeled “Business As Usual” case for the on-road fleet.

Pollutant	Impact	On-Road Pollution Reductions by Year		
		2030	2040	2050
Nitrogen Oxides (NOx)	NOx and VOCs are building blocks for ozone (“smog”) and contribute to particle pollution formation and a wide range of health impacts including asthma attacks, heart attacks, strokes, and premature death. Breathing VOCs can irritate the eyes, nose and throat, can cause difficulty breathing and nausea, and can damage the central nervous system as well as other organs. Some VOCs can cause cancer. NO2 is associated with increased risk of asthma attacks, ER visits, hospitalizations and a range of other health consequences.	-6% ↓	-56% ↓	-92% ↓
Volatile Organic Compounds (VOC)		-8% ↓	-42% ↓	-78% ↓
Fine Particle Pollution (PM2.5)	Particle pollution can increase the risk of heart disease, lung cancer and asthma attacks and can interfere with the growth and work of the lungs. Major health impacts include asthma attacks, heart attacks, stroke, COPD, lung cancer and death.	-8% ↓	-43% ↓	-61% ↓
Sulfur Dioxide (SO2)	Contributes to wheezing, shortness of breath and chest tightness, reduced lung function, increased risk of hospital admissions or emergency room visits.	-15% ↓	-67% ↓	-93% ↓
Greenhouse Gases (GHG)	Drives climate change health risks, including extreme weather, wildfires and degraded air quality among others.	-14% ↓	-66% ↓	-93% ↓



Benefits of Moving All Vehicle Classes to Zero-Emissions

All vehicles must move to zero-emission technologies to ensure the most robust public health benefits occur. The 2020 passenger vehicle fleet represents approximately 94 percent of the nation's on-road vehicle fleet and generates over 1 million tons of ozone- and particle-forming NOx emissions, and over 33,400 tons of fine particles annually. Heavy-duty vehicles represent approximately six percent of the on-road fleet in 2020, but generate 59 percent of ozone- and particle-forming NOx emissions and 55 percent of the particle pollution (including brake and tire particles).

Differentiating the relative impacts of fleet segments is particularly important when considering the concentrations of heavy-duty vehicles in environmental justice areas near highways, ports, railyards and warehouse settings. For greenhouse gases (GHG), the 2020 light duty vehicle fleet generates approximately 69 percent of GHG emissions, while the heavy-duty fleet produces 31 percent.

The table below illustrates the relative emission reduction benefits of on-road transportation electrification for each the light-duty fleet and the medium- and heavy-duty segments compared with the “Business-As-Usual” case. It is important to note that these on-road reductions could yield major benefits within each class, with light-duty vehicles reducing nearly twice the GHGs as heavy-duty, while heavy-duty engines could yield approximately eight times the smog- and particle-forming NOx emissions when compared with the light-duty fleet. Ultimately, all segments produce harmful pollutants and must move quickly to zero-emissions to protect health and reduce climate pollution.

Pollutant	Light Duty: On-Road Emission Reductions (Tons per Year, Percent Reduction)			Heavy Duty: On-Road Emission Reductions (Tons per Year, Percent Reduction)		
	2030	2040	2050	2030	2040	2050
Nitrogen Oxides	-23,124 -8%	-80,975 -61%	-111,168 -92%	-51,274 -6%	-478,879 -55%	-887,640 -92%
Volatile Organic Compounds	-49,080 -9%	-195,520 -41%	-347,094 -76%	-4,316 -5%	-41,379 -51%	-80,375 -87%
Fine Particles	-2,903 -10%	-11,369 -42%	-16,170 -58%	-644 -4%	-5,737 -43%	-9,682 -68%
Greenhouse Gases (CO ₂ e, Short Tons)	-198 M -18%	-733 M -70%	-1.0 B -94%	-37 M -7%	-322 M -58%	-572 M -92%



National Results: Public Health and Climate Benefits

The shift to zero-emission transportation and non-combustion electricity generation could yield major health benefits throughout the nation in the coming decades. Cumulatively, the national benefits of transitioning away from combustion in the transportation sector toward 100 percent zero-emission sales and a non-combustion electricity generation sector could generate over \$1.2 trillion in health benefits across the United States between 2020 and 2050. These benefits include approximately 110,000 lives saved, over 2.7 million asthma attacks avoided (among those aged 6-18 years), 13.4 million lost work days and a wider range of other negative health impacts avoided due to cleaner air.^{1,2} In addition to these health benefits, this analysis found that over \$1.7 trillion in global climate benefits could be achieved with a reduction of over 24 billion metric tons of GHGs by mid-century.³

National Scale Benefits to Health and Climate (Cumulative: 2020-2050)

Public Health Benefits 2020-2050			Value of Benefits 2020-2050	
Premature Deaths Avoided	Asthma Attacks Avoided	Lost Work Days Avoided	Public Health Benefits	Climate Benefits
110,000	2.78 M	13.4 M	\$1.2 T	\$1.7 T

Near-Term Health Benefits

While the benefits noted above are cumulative between 2020 and 2050, this analysis also finds that annual health benefits could reach into the tens of billions by the end of this decade – nearly \$28 billion in 2030 alone. Health benefits increase significantly as deployments of zero-emission technologies in the transportation and electricity generating sectors expand.

Annual Health Benefits (Billions)



Note: Total values presented for all vehicles using high estimate of benefits using a 3% discount rate and using 2017\$.

¹Note that the analysis and report include ozone-precursor emissions data. However, ozone-related health effects are not included in this report. US EPA's COBRA model relies on PM2.5 health effects to assess and monetize impacts. Results therefore do not include significant health burdens posed by ozone pollution throughout the United States independent of those related to PM reductions, as described in the health effects section of this report.

²In all cases, avoided health costs are presented in 2017 dollars. The value of avoided mortality estimates is grown from EPA's 1990 value of a statistical life to future years using standard income growth data and are presented in 2017 dollars. These results reflect the benefits of cumulative emission reductions estimated between 2020 and 2050, utilizing the American Lung Association's on-road and upstream emissions scenarios. Health results include the number of avoided adverse health impacts and the economic value of these health risk reductions at a 3% discount rate and reflect higher range estimates associated with the Di et al. (2017) health study. Greenhouse gas emission benefits are based on interim SCC values published in February 2021 by the Interagency Working Group on Social Cost of Greenhouse Gases, United States Government; climate benefits are also presented in 2017\$ values at a 3 percent discount rate.

³The social cost of CO₂ emissions (SC-CO₂) is a measure, in dollars, of the long-term damage done by a ton of carbon dioxide (CO₂) emissions in a given year. This dollar figure also represents the value of damages avoided for a small emission reduction (i.e., the benefit of a CO₂ reduction). SC-CO₂ is intended to be a comprehensive estimate of climate change damages and includes changes in net agricultural productivity, human health, property damages from increased flood risk, and value of ecosystem services. However, not all important damages are included due to data limitations. Note that the climate change benefits of clean electricity generation are limited to the transportation-driven marginal increases in emissions, and do not include all benefits from the entire grid shifting to non-combustion sources, which differs from the whole-grid approach to air pollutants.



State Results: Public Health Benefits Across the United States

Every state in the U.S. stands to experience significant public health benefits from the widespread implementation of zero-emission transportation and electricity resources over the coming decades. As shown below, more than half of the states could experience more than \$10 billion in cumulative public health benefits. Two states (California and Texas) could exceed \$100 billion in health benefits, and six more states (Pennsylvania, Florida, Ohio, New York, Illinois, and Michigan) could see benefits exceeding \$50 billion by 2050. These benefits cover a wide range of avoided health impacts, three of which (premature deaths, asthma attacks, lost workdays) are shown in the table below.

State	Cumulative Health Benefits, 2020 - 2050			
	Health Benefits (Billions)	Premature Deaths Avoided	Asthma Attacks Avoided	Lost Work Days Avoided
California	\$169.0	15,300	440,000	2,160,000
Texas	\$104.0	9,320	346,000	1,520,000
Pennsylvania	\$86.8	7,940	148,000	735,000
Florida	\$85.6	7,760	142,000	766,000
Ohio	\$68.5	6,280	137,000	635,000
New York	\$68.2	6,200	159,000	825,000
Illinois	\$59.5	5,410	138,000	670,000
Michigan	\$51.4	4,700	97,400	466,000
New Jersey	\$43.6	3,960	92,400	464,000
Indiana	\$36.8	3,360	83,000	373,000
North Carolina	\$35.3	3,210	79,100	387,000
Virginia	\$29.7	2,700	70,900	350,000
Georgia	\$29.3	2,640	78,500	385,000
Maryland	\$27.8	2,530	63,600	315,000
Tennessee	\$24.9	2,180	53,800	255,000
Kentucky	\$20.4	1,850	43,000	200,000
Wisconsin	\$19.2	1,760	39,300	186,000
Missouri	\$18.8	1,710	41,300	193,000
Massachusetts	\$18.0	1,640	35,500	195,000
Louisiana	\$17.8	1,610	40,800	184,000
South Carolina	\$17.0	1,550	32,000	154,000
Arizona	\$15.1	1,360	38,500	182,000
Minnesota	\$14.9	1,350	36,600	171,000
Alabama	\$14.3	1,300	28,300	134,000



State	Cumulative Health Benefits, 2020 - 2050			
	Health Benefits (Billions)	Premature Deaths Avoided	Asthma Attacks Avoided	Lost Work Days Avoided
Connecticut	\$13.7	1,250	27,400	143,000
Oklahoma	\$12.3	1,120	31,700	136,000
Iowa	\$10.8	989	24,500	108,000
West Virginia	\$9.8	898	16,100	81,200
Colorado	\$9.5	857	31,200	151,000
Arkansas	\$9.5	865	20,300	90,700
Mississippi	\$8.5	773	18,300	80,600
Nevada	\$7.5	676	14,800	78,900
Kansas	\$6.9	625	18,100	77,400
Washington	\$5.9	531	15,000	73,200
Utah	\$5.7	506	26,100	94,300
Nebraska	\$5.2	476	14,300	60,500
Delaware	\$5.1	462	11,200	55,100
Maine	\$4.5	402	5,870	31,000
New Hampshire	\$3.9	356	5,860	32,800
Rhode Island	\$3.8	348	6,570	35,600
New Mexico	\$3.0	273	7,380	32,300
Oregon	\$2.7	242	5,600	28,300
Vermont	\$2.0	183	2,880	15,700
Idaho	\$1.8	166	4,850	20,000
District of Columbia	\$1.7	149	5,680	36,400
South Dakota	\$1.6	143	4,140	16,500
North Dakota	\$1.5	133	3,300	14,800
Montana	\$1.3	122	2,550	11,800
Wyoming	\$0.9	81	2,290	9,870

Note: Health results include the number of avoided adverse health impacts and the economic value of these health risk reductions at a 3% discount rate and reflect higher range estimates associated with the Di et al. (2017) health study. Mortality estimates are grown from EPA 1990 value of a statistical life using standard income growth data while non-fatal costs are presented in 2017\$ values.

Note: Data for Alaska and Hawaii are not presented in this report because the US EPA COBRA Model provides health outputs for the contiguous United States.



Local Results: Public Health Benefits Across America

Communities across the United States stand to benefit from the widespread transition to zero-emission transportation and electricity generation. As transportation emissions are a dominant source of local exposures in many communities, a carefully and equitably designed shift to non-combustion transportation can mean cleaner air for all, and especially those most burdened by pollution from these sources today. Similarly, a shift away from fossil-fueled electricity generation is critical to improving the health of those most impacted by emissions from power plants, including in lower-income, rural communities across the United States.

This analysis found that the 100 U.S. counties (roughly 3 percent of all counties assessed) with the highest percent populations of People of Color could experience approximately 13 percent of the cumulative health benefits of this transition (\$155 billion, between 2020-2050). Expanding this further, the 500 U.S. Counties (16 percent of counties assessed) with the highest percent populations of People of Color could experience 40 percent of the benefits, or \$487 billion cumulatively between 2020 and 2050. It is also clear that the presence of benefits within these counties does not directly translate to benefits to individual neighborhoods or residents, however. This is an indicator of the urgent need to center equity in policies and investments to ensure access to the benefits of pollution-free mobility and power.

Additional analysis of the benefits in rural communities, lower-income communities, and neighborhood exposure levels could provide deeper insights into more equitable policy and investment designs. At a broader scale, this analysis shows a leveling of benefits across the country as the locations of power plants and transportation hubs are often impacting communities with varying socioeconomic characteristics.

As shown in the table on the next page, communities across the United States could experience billions in public health benefits, and significantly reduce premature deaths, asthma attacks and other negative health consequences of polluted air through 2050. The table includes the 25 Metropolitan Areas across the United States showing the largest cumulative health benefits by 2050 considering the shift to non-combustion electricity generation and zero-emission transportation.





Top 25 Metro Areas, Public Health Benefits	Cumulative Public Health Benefits 2020-2050			
	Health Benefits (Billions)	Premature Deaths Avoided	Asthma Attacks Avoided	Lost Work Days Avoided
1. Los Angeles-Long Beach, CA	\$95.5	8,680	241,000	1,210,000
2. New York-Newark, NY-NJ-CT-PA	\$84.2	7,660	206,000	1,070,000
3. Chicago-Naperville, IL-IN-WI	\$46.5	4,230	113,000	552,000
4. San Jose-San Francisco-Oakland, CA	\$42.5	3,850	113,000	561,000
5. Philadelphia-Reading-Camden, PA-NJ-DE-MD	\$41.1	3,760	86,600	424,000
6. Washington-Baltimore-Arlington, DC-MD-VA-WV-PA	\$38.9	3,540	104,000	516,000
7. Miami-Port St. Lucie-Fort Lauderdale, FL	\$36.5	3,320	62,300	342,000
8. Houston-The Woodlands, TX	\$33.4	3,000	130,000	568,000
9. Detroit-Warren-Ann Arbor, MI	\$29.2	2,690	55,100	268,000
10. Dallas-Fort Worth, TX-OK	\$28.0	2,530	88,300	405,000
11. Boston-Worcester-Providence, MA-RI-NH-CT	\$22.7	2,070	43,000	238,000
12. Atlanta-Athens-Clarke County-Sandy Springs, GA-AL	\$20.9	1,890	59,400	296,000
13. Cincinnati-Wilmington-Maysville, OH-KY-IN	\$20.7	1,900	51,600	233,000
14. Cleveland-Akron-Canton, OH	\$20.3	1,870	31,500	153,000
15. Pittsburgh-New Castle-Weirton, PA-OH-WV	\$19.9	1,830	26,100	138,000
16. Orlando-Lakeland-Deltona, FL	\$12.9	1,160	22,400	121,000
17. San Diego-Chula Vista-Carlsbad, CA	\$12.4	1,100	29,200	151,000
18. Indianapolis-Carmel-Muncie, IN	\$12.2	1,120	32,000	144,000
19. St. Louis-St. Charles-Farmington, MO-IL	\$12.2	1,120	25,800	122,000
20. Minneapolis-St. Paul, MN-WI	\$11.7	1,070	30,700	145,000
21. Phoenix-Mesa, AZ	\$11.0	994	30,700	145,000
22. Tampa-St. Petersburg-Clearwater, FL	\$10.9	988	20,100	108,000
23. Charlotte-Concord, NC-SC	\$9.2	833	23,200	113,000
24. Harrisburg-York-Lebanon, PA	\$8.8	805	16,500	78,700
25. San Antonio-New Braunfels-Pearsall, TX	\$8.8	791	112,000	25,200

Note: Health results include the number of avoided adverse health impacts and the economic value of these health risk reductions at a 3% discount rate and reflect higher range estimates associated with the Di et al. (2017) health study. Mortality estimates are grown from EPA 1990 value of a statistical life using standard income growth data while non-fatal costs are presented in 2017 \$ values.

Note: The counties assigned to a metropolitan area follow the groupings determined by the White House Office of Management and Budget (OMB) and used by the U.S. Census Bureau. The Metropolitan Statistical Areas and Combined Statistical Areas are used as the basis for considering populations at risk in these urban areas because they reflect the “high degree of social and economic interaction as measured by commuting ties,” as OMB describes them. In some cases, metropolitan area results may exceed state results due to geographies of metropolitan areas crossing state lines.



Policy Recommendations to Achieve Public Health and Climate Benefits

At every level of government, transportation and energy decisions are essentially public health decisions. The phase-out of combustion in the transportation and electricity generation sectors is critical as the nation transitions to a healthier future. Continued investments in combustion technologies may prolong the use of harmful fuels or otherwise delay investment in healthier choices today. Public leaders must align transportation and energy decisions and investments with the protection of public health and reductions in harmful emissions.

Recommended Federal Policies to Achieve Public Health Benefits of Zero-Emission Transportation and Electricity Generation

The Federal Government has a critical opportunity to move the nation to healthier, pollution-free transportation and power systems through a combination of strong policies and investments in zero-emission technologies and infrastructure, actions that enjoy broad public support according to a recent American Lung Association poll.^{vi} A key down payment was made in the transition to zero-emission transportation with the President signing the Bipartisan Infrastructure Law in November 2021. This law invests \$2.5 billion in zero-emission school buses and set \$7.5 billion in motion to expand the national infrastructure for zero-emission vehicles — an important start to the larger, and longer-term public/private investments needed. These investments must not only continue and scale up, but must be paired with stronger laws and rules to reduce harmful air and climate pollution:

- Fully implementing the provisions of the bipartisan infrastructure and vehicle investments and continuing to increase funding for non-combustion electricity generation and transportation as the nation continues to invest in a healthier future.
- Extending and increasing incentive and grant programs to support zero-emission vehicle purchases by consumers, transit agencies, school districts and other entities.
- Leading by example by converting public fleets to zero-emission vehicles immediately.
- Congress must pass legislation to accelerate the transition to zero-emission transportation more broadly than contained in the Bipartisan Infrastructure Law and to ensure more equitable distribution of clean air benefits.
- US EPA must act quickly to update National Ambient Air Quality Standards (NAAQS) for NO₂, SO₂, carbon monoxide, lead, ozone and particle pollution in line with the scientific understanding of what levels are appropriate with an adequate margin of safety of the most vulnerable communities.
- US EPA and the National Highway Traffic Safety Administration (NHTSA) must adopt standards that drive the complete transition to zero-emission passenger vehicles.
 - EPA has finalized regulations that help clean up carbon pollution from the light-duty vehicle sector through Model Year 2026. NHTSA must finalize the Corporate Average Fuel Economy Standards (CAFE) regulations through 2026 for light-duty vehicles.
 - These actions must be followed by increasingly stronger rules beyond 2026 that deliver on President Biden's goal for 50 percent of vehicles sold in the United States to be zero-emission by 2030, and a more complete transition to follow shortly thereafter.



- US EPA must move quickly to approve the next generation standards for heavy-duty trucks in 2022 that acknowledge the growing market for combustion-free medium- and heavy-duty vehicles:
 - More stringent greenhouse gas emission standards for heavy trucks by 2027
 - 90 percent reduction in smog-forming NOx emissions for new trucks by 2027
- The Biden Administration's Justice40 initiative must ensure that major investments are made in environmental justice communities throughout the United States. These investments must ensure that the benefits of zero-emission technologies are felt in historically underserved and over-polluted communities.
 - Treat 40 percent investment as a minimum requirement
 - Ensure that investments are located in communities of concern, and that health, climate and other benefits actually accrue within these communities
- Increase and sustain policies, incentives and investments to accelerate non-combustion renewable electricity generation and the retirement of combustion-based power plants to achieve the Biden Administration's target for 100 percent carbon pollution-free electricity by 2035.

Broad Public Support for Transportation Electrification

70% of American voters believe the federal government should:

- implement policies that support a transition to zero-emission vehicles; and
- require that by 2040 all new freight trucks, buses and delivery vans sold in the U.S. must produce zero tailpipe emissions.

American Lung Association Poll, 2021





Recommended State Policies to Achieve Public Health Benefits of Zero-Emission Transportation and Electricity Generation

Under the Federal Clean Air Act, California holds the authority to seek a waiver to enact stronger-than-national standards to address its air pollution challenges, while states can — and increasingly do — follow these more health-protective rules. At present, 15 states have adopted zero-emission vehicle standards and increasing numbers are pursuing zero-emission truck requirements. In addition to adopting these standards, states must invest in the fueling infrastructure needed to support the growing market, while also supporting the transition to non-combustion renewable power.

State	Zero Emission Vehicle Standard	Zero Emission Truck Standard	Zero Emission Truck MOU
California	●	●	●
Colorado	●		●
Connecticut	●		●
Hawaii			●
Maine	●		●
Maryland	●		●
Massachusetts	●	●	●
Minnesota	●		
Nevada	●		
New Jersey	●	●	●
New York	●	●	●
North Carolina			●
Oregon	●	●	●
Pennsylvania			●
Rhode Island	●		●
Vermont	●		●
Virginia	●		●
Washington	●	●	●
Washington, DC			●

Note: The California Zero Emission Vehicle standard sets increasing requirements for zero-emission passenger vehicle sales. The California Advanced Clean Truck standard sets similar sales percentages for medium- and heavy-duty truck sales. The Multi-State Memorandum of Understanding creates a coordinated approach to achieving 30 percent zero-emission truck sales by 2030 and 100 percent sales by 2050.



- States must adopt state standards for passenger vehicles and medium- and heavy-duty trucks to require that 100 percent of sales are zero-emissions.
- States must lead by example by converting public fleets to zero-emission vehicles.
- States must establish incentive programs to accelerate zero-emission mobility options and set clear requirements for the equitable distribution of incentive funding and infrastructure investments so that all communities (including urban, rural, lower-income, etc.) have access to the benefits of zero-emission mobility.
- States must remove barriers to equitable utility investments in zero-emission infrastructure serving all communities, and invest in upgrades needed to integrate light-, medium- and heavy-duty zero-emission vehicles across the grid.
- California must utilize its unique Clean Air Act authority to develop and implement stringent near- and long-term zero-emission standards (e.g., Advanced Clean Cars, Advanced Clean Trucks) that support attainment of NAAQS and state climate policies while also ensuring equity is central to policy design.
- States must enact programs and investments in infrastructure, consumer rebates and other supportive programs to join the growing list of jurisdictions following these more health-protective Advanced Clean Cars and Advanced Clean Trucks standards.
- States must not preempt actions by local governments seeking to expand zero-emission fueling infrastructure and clean electricity installations or to set more protective building codes.
- States can also join regional or other partnerships such as the Regional Electric Vehicle Midwest Coalition or the Multi-State Memorandum on Zero Emission Trucks to leverage broader resources to achieve healthier transportation.
- States must adopt and accelerate clean electricity standards, modernize electric grids and ensure equitable access to clean electricity to ensure full benefits of non-combustion electricity generation and transportation.



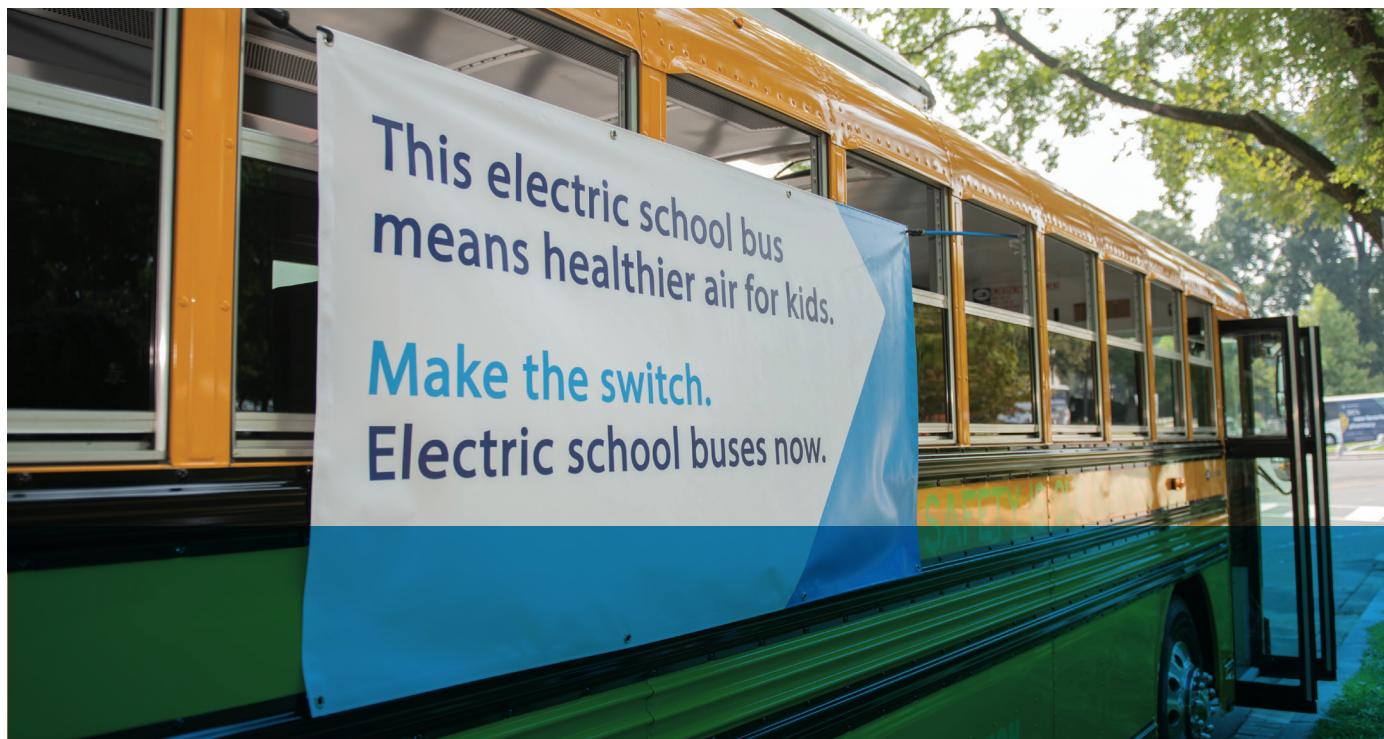


Recommended Local Policies to Achieve Public Health Benefits of Zero-Emission Transportation and Electricity Generation

In planning and building bike lanes and sidewalks, transit routes and carpool lanes, local government decisions impact how we move, and how safely and easily it is we do so. Local decisions can also ease the transition to zero-emissions. There are examples across the nation of public agencies, rural and urban transit fleets and school districts incorporating or fully converting to zero-emission technologies within their own fleets and make it easier for residents and businesses to make the switch and capture the benefits of cleaner air. Local governments must:

- Develop resources with utilities, manufacturers, local and regional governments and others to accelerate regional deployment of zero-emission vehicles, electricity and associated infrastructure
- Shift public fleets to zero-emissions across all weight classes.
- Establish simplified renewable energy and zero-emission fueling infrastructure installation processes for businesses, homeowners, renters and apartment managers.
- Coordinate with local agencies to implement zero-emission mobility options for lower-income neighborhoods, including car share, bike share, on-demand transit, etc.
- Ensure building code requirements follow best practices for charging readiness.
- Develop non-financial incentives such as preferred parking, sidewalk charging or other, visible measures to support residents in this transition.

At all levels, local, state and federal partners must collaborate and coordinate to deliver the framework for accessible, sustainable and reliable deployment of zero-emission transportation.





Conclusion

Too many Americans face unhealthy air that is being polluted by the transportation and electricity generation sectors. Climate change is making air pollution worse. This is especially true in lower-income communities and communities of color experiencing highly concentrated doses of pollution from diesel hotspots, refineries, power plants and other fossil fuel facilities. To reduce air pollution burdens and disparities, and to protect public health against the worst impacts of climate change, policies and investments must align with rapid reduction and elimination of combustion in these sectors. Doing so could yield over \$1.2 trillion in public health benefits across the United States between 2020 and 2050 and \$1.7 trillion in climate benefits. Acting now provides opportunities for major benefits in the near term and establishes pathways for generations to breathe healthier air.

ⁱAmerican Lung Association. Health Impact of Air Pollution. April 2021. <https://www.lung.org/research/sota/health-risks>

ⁱⁱAmerican Lung Association. State of the Air 2021. April 2021. www.lung.org/sota

ⁱⁱⁱAmerican Lung Association. State of the Air 2021. April 2021. www.lung.org/sota

^{iv}United States Environmental Protection Agency. Transportation and Environmental Justice Fact Sheet. March 2022. <https://www.epa.gov/system/files/documents/2022-03/420f22008.pdf>

^vAmerican Lung Association. State of the Air 2021. April 2021. www.lung.org/sota

^{vi}American Lung Association poll. June 2021. <https://www.lung.org/media/press-releases/seventy-percent-of-voters-support-federal-action>