

Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles

The U.S. Environmental Protection Agency (EPA) is proposing new and stronger standards to further reduce harmful air pollutant emissions from light-duty and medium-duty vehicles (also known as Class 2b and 3 vehicles) starting with model year (MY) 2027. The proposed standards would significantly reduce passenger car, light truck, and medium-duty vehicle emissions of greenhouse gases, hydrocarbons, nitrogen oxides (NO_x), and particulate matter (PM_{2.5}), which would result in widespread reductions in air pollution. The proposed standards would significantly reduce vehicle emissions and provide important benefits to communities near major roadways, where people of color and people with low income are disproportionately exposed to air pollution from vehicles. The proposed standards would phase in over model years 2027 through 2032.

What Vehicle Types Are Covered by this Proposal?

The light-duty vehicle category includes passenger cars and light trucks, consistent with previous EPA criteria pollutant and greenhouse gas rules. In this proposal, heavy-duty Class 2b and 3 vehicles are referred to as “medium-duty vehicles” (MDVs) to distinguish them from Class 4 and higher vehicles that remain under the heavy-duty program. In this rule, the MDV category includes primarily large pickups and vans with a gross vehicle weight rating (GVWR) of between 8,501 and 14,000 pounds that are typically used for work due to their higher towing and hauling capabilities compared to light-duty vehicles.

Overview of the Proposed Standards

EPA’s proposal builds upon a proliferation of announcements by automakers that collectively signal a rapidly growing shift away from a focus on internal-combustion engine (ICE) technologies and toward zero-emission technologies, including

electrification. These developments in the U.S. and around the world demonstrate that proven, zero-emission technology is an available and feasible way to greatly reduce emissions of both greenhouse gases and criteria pollutants and is capable of being implemented across a large portion of the new vehicle fleet.

In addition, the Bipartisan Infrastructure Law and the Inflation Reduction Act provide unprecedented investment to accelerate the development of and market for zero-emission technology. These measures provide significant support for expanding the manufacture, sale, and use of zero-emission vehicles by addressing elements critical to the advancement of clean transportation and clean electricity generation.

In assessing the feasibility of the proposed standards, EPA has considered current and anticipated progress by automakers in developing and deploying a diverse range of technologies. The proposed levels of stringency would continue the trend adopted by prior EPA rules of increasing the stringency of emission standards to achieve additional emissions reductions. While advanced gasoline technologies are expected to continue to play an important role in the future, vehicle electrification technologies enable significant additional emissions reductions.

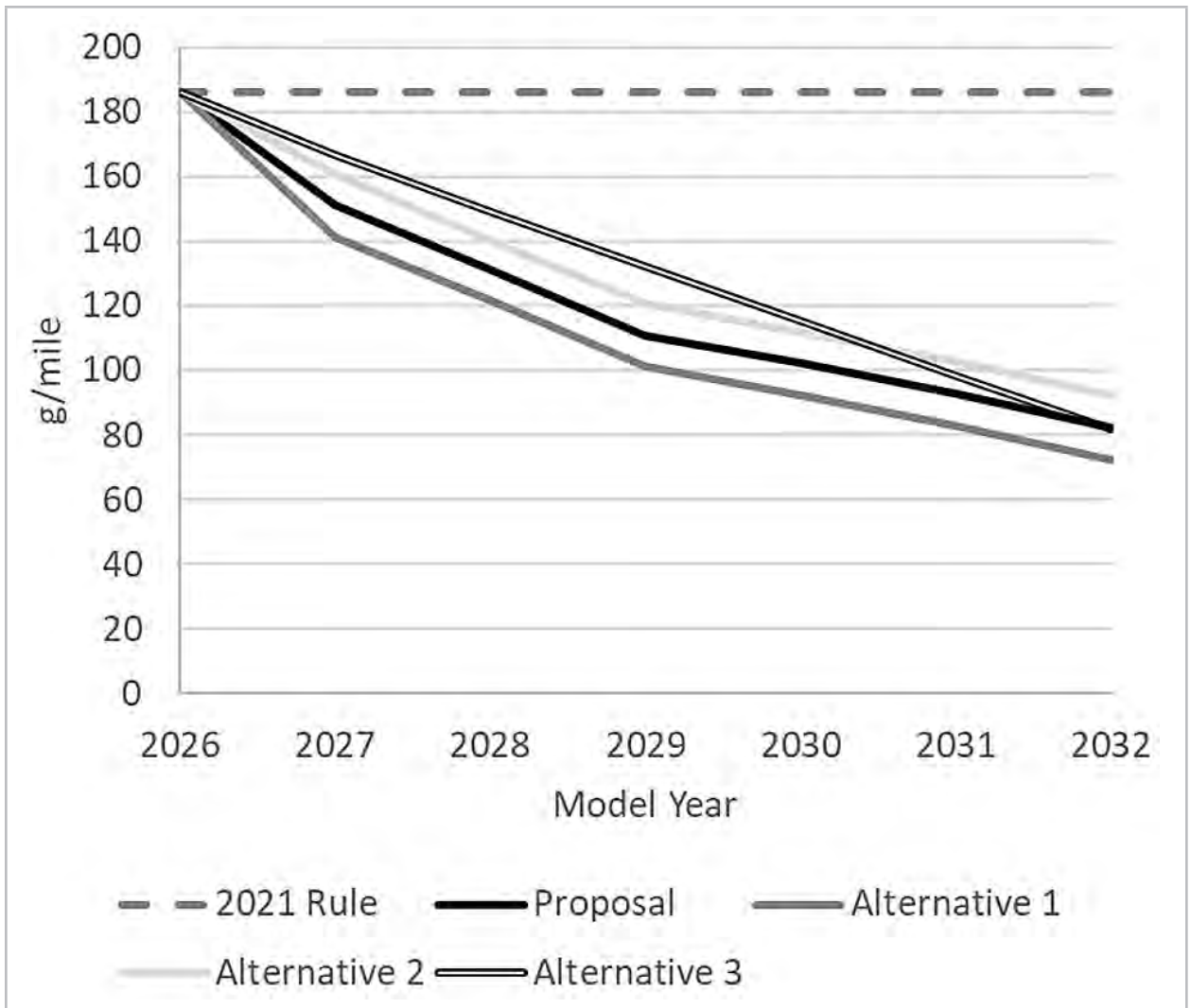
As the EPA greenhouse gas standards have increased in stringency, automakers have introduced a wider range of electrification technologies, including hybrid electric vehicles (HEVs) and, in recent years, plug-in hybrid electric vehicles (PHEVs) and battery-electric vehicles (BEVs). EPA anticipates that manufacturers would continue to employ a diverse range of technologies to comply with the proposed emissions standards, but also recognizes that manufacturer investment and consumer interest in electric vehicles is growing. Automakers are including electrified vehicles as an increasingly integral part of their current and future product lines, leading to an increasing diversity of, and demand for, these clean vehicles.

The Proposed Standards – Greenhouse Gas Emissions Standards

EPA is proposing more stringent greenhouse gas standards for both light-duty vehicles and medium-duty vehicles for MYs 2027 through 2032. In addition to the proposed standards, EPA is seeking comment on three alternative levels of stringency, and on the range of standards across these alternatives and the proposal, and also on whether the standards should continue to increase in stringency for future years, such as through MY 2035.

For light-duty vehicles, EPA is proposing standards that would increase in stringency each year over a six-year period, from MYs 2027-2032. The proposed standards are projected to result in an industry-wide average target for the light-duty fleet of 82 grams/mile (g/mile) of CO₂ in MY 2032, representing a 56 percent reduction in projected fleet average greenhouse gas emissions target levels relative to the existing MY 2026 standards. The projected industry fleet average g/mile targets under the proposed MY 2027-2032 standards compared to the current MY 2026 standard (established in 2021) are shown in the figure below.

Program Announcement



For medium-duty vehicles, EPA is proposing to revise the existing standards for MY 2027 given the increased feasibility of greenhouse gas emissions reducing technologies in this sector in this time frame. EPA’s proposed standards for MDVs would increase in stringency year over year from MY 2027 through MY 2032. When phased in, the MDV standards are projected to result in an average target of 275 grams/mile of CO₂ by MY 2032, which would represent a reduction of 44 percent in projected fleet average greenhouse gas emissions target levels relative to the current MY 2026 standards. The projected targets for medium-duty vans and pickups and the combined medium-duty fleet are provided in the table below.

Model Year Combined	Vans CO ₂ (g/mile)	Pickups CO ₂ (g/mile)	Combined CO ₂ (g/mile)
2027	393	462	438
2028	379	452	427
2029	345	413	389
2030	309	374	352

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Model Year Combined	Vans CO2 (g/mile)	Pickups CO2 (g/mile)	Combined CO2 (g/mile)
2031	276	331	312
2032 and later	243	292	275

The Proposed Standards – Criteria Pollutant Emissions Standards

For light-duty vehicles, EPA is proposing non-methane organic gases (NMOG) plus nitrogen oxides (NOx) standards that would phase-down to a fleet average level of 12 mg/mi by MY 2032, representing a 60 percent reduction from the existing 30 mg/mi standards for MY 2025 established in the Tier 3 rule in 2014. For MDVs, EPA is proposing NMOG+NOx standards that would require a fleet average level of 60 mg/mi by MY 2032, representing a 66 percent to 76 percent reduction from the Tier 3 standards of 178 mg/mi for 2b vehicles and 247 mg/mi for class 3 vehicles. EPA is proposing cold temperature (-7°C) NMOG+NOx standards for light- and medium-duty vehicles to ensure robust emissions control over a broad range of operating conditions. The proposed standards would also reduce emissions of mobile source air toxics. Once phased into the Tier 4 program, vehicles would be required to meet the proposed fleet average standards shown below.

Model Year	LDVs	MDV† NMOG+NOx (mg/mi)	
		Class 2b	Class 3
2026	30*	178*	247*
2027	22	160	
2028	20	140	
2029	18	120	
2030	16	100	
2031	14	80	
2032 and later	12	60	

*Tier 3 standards provided for reference
 † NMOG+NOx credit generated under Tier 3 can be carried forward for 5 years after it is generated. MDV standards only apply for vehicles under 22,000 lb GCWR.

The NMOG+NOx standards continue the emissions certification “bin” structure approach EPA has successfully used in prior criteria pollutant programs. Manufacturers assign each vehicle model to a bin that includes the applicable NMOG+NOx standards. EPA is proposing that manufacturers would be required to meet the standards across several test cycles. The proposed Tier 4 bins are as follows:

LDV bin	NMOG+NOx (mg/mi)
Bin 160*	160
Bin 125*	125
Bin 70	70
Bin 60	60
Bin 50	50

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LDV bin	NMOG+NOx (mg/mi)
Bin 40	40
Bin 30	30
Bin 20	20
Bin 10	10
Bin 0	0
* MDV only	

For both light-duty and medium-duty vehicles, EPA is proposing a Tier 4 PM standard of 0.5 mg/mi and a requirement that the standard be met across three test cycles, including a cold temperature (-7°C) test to ensure robust emissions control across a range of in-use driving conditions.

Projected Mix of Technologies

The proposed standards are performance-based, allowing each automaker to choose what set of emissions control technologies is best suited for their vehicle fleet to meet the standards. EPA projects that one potential pathway for the industry to meet the proposed standards would be through:

- Nearly 70 percent BEV penetration in MY 2032 across the combined light-duty passenger car, crossover/SUV, and pickup truck categories
- About 40 percent BEV penetration by 2032 across the combined medium-duty van and pickup truck categories
- Wide-spread use of gasoline particulate filters to reduce PM emissions
- Improvements in technology to reduce CO₂ from conventional gasoline vehicles

Manufacturers may also choose to employ hybrid or plug-in hybrid technologies to help meet the proposed standards.

Climate and Air Quality Urgency

Making cars cleaner is critical to address climate change and improve air quality. Transportation is the single largest source of greenhouse gas emissions in the United States, making up 27 percent of total greenhouse gas emissions. Within the transportation sector, passenger cars and trucks are the largest contributor, at 58 percent of all transportation sources and 17 percent of total U.S. greenhouse gas emissions.

The proposed standards would contribute toward the goal of holding the increase in the global average temperature to well below 2°C above pre-industrial levels and reducing the probability of severe climate change-related impacts, including heat waves, drought, sea level rise, extreme climate and weather events, coastal flooding, and wildfires. Reductions in greenhouse gas emissions from this proposal would benefit populations that may be especially vulnerable to damages associated with climate change, such as the very young, the elderly, communities of color, low-income, disabled, and indigenous populations.

EPA's proposal would significantly reduce emissions of air pollutants that contribute to climate change and unhealthy air. Between 2027 and 2055, the proposed standards would cumulatively avoid 7.3 billion metric tons of CO₂. In 2055, the proposal would reduce harmful air pollutants from vehicles, including approximately 15,000 tons of PM_{2.5}, 66,000 tons of NO_x, and 220,000 tons of hydrocarbons, compared to 2055 levels without the proposal. These pollutants contribute to the formation of PM ("soot") and ozone ("smog"), as well as elevated concentrations of pollution near roadways, where millions of people live and people of color and people with low income are disproportionately exposed to air pollution from vehicles.

Benefits

EPA estimates that the total benefits of this proposal far exceed the total costs, with net present value of benefits in the range of range of \$850 billion to \$1.6 trillion, with equivalent annualized net benefits in the range of \$60 billion to \$85 billion.

Between \$63 billion and \$280 billion of total benefits are attributable to reduced emissions of criteria pollutants that contribute to ambient concentrations of PM_{2.5}. PM_{2.5} is associated with premature death and serious health effects such as hospital admissions due to respiratory and cardiovascular illnesses, nonfatal heart attacks, aggravated asthma, and decreased lung function. The proposed program is estimated to have \$330 billion in climate benefits.

Costs and Consumer Savings

The vehicle technology costs of this proposal range from \$180 billion to \$280 billion, but the program also would have additional social benefits from fuel savings of \$450 billion to \$890 billion through 2055, and repair and maintenance savings (stemming from lower maintenance and repair of electric vehicles compared to gasoline vehicles) estimated through 2055 at \$280 billion to \$580 billion.

EPA estimates that the standards will increase the technology costs to auto manufacturers by about \$1,200 per vehicle on average in model year 2032. This estimate represents compliance costs to the industry and is not the same as the price consumers pay when purchasing a new vehicle. For example, purchase price could be reduced by any state and Federal purchase incentives that are available to consumers. Under the Inflation Reduction Act, consumers are eligible for up to \$7,500 for the purchase of an electric vehicle.

In addition, consumers would benefit from significant savings on operating costs over the life of a vehicle that meets the proposed standards. For all vehicles meeting the standards, these savings include fuel savings and, for BEVs, maintenance and repair savings as well. Although EPA cannot predict how an individual manufacturer will price vehicles, we project that the average increase in the technology costs of a new vehicle will be more than fully offset by significant savings in operating costs.

For example, a BEV owner of a model year 2032 sedan, crossover, or SUV would save more than \$9,000 on average on fuel, maintenance, and repair costs over an eight-year period (the average period of first ownership) compared to a gasoline vehicle. A BEV pickup truck owner would save even more – about \$13,000.

Additional Provisions

In addition, EPA is proposing greenhouse gas program revisions in several areas, including off-cycle and air conditioning credits, the treatment of upstream emissions associated with battery-electric and plug-in hybrid electric vehicles in compliance calculations, and vehicle certification and compliance.

EPA is proposing battery durability and warranty requirements for light- and medium-duty plug-in vehicles, and new standards to control refueling emissions from incomplete medium-duty vehicles. EPA is proposing revised small volume manufacturer provisions that are available to manufacturers of less than 5,000 vehicles per year. EPA is also proposing additional flexibilities for small businesses.

EPA is also seeking comment on potential future gasoline fuel property standards, aimed at further reducing PM emissions, for consideration in a possible subsequent rulemaking. These could provide an important complement to the vehicle standards being proposed in the current action.

Public Participation

EPA welcomes public input into this rulemaking and looks forward to continuing its engagement with stakeholders throughout the rulemaking process. Today's proposal reflects input from stakeholders including community groups, automobile manufacturers, environmental and public health organizations, and state, local, and tribal governments through meetings with stakeholders throughout the development of the proposal.

EPA plans to hold a virtual public hearing for this proposal. For information about how to register for the hearing, please see our website or the hearing notice which will be published in the Federal Register.