Environmental Protection Agency
1200 Pennsylvania Avenue NW
Washington, DC 20460

July 5, 2023

Consumer Reports Comments on EPA's "Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles."
(Docket ID: EPA–HQ–OAR–2022–0829)

Submitted via: www.regulations.gov

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Executive Summary

Consumer Reports (CR) supports EPA's efforts to set strong multi-pollutant emissions standards for light- and medium-duty vehicles which will lower the cost of transportation for American families and protect the climate and public health. While the EPA's proposal is strong, it could be stronger. CR recommends that EPA finalize a rule that's at least as stringent as the proposed Alternative 1 in order to maximize benefits to consumers and the environment. CR has collected almost 19,000 signatures from consumers who support EPA strengthening its current proposal for greenhouse gas standards that will be submitted with these comments.

EPA's proposed standards are achievable, will save consumers money, and will deliver more clean vehicles that consumers want. This proposal is closely aligned with automakers' existing commitments and market trends. Compliance flexibilities in the rule mean that there are a wide range of compliance pathways that allow automakers to meet EPA's proposed standard, or the stronger Alternative 1.

CRs' updated EV ownership cost analysis presented in this comment letter shows that existing mainstream EVs that qualify for federal tax credits can already save consumers an average of around $10,000 over the vehicle lifetime, while delivering savings in the first year of ownership for consumers that finance their vehicle. These savings will only continue to increase as automaker investments continue to drive down costs.

Consumer demand for cleaner, cost saving vehicles is high and continues to grow rapidly. CR's modeling finds that an EV-only compliance pathway for EPA's proposed standards would only result in enough EVs being manufactured for 25% of Americans to own one. A 2022 CR survey found that 36% of Americans were already "definitely" or "seriously considering" an electric vehicle if they were to buy or lease a vehicle today, indicating that consumer demand may already exceed what is needed to comply with these standards.

There are many outside interests that want to see this rule weakened. EPA should not bow to this pressure and should finalize a strong rule that puts the needs of consumers and the environment ahead of special interests. Strong multi-pollutant standards will save consumers money, improve public health, and help protect our climate. CR asks that the EPA finalize the strongest possible standards.

1. Introduction

1.1. About Consumer Reports

Founded in 1936, Consumer Reports (CR) is an independent, nonprofit and nonpartisan organization that works to create a fair and just marketplace for consumers. Known for its rigorous testing and rating of products and vehicles, CR also advocates for laws and corporate practices that are beneficial for consumers. CR is dedicated to amplifying the voices of consumers to promote safety, digital rights, financial fairness, and sustainability. The organization surveys millions of Americans every year, reports extensively on the challenges and opportunities facing today's consumers, and provides ad-free content and tools to 6 million members across the United States. In the area of transportation, CR is working to ensure affordable, clean and safe mobility choices for all consumers.

1.2. The Benefits of Strong Vehicle Standards to Consumers

Inefficient vehicles impact consumers in a number of ways. Consumers face higher transportation costs when using less efficient vehicles. Inefficient vehicles produce higher levels of air pollution and greenhouse gas (GHG) emissions. Criteria pollutants such as ozone and particulate matter cause health issues such as respiratory diseases, lung cancer, preterm births, and neurological damage,[1,2] which lead to increased spending on public and individual healthcare. GHG emissions contribute to extreme weather events such as extreme heat, flooding, and drought which cost consumers billions of dollars in property damage and increased insurance premiums.[3]

These issues are exacerbated in overburdened communities, such as communities of color, due to redlining and other historically discriminatory policies which place these communities along ports and high-transit corridors. Increasing the supply of electric vehicles (EVs) and other lower emission vehicle technologies can mitigate these impacts and contribute to an equitable transportation ecosystem for all consumers.

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[1] *Air Pollution: Everything You Need to Know,* Natural Resources Defense Counsel, 2021, https://www.nrdc.org/stories/air-pollution-everything-you-need-know.
[2] *Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects,* Health Effects Institute, 2010, https://www.healtheffects.org/publication/traffic-related-air-pollution-critical-review-literature-emissions-exposure-and-health.
[3] *U.S. Billion-Dollar Weather and Climate Disasters*, NOAA National Centers for Environmental Information, 2022, https://www.ncei.noaa.gov/access/billions.

Providing consumers with cleaner and more energy-efficient vehicle technologies can significantly lower these costs, and enables consumers to make purchasing decisions that save them money.

The proposed EPA rule would increase the supply of cleaner, cost-saving transportation options, such as EVs and hybrids, available to consumers. This proposal, particularly the more stringent Alternative 1, would support the transition to a cleaner transportation sector, providing cost savings, as well as other benefits that go beyond the pocketbook. This proposal would save consumers money on fuel and vehicle maintenance. It would also reduce emissions, thus contributing to reduced spending on healthcare costs tied to air pollution, and disaster recovery tied to GHG emissions.

These savings are particularly important for overburdened communities who overwhelmingly bear the brunt of the negative impacts of air pollution. Not only do these communities face a disproportionate exposure to vehicle tailpipe emissions,[4] but lower income households also spend a greater percentage of their income on transportation costs than their wealthier counterparts, making them more sensitive to fluctuation and uncertainty in fuel prices.[5] Thus, policies such as the proposed rule, which reduce pollutant exposure and increase accessibility to clean, reliable modes of transportation, are needed.

1.3. Consumer Petitions in Support of Proposed Rule

Consumer Reports collected 18,817 signatures from consumers in support of strengthening EPA's current proposal for greenhouse gas standards.[6]

Petition Text:
"We're urging the EPA and NHTSA to adopt the strongest possible rules to reduce climate- and health-damaging vehicle emissions and greatly reduce fuel consumption, while helping consumers save an estimated $12,000 over the lifetime of a new vehicle. The rules will rapidly accelerate the number of cleaner vehicles like EVs and hybrids in production over the next decade; save lives due to a dramatic decrease in tailpipe pollution; and put us on the route towards a zero emissions future. These rules are a win-win for the climate, consumers' wallets, and our health."

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[4] *Disparities in the Impact of Air Pollution,* American Lung Association, April 2020, https://www.lung.org/clean-air/outdoors/who-is-at-risk/disparities.
[5] *High Cost of Transportation in the United States,* Institute for Transportation and Development Policy, May 2019, https://www.itdp.org/2019/05/23/high-cost-transportation-united-states.
[6] *Petition: More Clean Vehicles = Better Climate Futur*e, Consumer Reports, 2023, https://action.consumerreports.org/nb-20230425-epa-cleancars-petition.

2. The Proposed EPA GHG Standards for MYs 2027+ are Achievable

Transportation accounts for 28% of GHG emissions in the United States[7]—more than any other sector. EPA's GHG Standards for Light- and Medium-Duty vehicles offer a cost-effective way to reduce these emissions and criteria pollutants, while maintaining a technology-neutral approach.

2.1. Automakers Have Multiple Options for Compliance

EPA's proposal for MY27+ Light- and Medium-Duty vehicle GHG standards are strong, achievable, technology-neutral performance standards. EPA's analysis found that electric vehicles (EVs) are likely to be the most cost-effective compliance pathway for automakers to meet these standards, but they are not the only option. EPA estimated that an EV-only compliance pathway would require 67% of vehicles sold to be EVs by 2032. However, automakers can also use a mix of improvements in internal combustion engine (ICE) fuel efficiency, conventional hybrids, plug-in hybrids (PHEV), and even hydrogen fuel cell electric vehicles (FCEV) to comply with these standards. CR's modeling presented in Section 6.2 shows that automakers can utilize a wide range of options to comply with these rules. Most automakers will be able to comply with these rules while only selling between 50-60% battery electric vehicles (BEVs) by using a mix of widely available and cost effective technologies. Automakers that invest heavily in conventional and plug-in hybrids will be able to comply while selling as few as 40% BEVs in 2032.

CR estimates that an EV-only compliance pathway would result in the production of enough EVs for approximately 25% of Americans to own one by the end of 2032. In a 2022 nationally representative survey of 8,027 US adults, CR found that 36% of Americans were already "definitely" or "seriously considering" an electric vehicle if they were to buy or lease a vehicle today, indicating that consumer demand may already exceed what is needed to comply with these standards.[8] This demand will also increase as consumers see the benefits from recently enacted investments in public charging infrastructure. A deeper dive on consumer demand dynamics can be found in Section 4 of this comment.

2.2. The Proposal is in Line With Automakers Commitments

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[7] *Sources of Greenhouse Gas Emissions*, U.S. Environmental Protection Agency, 2021, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions.

[8] *More Americans Would "Definitely" Get Electric Vehicles*, Consumer Reports, July 7, 2022, https://advocacy.consumerreports.org/press_release/more-americans-would-definitely-get-electric-vehicles/.

EPA's analysis of existing automaker EV commitments shows that the industry was already on track to deliver around 50% EVs by 2030. The proposed standards simply reflect a slight boost to the trajectory the industry was on according to public commitments by automakers.[9] Since these are technology-neutral standards automakers can adjust to this either by slightly increasing their electrification plans or by deploying existing, cost-effective efficiency technology to their remaining ICE vehicle fleets. As of January 2023, automakers and battery makers planned to invest $860 billion in the transition to EVs by 2030, including $210 billion in the U.S, according to an analysis by Atlas Public Policy.[10]

3. The Proposed Standards Will Save Consumers Money

Over the past two decades, clean car standards such as EPA's GHG Standards for Model Years 2023-2026, harmonized with the Department of Transportation (DOT) National Highway Traffic Safety Administration's (NHTSA) Corporate Average Fuel Economy (CAFE) standards, have delivered $7,000 in lifetime fuel savings and a 30% reduction in greenhouse gas emissions from the average new vehicle over the last two decades.[11] At the same time, vehicles have become safer, larger, and more powerful; but, most impressively, all of those improvements were delivered with no (inflation-adjusted) increase in vehicle prices.

EPA estimates that its latest proposed standards for MY27+ will save consumers over $1 trillion through 2055 while reducing GHG emissions by over 7 gigatons. This result is consistent with CR's analysis from 2021 which found that reducing emissions from new vehicles by 60% by 2030 would save consumers $1.6 trillion through 2050.[12] This proposal, when combined with EPA's previous rule for model years 2023 to 2026, is consistent with that trajectory of 60% reduction in emissions by 2030.

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[9] *Automakers Are Adding Electric Vehicles to Their Lineups. Here's What's Coming.*, Consumer Reports, March 10, 2023, https://www.consumerreports.org/cars/hybrids-evs/why-electric-cars-may-soon-flood-the-us-market-a9006292675/.

[10] *$210 Billion of Announced Investments in Electric Vehicle Manufacturing Headed for the U.S.*, Atlas EV Hub, January 12, 2023, https://www.atlasevhub.com/data_story/210-billion-of-announced-investments-in-electric-vehicle-manufacturing-headed-for-the-u-s/.

[11] *Vehicle Price Trends: Fuel Economy and Safety Improvements Come Standard*, Consumer Reports, February 21, 2023, https://advocacy.consumerreports.org/wp-content/uploads/2023/02/CR-Vehicle-Price-Trends-Feb-21-2023.pdf.

[12] *Meeting Emissions Goals Will Save Consumers A Lot of Money*, Consumer Reports, March 2021, https://advocacy.consumerreports.org/wp-content/uploads/2021/03/Consumer-Reports-Vehicle-Emissions-Standards-Fact-Sheet-3.22.21-FINAL.pdf.

CR analysis shows that at an average gas price of $3.50/gallon, close to the national average gas price in June 2023, an electric SUV would deliver an average of $1,700 in fuel and maintenance savings every year.[13] A 2020 analysis by CR found that the most popular EVs were already cheaper to own than the most popular and highest-rated gasoline vehicles in their class, even factoring in the higher purchase prices of EVs.[14] That analysis has been updated for 2023 in Section 5 of this comment letter. The findings are consistent with the previous analysis; however now all 6 EVs analyzed show consumer savings in the very first year of ownership when financed. This means that the average American buying a new, mainstream vehicle doesn't have to wait for some point in the future to start saving money with an EV.

Overall, EVs save an average of 60% on fuel and 50% on repairs and maintenance compared to comparable gasoline vehicles.[15] Importantly, the 2020 study found that while EVs were usually cheaper to own for a first owner who drove the vehicle for the first seven years, the largest chunk of the savings flowed to a second owner who purchased the vehicle used. This is because used vehicle buyers will pay less of a premium to purchase an EV, but will encounter similar fuel savings, and even greater maintenance cost savings due to increasing maintenance requirements for older ICE vehicles.

Additionally, recent federal investments give consumers even more options to save on the initial purchase or lease of an EV. The Inflation Reduction Act (IRA) offers tax credits of up to $7,500 for the purchase of new EVs that meet certain manufacturing, vehicle pricing, buyer income, and critical minerals requirements. A 2023 study from the International Council on Clean Transportation estimated that these tax credits would make the average new qualifying EV cheaper to purchase than the average new conventional vehicle by 2025, resulting in a large boost in EV demand.[16] The IRA also includes tax credits of up to $4,000 for the purchase of used EVs subject to certain

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[13] *New Consumer Reports analysis shows rising gas prices ramp up savings for EV owners*, Consumer Reports, March 10, 2022, https://advocacy.consumerreports.org/press_release/new-consumer-reports-analysis-shows-rising-gas-prices-ramp-up-savings-for-ev-owners/.

[14] *New analysis from CR finds that the most popular electric vehicles cost less to own than the best-selling gas-powered vehicles in their class*, Consumer Reports, October 8, 2020, https://advocacy.consumerreports.org/press_release/new-analysis-from-cr-finds-that-the-most-popular-electric-vehicles-cost-less-to-own-than-the-best-selling-gas-powered-vehicles-in-their-class/.

[15] *Id*.

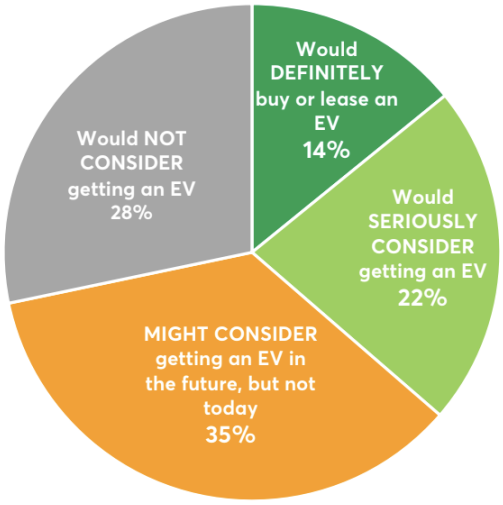
[16] *Analyzing the Impact of the Inflation Reduction Act on Electric Vehicles Uptake in the United States*, The International Council on Clean Transportation, January 2023, https://theicct.org/wp-content/uploads/2023/01/ira-impact-evs-us-jan23-2.pdf.

income and vehicle price limits, helping to make EV's more accessible to consumers who buy used vehicles.

4. There is Strong Consumer Demand for Cleaner Vehicles

In January and February 2022, Consumer Reports fielded a nationally representative survey of 8,027 US adults on consumer awareness of BEV and low carbon fuels.[17] The survey found that 71% of Americans express some level of interest in buying or leasing an electric vehicle, as shown in Figure 4.1. Within that group, 14% of Americans would "definitely buy" an EV if they were to buy or lease a vehicle today. This translates to approximately 36 million "EV-ready" buyers, which is an increase of 350% between 2020 and 2022.

Figure 4.1: Likelihood of Buying or Leasing an Electric-Only Vehicle Today



Unfortunately, automakers have not kept up with orders. As a result, for every single EV being manufactured, there are 45 consumers ready to buy or lease one.[18] The imbalance between supply and demand is resulting in long waitlists and dealer markups. Automakers are making investments to improve supply, but the growth in supply has been lagging the growth in demand.

[17] *Battery Electric Vehicles & Low Carbon Fuels Survey*, Consumer Reports, April 2022, https://article.images.consumerreports.org/image/upload/v1657127210/prod/content/dam/CRO-Images-2022/Cars/07July/2022_Consumer_Reports_BEV_and_LCF_Survey_Report.pdf.
[18] *Excess Demand, The Looming EV Shortage*, Consumer Reports, March 2023, https://advocacy.consumerreports.org/wp-content/uploads/2023/03/Excess-Demand-The-Looming-EV-Shortage.pdf.

Absent strong action and direction from the federal government, this gap between supply and demand will only continue to widen. This is because the barriers to EV adoption identified in CR's 2022 survey of BEV and low carbon fuels awareness are being addressed: purchase cost for EVs is declining, charging infrastructure is expanding, consumers are gaining more experience with EVs, and automakers are investing in new models and increased production.[19] These trends tend to reinforce one another in a virtuous cycle to create even more demand for these vehicles.

The EPA's GHG standards can be especially helpful in solving the chicken-and-egg problem with infrastructure. By guaranteeing that greater numbers of EVs will be manufactured in the coming years, the new standards will help give private industry the confidence it needs to invest in infrastructure, knowing that greater demand for reliable charging infrastructure is on the way. Private corporations are already beginning to see the opportunity that EV charging can provide, with Walmart, 7-11, Starbucks, and Subway all recently announcing major EV charging initiatives. This increased private investment combined with the $7.5b in federal investment in charging infrastructure from the Bipartisan Infrastructure Law can help reduce a major barrier to consumer adoption of EVs. As consumers become more confident in the availability and reliability of the charging network, their interest in purchasing an EV is likely to increase.

Another key driver of EV purchase interest is direct experience with EVs. This is illustrated in Figure 4.2, in which the three pie graphs represent low, medium, and high levels of experience with battery electric vehicles.[20] CR found that consumers with the most direct experience were almost ten times as likely to say they would "definitely buy" an electric vehicle today as consumers with no direct experience (58% vs 6%).[21] More EVs on the road means more opportunities for Americans to gain more direct experience and exposure to EVs. Right now, broad consumer experience with EVs is very limited, but that is likely to change as more people see family, friends, and neighbors bring home their first EV. This data show that as consumers gain that greater familiarity with EVs they will be more likely to consider purchasing them.

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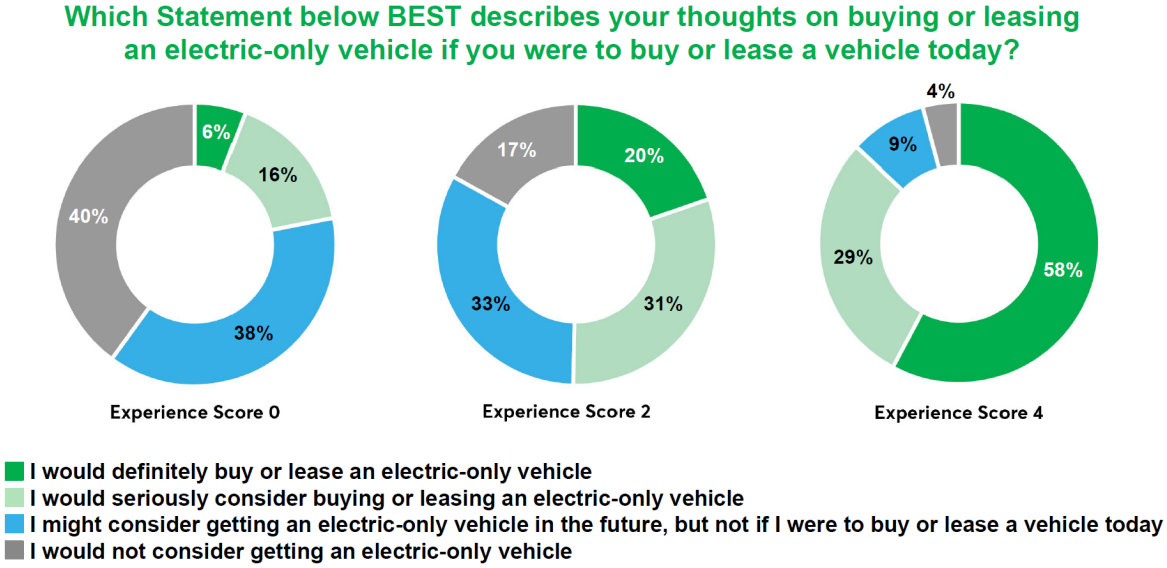
[19] *Battery Electric Vehicles & Low Carbon Fuels Survey*, Consumer Reports, April 2022, https://article.images.consumerreports.org/image/upload/v1657127210/prod/content/dam/CRO-Images-2022/Cars/07July/2022_Consumer_Reports_BEV_and_LCF_Survey_Report.pdf.

[20] *Id*.

[21] Experience was measured based upon "yes" answers to four different questions:
1) Have you seen an EV in your neighborhood in the past month
2) Do you know someone with an EV
3) Have you been a passenger in an EV in the past year
4) Have you driven an EV in the past year

Figure 4.2 - Survey Results on EV Demand by Experience with EVs



Automaker investments and consumer costs have been discussed in other areas of this comment letter, but they also have the potential to drive increased consumer demand. As automakers deliver more volume, economies of scale and intensified competition for customers will further feed cost declines, which will feed back into the cycle, and lead to increased EV demand.

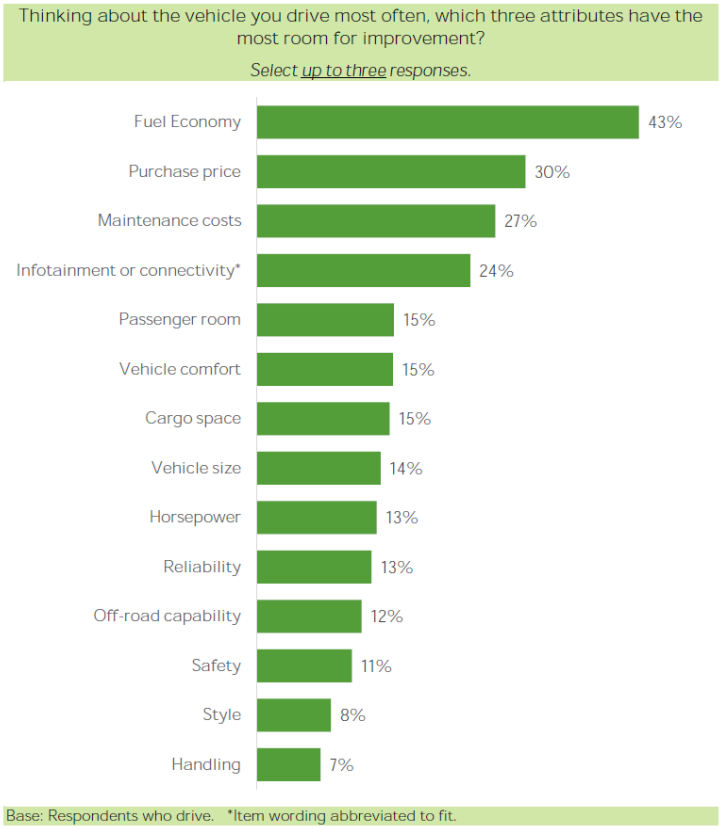
However, it's not just that consumers are showing increased interest in EVs; they're also showing declining interest in conventional gasoline vehicles. CR's car buying survey from March and April 2022 found that 30% of licensed drivers who were then in the market to buy or lease a new (and not a used) vehicle were not even considering a conventional, non-hybrid vehicle.[22] This however, isn't just something consumers are telling us, it's also showing up in the market. Sales of new ICE vehicles decreased by 26% from 2019 to 2022, while combined sales of BEVs, PHEVs and conventional hybrids increased by 144%. BEV sales alone increased by 244% over that same period.[23]

Consumers who are still considering gasoline powered vehicles want them to keep getting more efficient. In a 2022 CR survey of 2,161 US adults assessing Americans' beliefs and attitudes about fuel economy, seven in ten American drivers say that fuel

[22] *Car Buying: A National Representative Multi-Mode Survey, 2022 Results*, Consumer Reports, May 2022, https://article.images.consumerreports.org/prod/content/dam/surveys/Consumer_Reports_Car_Buying_March_2022.pdf.
[23] Consumer Reports analysis of Wards Intelligence annual sales data, available with subscription at: https://wardsintelligence.informa.com/datacenter.

economy is either “very important” or “extremely important” to them when considering what vehicle to purchase or lease.[24] In addition, when asked which attributes of the vehicle they drive most often have the most room for improvement, 43% of drivers selected improvements in fuel economy, the most commonly selected attribute, which beat out purchase price (30%), maintenance costs (27%), and eleven other features.[25] The full results are shown in Figure 4.3. Finally, 85% of Americans agree that automakers should continue to improve fuel economy across vehicle types.[26] This underscores the urgency of this rule to ensure that there is a stringent path forward for automakers to not only increase access to EV technology, but to improve the efficiency of conventional vehicles that some consumers will still be buying.

Figure 4.3 - Vehicle Attributes with the Most Room For Improvement



[24] *CR nationally representative survey of 2,161 US adults in September and October*, Consumer Reports, 2022, https://advocacy.consumerreports.org/wp-content/uploads/2023/03/Consumer-Reports-Fuel-Economy-2022-National-Sample-Report.pdf.
[25] *Id*.
[26] *Id*.

Unfortunately, the communities most harmed by transportation emissions and pollution are adopting electric vehicles at disproportionately low rates.[27] Despite considerable interest in EVs across race and ethnicity, inequities in EV adoption persist. The BEV and low carbon fuel awareness survey found that overall interest in purchasing EVs was high across all demographics, with communities of color showing at least as great a level of interest in purchasing an electric vehicle as white consumers: 33 percent of White, 38 percent of Black, 43 percent of Latino, and 52 percent of English-speaking Asian Americans say they would "definitely" or "seriously consider" purchasing or leasing an EV.[28]

The same survey found that although exposure to EVs was roughly the same among members of the Black community as white and Latino Americans (either through personal interactions, observations in their community, or through riding or driving an EV), they reported being less familiar with the fundamentals of owning an EV than any other group. This finding further stresses the need to prioritize increasing EV sales in communities that are disproportionately affected by transportation pollution. EPA should therefore consider the needs of consumers in all demographics and income levels.

5. 2023 EV Ownership Cost Comparison

Many more EVs have entered the market, and significant changes have been made to the federal EV tax credit since CR released its EV ownership cost study in 2020. Given these changes, updated analysis of current EV ownership costs has been performed and is presented in this section.[29]

This analysis uses similar modeling methodology as the 2020 study with the following changes:[30]

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[27] *Survey Says: Considerable Interest in Electric Vehicles Across Racial, Ethnic Demographics*, September 2022, Consumer Reports, Union of Concerned Scientists, EV Noire & Green Latinos, https://advocacy.consumerreports.org/wp-content/uploads/2022/09/EV-Demographic-Survey-English-final.pdf.

[28] *Id.*

[29] A summary of the results of this analysis can be found in the following fact sheet: *CR Fact Sheet: Electric Vehicles Save Consumers Money,* Consumer Reports, June 30, 2023, https://advocacy.consumerreports.org/research/cr-fact-sheet-electric-vehicles-save-consumers-money/

[30] *New analysis from CR finds that the most popular electric vehicles cost less to own than the best-selling gas-powered vehicles in their class*, Consumer Reports, October 8, 2020, https://advocacy.consumerreports.org/press_release/new-analysis-from-cr-finds-that-the-most-popular-electric-vehicles-cost-less-to-own-than-the-best-selling-gas-powered-vehicles-in-their-class/.

- Selected vehicles include the 6 mainstream EVs that qualify for at least part of the current federal EV tax credit in June 2023.
- Comparison ICE vehicles are selected with similar utility and features as the EV. Vehicles were selected from the same automaker when possible. When no similar vehicle was available from the automaker, the appropriate trim level of the best selling vehicle in the class was used.
- Energy costs are updated to the reference case from EIA's Annual Energy Outlook 2023.[31]
- Public direct current fast charging costs are updated to Electrify America's current standard charging rate of $0.48/kWh.[32]
- Average loan interest rates were updated to current (June 2023) average values for prime buyers of 6.4% according to NerdWallet.[33]

The selected vehicles, along with their current market prices according to TrueCar.com, are shown in Table 5.1. The TrueCar price is used rather than MSRP because it better represents the price consumers are actually paying for these vehicles.

Table 5.1 - Vehicles for Ownership Cost Comparison[34]

EV				ICE		
Make and Model	**TrueCar Price***	**Range**	**HP**	**Make and Model**	**TrueCar Price**	**HP**
Chevy Bolt EUV LT	$25,640	247	200	Chevy Trax LT	$23,470	137
Ford Mustang Mach E Select RWD	$42,610	247	266	Ford Escape ST Line Select	$35,590	250
VW ID4 Pro RWD	$36,770	275	200	VW Tiguan SE	$29,420	184
Ford F150 Lightning XLT	$64,670	240	426	Ford F150 XLT 3.5L	$54,300	400
Tesla Model 3 RWD	$34,130	272	271	Toyota Camry XLE	$32,170	203
Tesla Model Y AWD	$41,380	279	380	Toyota Rav4 Limited	$39,310	203

*Price for EVs is after available federal tax credit

[31] *2023 Annual Energy Outlook*, US Energy Information Administration, March 16, 2023, https://www.eia.gov/outlooks/aeo/.
[32] *Electrify America is increasing prices at its DC fast charging stations*, The Verge, February 23, 2023, https://www.theverge.com/2023/2/3/23584747/electrify-america-price-increase-ev-charging-stations-march-2023.
[33] *Average Car Loan Interest Rates by Credit Score*, NerdWallet, June 27, 2023, https://www.nerdwallet.com/article/loans/auto-loans/average-car-loan-interest-rates-by-credit-score.
[34] All vehicles were model year 2023 except for the Chevy Trax which is a 2024 model.

Table 5.2 shows the estimated average market adjustment for the vehicles being compared. The TrueCar price represents the market average transaction prices that consumers are actually paying for the vehicle. This may be higher or lower than MSRP. The market adjustment is the difference between the average transaction price and the MSRP. A positive value of the market adjustment means consumers on average are paying above MSRP and a negative value means that consumers are paying below MSRP. The comparison is made for all four sets of vehicles that are sold at dealers and from the same manufacturer.[35]

On average, the four EVs were selling at an average transaction price $2,700 more than MSRP, while on average the four ICE vehicles were selling at an average transaction price $2,200 below MSRP. This means that market adjustments are leading to a net increase of $4,900 in the relative price difference between EVs and their gasoline equivalent, compared to what it would be if both vehicles sold for MSRP. The largest difference is seen on the F150 Lightning, which is transacting with a net difference of over $11,000 more than the difference that would have been if both the EV and ICE version were sold at MSRP. This rather large market price difference is continued evidence that EV demand continues to exceed EV supply in the market.

Table 5.2 - Vehicle Market Adjustments Compared to MSRP

EV	Market Adjustment	ICE Vehicle	Market Adjustment	EV Net vs MSRP
Chevy Bolt EUV LT	$4,350	Chevy Trax LT	$70	$4,280
Ford Mustang Mach E Select RWD	$1,570	Ford Escape ST Line Select	-$950	$2,520
VW ID4 Pro RWD	-$1,030	VW Tiguan SE	-$2,450	$1,430
Ford F150 Lightning XLT	$5,800	Ford F150 XLT 3.5L	-$5,440	$11,240
Average	**$2,670**		**-$2,190**	**$4,870**

The results of the ownership cost analysis in Figure 5.1 and Table 5.3 show that despite paying over MSRP for many EVs, the average consumer is still pocketing significant savings by purchasing the EV over the comparable ICE vehicle. All 6 EVs analyzed will deliver savings in the first year to the average American. Overall average savings totaled $4,200 over a 7 year first owner period, and $9,700 over the vehicle lifetime

[35] Tesla sells all vehicles at MSRP so they are not included here. Also, the comparison is most useful comparing vehicles sold by the same automaker, which isolates any effects that might occur due to the popularity of specific brands or differences in the behavior of different dealer networks, since both vehicles in a pair are sold at the same dealers.

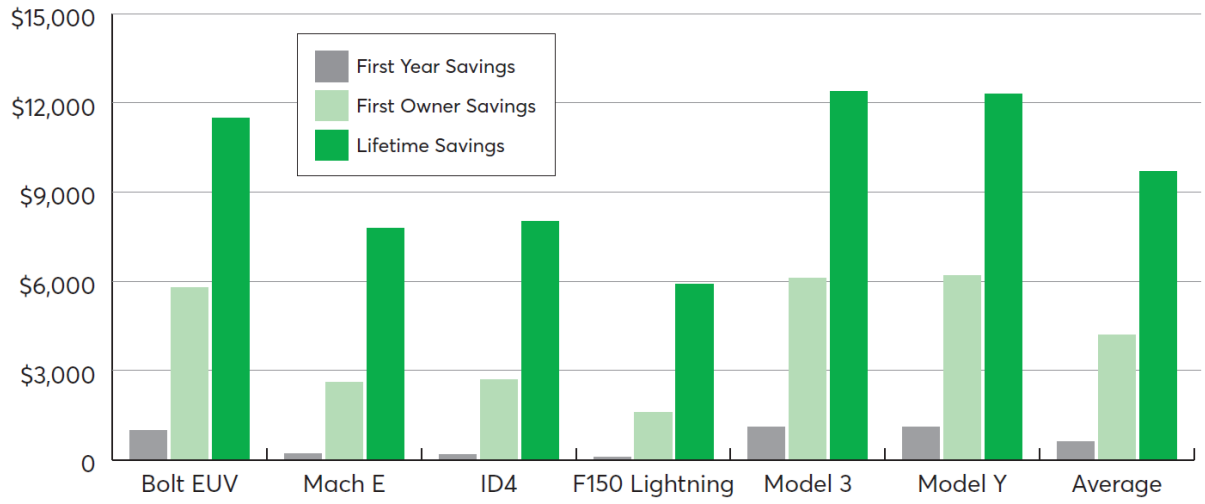
200,000 miles. Lifetime savings ranged from $6,000-$12,000 for the six vehicles studied.

Although the vehicle comparisons are somewhat different from the 2020 study, the results generally show an increase in savings delivered by EVs, especially for the first owner. It is also worth noting that while in 2020 Tesla was largely competing with other luxury brands like Audi and BMW, their recent price cuts have brought their lowest priced vehicles into direct competition with two of the most popular mainstream vehicles in the country, the Toyota Camry and Toyota RAV4.

Table 5.3 - EV Net Ownership Cost Savings

EV	First Year Savings	First Owner Savings	Lifetime Savings
Bolt	$980	$5,800	$11,500
Mach E	$200	$2,600	$7,800
ID4	$190	$2,700	$8,000
F150 Lightning	$80	$1,600	$5,900
Model 3	$1,100	$6,100	$12,400
Model Y	$1,100	$6,200	$12,300
Average	**$600**	**$4,200**	**$9,700**

Figure 5.1 - EV Net Ownership Cost Savings



All of this indicates that consumers will not have to wait until some date far into the future in order to achieve significant savings from going electric. For many consumers, big savings can already be pocketed today. As more consumers recognize this fact, EV demand will inevitably continue to grow.

6. Specific Technical Comments On EPA's Proposal and Modeling

6.1. Internal Combustion Engine Vehicle Backsliding

EPA's modeling accurately considers the high effectiveness of battery EVs at delivering both significant emissions reductions and consumer savings. EPA's modeling finds that EVs are so cost-effective that emissions from the remaining ICE fleet actually increase over the period of the rule by an average of around 4%. This is because EPA's model finds that it would be cost-effective for automakers to remove already developed technology from their ICE vehicles to save money while building more EVs.

However, this modeling result does not seem likely in the real world. Consumer demand for EVs is rapidly increasing, and technology improvements will mean that the remaining gasoline powered vehicles will have to compete with better and better EV offerings.[36] In order to continue to find buyers for their remaining gasoline powered vehicles, automakers will need to make them better, not worse.

Furthermore, this result ignores consumer demand for cleaner, more efficient gasoline vehicles. Consumer Reports' 2022 fuel economy survey found continued strong consumer demand for more efficient vehicles.[37]

- 95% of American drivers said fuel economy is at least somewhat important to them when considering what vehicle to purchase or lease, and seven in 10 (70%) say it is very important or extremely important.
- 85% of Americans agreed that automakers should continue to improve fuel economy for all vehicle types.
- 78% of American drivers agreed that they expect each new generation of vehicles available on the market to be more fuel-efficient than the last.

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[36] *Excess Demand, The Looming EV Shortage*, Consumer Reports, March 2023, https://advocacy.consumerreports.org/wp-content/uploads/2023/03/Excess-Demand-The-Looming-EV-Shortage.pdf.

[37] *Fuel Economy: A Nationally Representative Multi Mode Survey*, Consumer Reports, November 2022, *https://article.images.consumerreports.org/image/upload/v1670867143/prod/content/dam/surveys/Consumer_Reports_Fuel_Economy_National_September_October_2022.pdf*.

EPA specifically estimates that hybrid vehicles will drop from 4% of the vehicle fleet in 2027 to 0% of the fleet in 2031 and 2032.[38] Research from CR has shown that many hybrids on the market today are extremely cost-effective for consumers, delivering a payback on their cost in 3 years or less, with some delivering savings instantly.[39] CR's 2022 nationally representative car buying survey of 6,960 US adults found that 32% of consumers planning to purchase or lease a vehicle within a year were considering a hybrid car or truck.[40] While consumer demand for EVs is likely to continue to grow rapidly, EVs do not yet work for all consumer lifestyles, and hybrids offer a viable and cost-effective alternative for these consumers to both reduce their emissions and their fuel spending. EPA's modeling that shows that this popular and cost-effective technology will be completely abandoned by the entire market by the end of the decade is at odds with the data on consumer preferences for these vehicles.

Finally, over the duration of this proposed rule, EVs will be gaining significant market share. As they do so, ICE vehicles will by necessity be losing market share. Automakers will need to make decisions about which ICE vehicles and powertrains to keep producing and which ones to discontinue. The most logical approach to meeting these standards would be to phase out their oldest and least efficient vehicles and powertrains, while keeping their newest, most advanced, and most efficient powertrains. This process has the potential to result in significant improvements in average vehicle emissions without automakers having to deploy any additional technology. For example, in the 2023 model year, the best selling Ford F150 offers ICE variants that range in emissions from 352 g/mi to 741 g/mi.[41] This large range in emissions leaves a lot of room for improving fleet performance by focusing future production on the lowest emitting variants and eliminating the highest emitting variants. A more detailed analysis from the Natural Resource Defense Council found that shifting to the lowest emitting powertrains could result in emissions reductions of between 19 and 65 grams per mile, compared to the current sales weighted average, for the 12 best selling vehicles.[42]

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[38] *Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles, Draft Regulatory Impact Analysis*, EPA-420-D-23-003, Table 13-68

[39] *Regardless of Gas Prices, Some Hybrids Pay for Themselves Immediately*, Consumer Reports, March 2, 2023, https://www.consumerreports.org/cars/hybrids-evs/hybrids-vehicles-pay-for-themselves-a1092610835/.

[40] *Fuel Economy: A Nationally Representative Multi Mode Survey*, Consumer Reports, November 2022, *https://article.images.consumerreports.org/image/upload/v1670867143/prod/content/dam/surveys/Consumer_Reports_Fuel_Economy_National_September_October_2022.pdf*.

[41] *Fuel Economy of 2023 Ford F150*, U.S. Department of Energy, 2023, https://www.fueleconomy.gov/feg/PowerSearch.do?action=noform&path=1&year1=2023&year2=2023&make=Ford&baseModel=F150&srchtyp=ymm&pageno=1&rowLimit=50.

[42] *Shifting to Cleaner Gas Engines Can Help Reduce Emissions*, Natural Resource Defense Council, July 5, 2023, https://www.nrdc.org/bio/kathy-harris/shifting-cleaner-gas-engines-can-help-reduce-emissions

Given the above, CR makes the following general recommendations to improve EPA's modeling:

- EPA's model should not remove technology that automakers have already invested in adding to their existing ICE vehicles.
- As EV market share increases over the course of the rule, EPA should model a reduction in the number of ICE powertrains that automakers continue to build in such a way that the newest and most advanced options are kept, and the oldest and least advanced are phased out over time.

6.2. Modeling of Compliance Pathways

EPA's compliance modeling estimates the single most cost-effective compliance pathway for the vehicle fleet under the proposed regulation. However, it is not the only possible compliance pathway automakers can take. Different automakers are likely to take wildly different compliance pathways, with some automakers going all in on EVs, while other automakers may hedge their bets with more hybrids and PHEVs.

CR modeled a range of reasonable alternative compliance pathways that automakers might consider. The modeling considers different levels of continued ICE improvement and deployment of PHEVs as a percentage of all plug-in vehicles.[43] The results of this analysis for model year 2032 are shown in Table 6.1. They show that a wide range of compliance pathways are available to automakers that can reduce the required BEV sales market share for model year 2032 to between 50-60% with varying levels of ICE improvement and PHEV deployment. There is even a feasible compliance option which would allow compliance with only 40% BEVs with heavy investment in hybrid and PHEV technology.

[43] ICE improvements of 1% (low), 3.5% (medium) and 5% (high) are modeled. PHEV market share was modeled as a percentage of all plug-in vehicles with values of 0%, 10%, 20% and 40% modeled.

Table 6.1 - Modeling of Compliance Alternatives for EPA's Proposed Standards for MY2032

Compliance Scenario	ICE Improvement (%/year)	PHEV Market Share	BEV Market Share
EPA modeling	-0.8%	0%	67%
Low ICE, 0% PHEV	1%	0%	63%
Low ICE, 10% PHEV	1%	6%	60%
Low ICE, 20% PHEV	1%	14%	54%
Medium ICE, 0% PHEV	3.5%	0%	57%
Medium ICE, 10% PHEV	3.5%	6%	54%
Medium ICE, 20% PHEV	3.5%	12%	50%
High ICE, 0% PHEV	5%	0%	53%
High ICE, 10% PHEV	5%	5%	50%
High ICE, 20% PHEV	5%	11%	47%
High ICE, 40% PHEV	5%	26%	40%

A few scenarios were also modeled for EPA's Alternative 1. These results are shown in Table 6.2. They find that with only a small improvement in ICE vehicles (1% per year reduction in emissions), automakers can comply with these stronger standards with a minimal increase in BEV market share from 67% to 68% compared to EPA's modeling of the proposed standards. Further reductions in BEV market share are also possible with further investment in ICE improvement and PHEV deployment.

Table 6.2 - Modeling of Compliance Alternatives for EPA's Alternative 1 for MY 2032

Compliance Scenario	ICE improvement (%/year)	PHEV Market Share	BEV Market Share
Low ICE, 0% PHEV	1%	0%	68%
Medium ICE, 10% PHEV	3.5%	6%	59%
High ICE, 20% PHEV	5%	13%	52%

Overall these results show that automakers have many potential reasonable compliance pathways to comply with either EPA's proposed standards or the stronger Alternative 1.

6.3. Changes to the Footprint Curves

Overall CR supports the efforts by EPA to eliminate the regulatory incentive for automakers to shift their fleet mix from smaller cars to larger light trucks. This shift towards larger and less efficient vehicles has eroded a significant portion of the emissions improvements that could have been delivered by EPA's past light-duty vehicle GHG standards. A recent analysis by CR found that while the average fuel economy from new vehicles has improved by 30% from 2003 to 2021, it would have improved by 43% had the fleet mix stayed the same as it was in 2003.[44]

While consumers can and should be able to select the vehicle that best suits their needs, the EPA GHG program should not provide an implicit incentive for automakers to build and promote larger and more polluting vehicles. The efforts by EPA to narrow the gap between the car and light truck curves, and to reduce the slopes of both footprint curves in this current rulemaking will go a long way towards reducing the incentive for automakers to use mix shifting as a compliance strategy, but it is unclear if it will completely eliminate the incentive.

CR agrees with the data-driven approach EPA used to identify the appropriate offset for vehicles with 2-wheel drive versus vehicles with 4-wheel drive. However, there are questions about the use of towing as a means to define the slope of the truck curve. Most Americans never use their vehicle's towing capabilities.[45] Granting vehicles significant additional emissions allowance for an attribute that is rarely actually utilized by consumers has the potential to continue to perpetuate the shift towards larger vehicles, without appreciable improvement in functional utility for consumers. At a minimum, EPA should factor in the actual consumer demand and usage of towing capabilities into their analysis for the footprint curves, or consider alternative potential definitions of utility. One alternative would be to consider combined passenger and cargo volume, which is more likely to be valued and utilized by consumers.

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[44] *Vehicle Price Trends: Fuel Economy and Safety Improvements Come Standard*, Consumer Reports, February 21, 2023, https://advocacy.consumerreports.org/wp-content/uploads/2023/02/CR-Vehicle-Price-Trends-Feb-21-2023.pdf.

[45] *You Don't Need A Full-Size Pickup Truck, You Need a Cowboy Costume,* The Drive, March 15, 2019, https://www.thedrive.com/news/26907/you-dont-need-a-full-size-pickup-truck-you-need-a-cowboy-costume.

6.4. Plug-in Hybrid Utility Factor Changes

CR generally supports EPA's proposed changes to the utility factor for plug-in hybrid electric vehicles (PHEVs). Real-world emissions from PHEVs are often significantly higher than the theoretical values estimated assuming optimum use conditions.[46] CR agrees with EPA adjusting their approach to better match real-world use data. CR does not take a position on which of the proposed utility factor curves is the best option. However, CR does recommend that EPA periodically update their analysis of real world PHEV usage as more vehicles are sold, and more data becomes available.

6.5. Elimination of Additional Credits for EVs

CR supports EPA eliminating credits for EVs that could allow vehicles to achieve compliance values below 0g/mi. These credit provisions were in place to capture real-world emissions benefits that were not captured by EPA's test cycle. They are not appropriate when applied to vehicles that already have eliminated all tailpipe emissions.

6.6. Inclusion of Maintenance and Repair Savings in Cost Benefit Analysis

CR supports EPA including maintenance and repair savings in their cost benefit analysis. CR's research has found that in real world operations BEVs and PHEVs can both deliver around 50% savings compared to conventional gasoline powered vehicles.[47] CR is in the process of updating this analysis with more recent data and will share the results with EPA once it is complete.

7. CR Supports Strong Consumer Protections for Batteries

CR appreciates the EPA's inclusion of provisions in the rule that would require consumer protections for batteries in EVs sold beginning in model year 2027 and beyond. When a consumer goes through the process of purchasing a new vehicle for their household, there is an expectation that their vehicle will maintain condition and reliability throughout its useful life. For consumers purchasing a zero-emission vehicle, these concerns can be exacerbated based on their lack of experience with the

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[46] *Real World Usage of Plug-In Hybrid Vehicles in the United States*, The International Council on Clean Transportation, December 20, 2022, https://theicct.org/publication/real-world-phev-us-dec22/.
[47] *New analysis from CR finds that the most popular electric vehicles cost less to own than the best-selling gas-powered vehicles in their class*, Consumer Reports, October 8, 2020, https://advocacy.consumerreports.org/press_release/new-analysis-from-cr-finds-that-the-most-popular-electric-vehicles-cost-less-to-own-than-the-best-selling-gas-powered-vehicles-in-their-class/.

technology and the lower general knowledge of EV technology compared to ICE vehicles, which consumers have had to deal with for decades. While existing data on EVs has found that battery failures are usually rare, it is critical that EPA maintains strong consumer protections to give customers continued peace of mind that the vehicle they purchase will operate as advertised throughout its lifespan.[48]

These provisions are especially important for consumers in the secondary vehicle market. Used cars make up about 70% of sales in the automotive market.[49] Further, lower income consumers are especially price sensitive to transportation costs and spend a disproportionate amount of their income on transportation.[50] As more EVs enter the secondary market in the coming years, it is imperative that consumers have protections against poorly designed or manufactured batteries that diminish in capacity or fail early. The most vulnerable populations at the forefront of climate and air quality hazards need consumer protections addressing the lifetime of the vehicle, its battery, and its reparability.

Additionally, while the cost of producing batteries continues to drop, the battery is still the most expensive part of an electric vehicle.[51] When shifting from gasoline to electricity, it is the battery that enables the electric vehicle to eliminate tailpipe pollution and reduce greenhouse gas and other pollutants. Therefore, reduced capacity or complete failure of the battery pack represent a significant risk to emissions reductions given the potentially high cost of a replacement. Strong corresponding consumer protections regarding durability, battery health and warranties are therefore critical to the emissions and economic success of EPA's multipollutant program.

EPA's proposal that new EVs and PHEVs maintain minimum performance requirements for vehicle's state of certified energy (SOCE) beginning at 80% SOCE for the first five years (or 62,000 miles) and 70% SOCE for eight years (or 100,000 miles) will give consumers greater trust that their batteries will maintain a reliable state of health standard for the useful life of the vehicle. CR also appreciates EPA's inclusion of

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[48] *New Study: How Long Do Electric Car Batteries Last?*, Recurrent, 2023, https://www.recurrentauto.com/research/how-long-do-ev-batteries-last.

[49] In 2022 there were 36.2 million used cars and 13.7 new cars sold, so 73% of vehicles sold were used cars in 2022. This number fluctuates from year to year, but tends to stay around 70% give or take a few percentage points. Sales data from AutoNews and NADA: https://www.autonews.com/used-cars/used-car-volume-hits-lowest-mark-nearly-decade and https://www.nada.org/nada/press-releases/nada-issues-analysis-2022-auto-sales-and-2023-sales-forecast

[50] *High Cost of Transportation in the United States*, Institute for Transportation and Development Policy, May 2019, https://www.itdp.org/2019/05/23/high-cost-transportation-united-states/.

[51] *Batteries For Electric Cars Speed Toward a Tipping Point*, Bloomberg, December 2020, https://www.bloomberg.com/news/articles/2020-12-16/electric-cars-are-about-to-be-as-cheap-as-gas-powered-models#xj4y7vzkg.

warranty provisions that cover the battery, and associated electric powertrain components of the vehicle, for eight years (or 80,000 miles.)

With the increased requirements surrounding battery health, it is imperative that consumers have the ability to monitor their battery's individual performance levels. CR appreciates the inclusion of language requiring accessible battery state-of-health monitors for light-duty vehicles in addition to provisions for strong testing procedures to confirm the accuracy of these monitors. Easily accessible and reliable battery state-of-health data will go a long way towards supporting a thriving used EV market.

CR urges the EPA to consider additional standards for vehicle batteries to maintain a strong state of certified range (SOCR) aligned with the California Air Resources Board's (CARB) Advanced Clean Cars II (ACC II) rule which requires that new vehicles sold maintain up to 80% certified range for 10 years (or 150,000 miles) to ensure consistent range-durability standards across states.

8. EPA Should Improve Consumer Information on the Window Sticker for EVs

If enacted, EPA's GHG rule will help support continued growth in EV sales. To help support consumers as they make the transition to EVs, CR asks that EPA open a separate rulemaking to update the consumer information that is provided on the window sticker for EVs. The EV market has evolved immensely in the years since the window sticker was last revised. Updating the sticker with more relevant information can help improve the EV buying experience. CR would suggest the following improvements to the data that is provided to consumers.

8.1. More Useful EV Range Information

As Car and Driver has recently highlighted, EPA's current testing for EV range does not always match with real world vehicle performance.[52] A big portion of the problem is the fact that EPA only publishes a combined city/highway EV range number. However, EVs tend to achieve shorter range at real world highway speeds, which is when range is most often relevant to consumers. Also, range is only estimated under ideal weather conditions, leaving consumers with no information about how their vehicle might perform in hot or cold weather. While a single combined number is generally useful in

[52] *Comparison of On-Road Highway Fuel Economy and All-Electric Range to Label Values: Are the Current Label Procedures Appropriate for Battery Electric Vehicles?*, SAE International, April 11, 2023, https://www.sae.org/publications/technical-papers/content/2023-01-0349/.

comparing different vehicles against each other, providing consumers with more information including highway range in both hot and cold weather would be most useful in helping consumers understand the true performance they can expect from their vehicle, and better determine if it will meet their needs.

8.2. Consider Alternatives to Mile Per Gallon Equivalent (MPGe)

While MPGe is somewhat useful in helping consumers understand how EVs compare with gas and hybrid vehicles in terms of efficiency, it's not a very useful metric for vehicle owners. EPA should reconsider the use of MPGe on the window sticker and explore replacing or supplementing it with a more useful efficiency metric. In general most modern EVs present efficiency in terms of miles per kilowatt hour on their trip odometers, which is more consistent with how consumers are used to thinking about efficiency in terms of miles per gallon.

8.3. Provide EV Battery Size Information

While manufacturers may choose to include battery size information on the window sticker, it is not required. CR would recommend that manufactures provide the usable battery capacity of the vehicle on the window sticker. This also provides useful information for comparison between vehicles. Two separate vehicles might both have the same rated range, but achieve it with wildly different battery sizes. Providing that information to consumers can help them potentially consider more efficient options. There may also be some value in manufacturers also providing the basic battery chemistry details as well given that certain types of batteries may perform differently under different conditions. This type of information may become even more important as the market explores more diversity in battery chemistries.

8.4. Develop and Present Standard Metrics for Charging Speeds

Charging speed is becoming an increasingly important differentiator in terms of the convenience of driving an EV longer distances. While the range of EVs is still important, it is charging speed that can most affect how convenient longer trips in EVs will be. CR suggests that EPA develop standardized testing and metrics for EVs' DC-fast charging speeds. Currently automakers provide consumers with cherry-picked charging speeds, often based upon narrow slices of the vehicle's charging curve under ideal conditions.

CR would suggest a standardized test for fast charging speed measuring the time to charge from 10% to 80% state of charge.

However, that metric is only part of the story because it doesn't tell how many miles of range are gained over that time. A separate metric should also be included that measures the average numbers of miles of range gained over a set period of time, potentially average miles per 10 minutes of charging or average miles per minute gained from 10%-80% state of charge. This will give consumers a more standardized way to understand how long they will have to spend charging to cover a specific distance using public fast charging.

Level 2 charging speeds can also be important information, but more information should be provided to consumers about the conditions under which the test was performed. At a minimum EPA should require the amperage of the charger needed to achieve the presented level 2 charging times be provided.

9. Conclusions

Consumer Reports (CR) thanks EPA for their efforts to set strong multi-pollutant emissions standards that lower the cost of transportation for American families and protects the climate and public health. There are many outside interests that want to see this rule weakened. EPA should not bow to this pressure and should put forward a strong rule that puts what's good for consumers and the environment ahead of special interests. Strong multi-pollutant standards will save consumers money, improve public health, and help protect our climate. CR asks that EPA finalize the strongest possible standards which are at least as stringent as "Alternative 1" in order to maximize benefits to consumers and the environment.

Respectfully Submitted,

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