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Beyond environmental benefits

BUILDING A BROADER CONSUMER NARRATIVE FOR THE ZERO-EMISSION VEHICLE TRANSITION

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The International Zero-Emission Vehicle Alliance is a network of leading national and subnational governments demonstrating their deep commitment to accelerating the transition to zero-emission vehicles within their markets and globally. Its members include Austria, Baden-Württemberg, British Columbia, California, Canada, Chile, Connecticut, Costa Rica, Germany, Maryland, Massachusetts, the Netherlands, New Jersey, New York, New Zealand, Norway, Oregon, Québec, Rhode Island, Switzerland, the United Kingdom, Vermont, and Washington. The members collaborate through discussion of challenges, lessons learned, and opportunities; hosting events with governments and the private sector; and commissioning research on the most pressing issues in the ZEV transition.

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Executive summary

An accelerated transition to zero-emission vehicles (ZEVs) is contingent on active consumer acceptance for the new vehicle technology. This study supports efforts to create a compelling, positive consumer narrative around ZEVs by emphasizing the perceived relative advantages of ZEVs over combustion engine vehicles. To do this, we conducted a review of consumer survey literature on ZEVs with a focus on their perceived benefits. Despite the ubiquity of discussions about the environmental benefits of ZEVs, our analysis indicated that these benefits have a declining impact on ZEV uptake. Therefore, the study specifically examined *non-environmental benefits* that policymakers might leverage to create a broader positive narrative for consumers. Key findings from the review and recommendations for ZEV promotion campaigns were as follows:

Cost savings were by far the most cited and top-rated perceived benefit across the consumer review literature. Further, there was some evidence that fuel cost savings may have better traction with consumers than long-term or life-cycle cost savings.

The superior driving experience offered by ZEVs mattered to consumers. Consumers highly rated the enjoyment or comfort of driving a ZEV as a purchase consideration. Consumer survey literature often associated ZEVs with performance characteristics such as faster acceleration as well as lack of noise. A few studies also cited safety as a perceived benefit, potentially on account of the higher dynamic stability offered by a heavy battery at the bottom of the car.

Drivers found ZEVs more convenient to use as they negate the need for frequent trips to a gas station and require less maintenance. Current ZEV users highly rated the convenience of being able to charge a vehicle at home and start the day with the equivalent of a full tank. Further, reductions in maintenance requirements were considered a benefit both in terms of convenience as well as cost savings.

Our review also found that, **between current and potential users, there was a gap in the perception of ZEV benefits linked to enjoyment or convenience**. In part, this gap may reflect an **awareness issue**, wherein certain benefits may only be fully appreciated upon actual use.

Our review points toward the following considerations for policymakers engaged in designing ZEV promotion or awareness campaigns:

- **Focusing on fuel cost savings**, particularly in light of the declining influence of environmental considerations on users adopting ZEVs.
- **Emphasizing the enjoyment, comfort, and convenience** of using ZEVs.
- **Employing experience-based elements such as test rides and testimonials from and interactions with current users** to address potential awareness gaps.

Contents

Introduction: Looking beyond the environmental benefits of zero-emission vehicles

An accelerated transition to zero-emission vehicles (ZEVs) requires, among other factors, an active acceptance of the new technology by consumers choosing their next vehicle.[1] Consumer acceptance can be linked to the dissemination of a positive narrative around ZEVs that emphasizes their relative benefits in a compelling way and reduces the valence of their perceived disadvantages. Developing an empirical understanding of which ZEV attributes potential buyers prioritize and current owners value most provides an effective foundation for building this positive narrative.

The fundamental connection between user acceptance and ZEV uptake is well recognized in the literature on consumer preferences and surveys relating to the purchase of ZEVs. These studies typically analyze factors including the likelihood that consumers will purchase or consider purchasing a ZEV, barriers to uptake, understanding of key attributes, and support for government policies that encourage ZEV adoption. The findings often vary depending on the geography, demography, or methodology used in the analyses. In recent years, researchers have also conducted multiple systematic reviews of consumer survey studies with the objective of synthesizing the findings (e.g., Bryła et al., 2023; Wang & Witlox, 2025). However, to our knowledge, a systematic review focused on the perceived benefits of ZEVs as reported in consumer surveys has not been conducted to date. This study addresses this literature gap.

For the purpose of this study, we define perceived benefits as the relative advantages of ZEVs over internal combustion engine vehicles (ICEVs), that is, the innate aspects of ZEVs that are perceived to be better than ICEVs (Featherman et al., 2021). In doing so, we exclude benefits that accrue through specific policy measures, such as purchase incentives, free parking, or reduced purchase or operation taxes, because these are externally introduced to incentivize ZEV uptake, are not market agnostic, and are not necessarily permanent.

This paper also looks beyond the environmental benefits of ZEVs. The clean air and climate benefits of ZEVs are widely understood given that emission reductions are, by definition, associated with zero-emission vehicles. These benefits have been much discussed in consumer survey literature since the early stages of the ZEV transition (e.g., Plötz et al., 2014). There is also evidence that the role of these environmental benefits in inducing EV uptake is declining. Annual consumer surveys by Plug in America between 2021 and 2025 indicated a steady decline in the percentage of electric vehicle (EV) owners for whom environmental considerations rank as the most important purchase consideration, as shown in Figure 1 (Plug in America, 2021, 2022, 2023, 2024, 2025). In line with this trend, a 2025 systematic review of ZEV consumer survey literature focused exclusively on the role of environmental benefits in EV uptake; it concluded that the connection between environmental considerations and EV adoption is "significant but weak" (Anwar & Khalid, 2025, p. 206).

1 For the purposes of this study, the term zero-emission vehicles (ZEVs) is used primarily to refer to battery electric vehicles (BEVs). While we also included plug-in hybrid vehicles (PHEVs) and fuel cell electric vehicles (FCEVs) when these were categorized as ZEVs or EVs in specific studies, we did not seek out insights on those technologies in isolation. Further, much of the literature reviewed in this report used the term EVs to refer to BEVs. As such, we use the three terms—ZEVs, BEVs, and EVs—interchangeably within the report. Furthermore, all references to vehicles pertain to passenger cars unless otherwise specified.

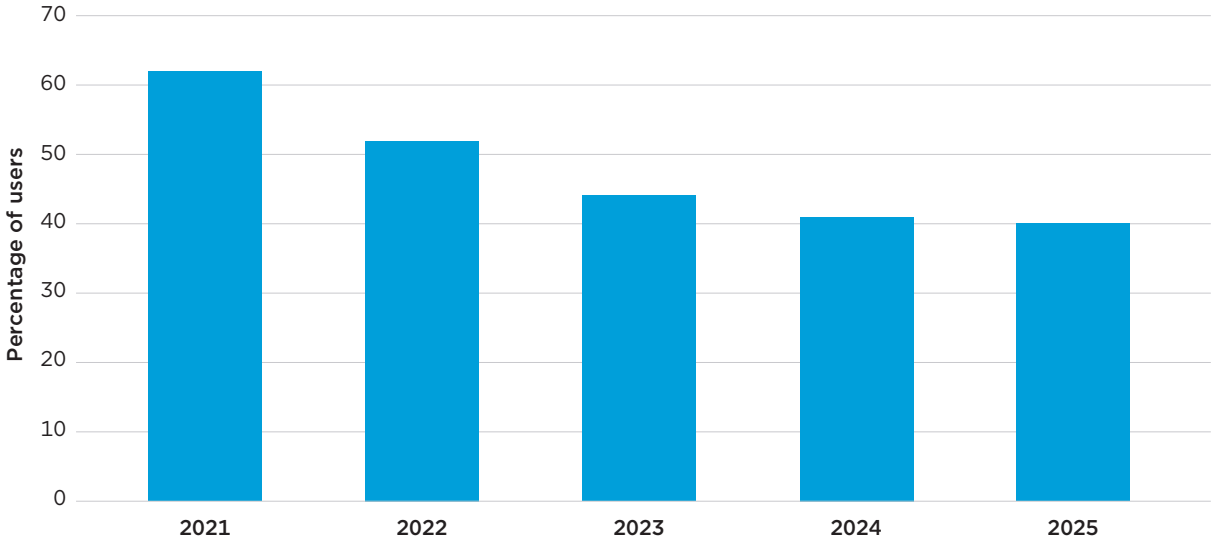

Figure 1. Percentage of EV owners for whom clean air/environmental reasons were the "most important" purchase consideration. Data are from Plug in America (2021, 2022, 2023, 2024, 2025).

This paper thus analyzes the wider range of perceived benefits that could be employed to build a positive consumer narrative for ZEVs. In doing so, we acknowledge that environmental benefits, while still important, may not be a sufficient argument on their own to induce a switch from an ICEV to a ZEV, and a focus on wider perceived benefits could be helpful for awareness campaigns.

Against this background, we conducted a review of ZEV consumer survey literature with a focus on the non-environmental perceived benefits of ZEVs. The next section provides a brief overview of the methodology adopted for conducting the review. The subsequent section lays out the findings from the analysis concerning the key perceived benefits cited in the literature and their relative influence on ZEV uptake. This is followed by a discussion of the perceived benefits for different consumer segments. The paper concludes with some key takeaways from the findings and an assessment of how these findings may inform future consumer awareness efforts, focusing on which positive messages about ZEVs are most likely to be persuasive to potential consumers.

Approach and methodology

For this study, we reviewed existing consumer survey literature to provide insights on the perceived benefits of ZEVs. The literature review was broadly informed by the principles of Preferred Reporting Items for Systematic reviews and Meta-Analyses (n.d.). These principles involve adopting a well-defined set of steps relating to data collection (including data sources, search criteria, and boundary conditions), screening, analysis, and reporting. They also entail providing robust justifications for the decisions made at different steps and acknowledging study limitations where applicable.

Our review covered both academic and gray literature (studies published outside of academic journals and academic conference proceedings), and we used the online database SCOPUS (n.d.) to search for academic literature and Google web search for gray literature. The search criteria included possible combinations of different synonyms for ZEVs (electric vehicles, electric cars, etc.) and consumers (users, drivers, buyers, etc.). We considered studies published between January

2021 and mid-April 2025, when the search was conducted. Altogether, we selected 43 studies—27 academic papers and 16 consumer survey reports—for the review. Table 1 provides a summary of the selected papers. Further details on the methodology, including the screening process for selected studies, are provided in Appendix A. The full list of reviewed studies is provided in Appendix B.

Table 1. Summary of documents included in the analysis

Document type	Academic papers (n = 27, average sample size ≈ 600)		Consumer survey reports (n = 16, average sample size ≈ 7200)	
Year of publication	2021	**5**	2021	**3**
	2022	**7**	2022	**4**
	2023	**2**	2023	**3**
	2024	**7**	2024	**6**
	2025	**6**	2025	**0**
Countries covered in the survey	China	**8**	United States	**8**
	India	**7**	Australia	**2**
	Australia	**2**	Multiple countries	**3**
	Multiple countries	**2**	Others (included Indonesia, Netherlands, and the United Kingdom)	**3**
	Others (included Canada, Greece, Hungary, Italy, Saudi Arabia, Singapore, Thailand, and the United States)	**8**		
Consumer type covered in the survey	Potential[a]	**20**	Potential	**6**
	Existing	**2**	Existing	**7[b]**
	Both	**5**	Both	**2**
			Unknown	**1**

[a] Multiple studies did not explicitly rule out existing users within their survey but did indicate that the survey targeted potential users overall. Further, the definition of potential users (users who currently do not own or use an EV) varied across studies, with some including only those who actually stated an intent to purchase an electric vehicle in the future, while others included all current non-users.

[b] Some of these studies also included potential users, but the studies stated that the discussion of perceived benefits was based on the opinions of existing users only.

The perceived benefits[2] of ZEVs do not feature in a large section of consumer survey studies, particularly within academic literature. Of the 145 academic papers and 35 consumer survey reports shortlisted as relevant for the review, just 27 academic papers (≈ 20%) and 16 reports (≈ 50%) discussed consumer opinions on the perceived benefits or relative advantages of ZEVs, some featuring meaningful treatments of the topic and others merely mentioning it. There was an appreciable preoccupation within the literature with the barriers to ZEV uptake given that understanding these barriers is crucial for accelerating the ZEV transition. Through its focus on perceived benefits, this paper helps balance the literature and the narrative around pathways to higher consumer confidence in ZEVs.

2 Various studies also refer to the perceived benefits of ZEVs as encouraging factors or reasons for ZEV adoption.

Perceived benefits of zero-emission vehicles: Findings from literature review

The literature review indicated that the non-environmental perceived benefits cited by consumers fell into five broad categories. These were cost savings, lack of noise, ease or enjoyment of driving, convenience, and safety. Figure 2 shows how frequently benefits falling into these five categories were cited across the 43 studies reviewed. Cost savings were the most commonly cited benefit in the literature, appearing in almost 85% of the studies, while safety was the least cited among these five. In most studies, however, lists of perceived benefits were not compiled based on an open-response question.[3] As such, the frequency of citation reflects the interest and intent of authors to discuss certain benefits, as well as the opinion of those responding to the survey. A discussion on these five major categories of benefits is provided in the following sections.

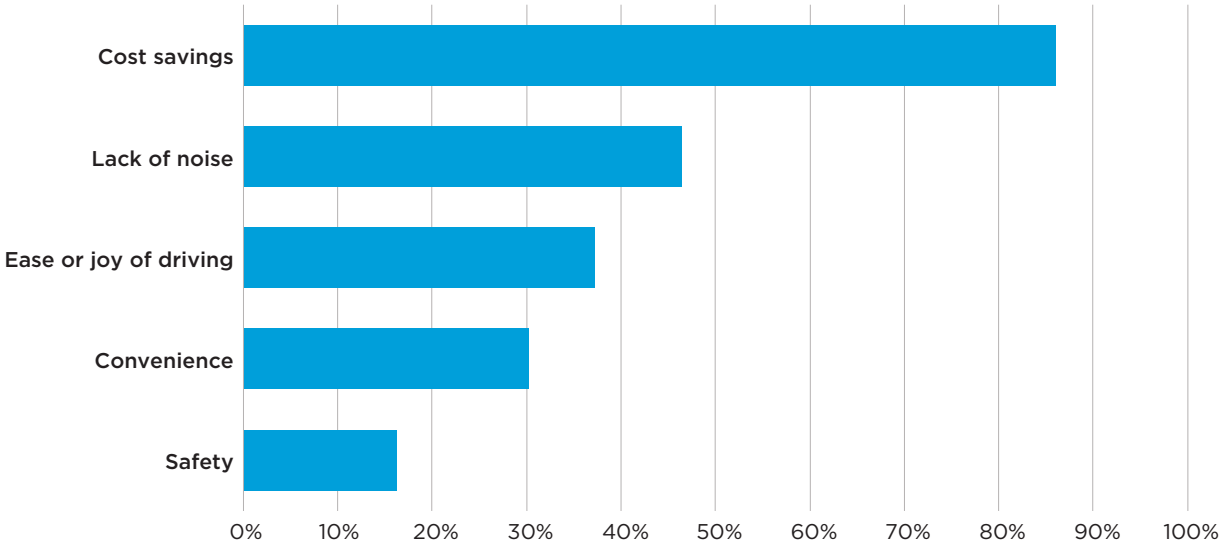

Figure 2. Percentage of studies (n=43) citing key perceived benefits of electric vehicles

Cost savings

In the literature, cost savings were variously described as savings in operational or fuel costs (e.g., Loengbudnark et al., 2022; Zheng et al., 2022), maintenance cost savings (e.g., Lanzini, 2024), savings in the form of reductions in household expenditures on transportation (e.g., Jaiswal et al., 2021), as well as savings over the lifetime of the vehicle (e.g., CR Survey Research Department, 2022; Nagpal et al., 2023).

Cost savings were the most frequently discussed non-environmental perceived benefit within the literature. For example, a 2019 survey of 400 potential users in Greece revealed that, following environmental benefits, low operating cost was the strongest incentive for purchasing an EV (Lioutas et al., 2021). Similarly, a survey of 160 existing and potential EV users in India showed that

3 The extent of this is not fully clear. However, almost all academic papers discussed perceived benefits within a framework of fixed questions focused on one or more benefits (e.g., "how important is cost savings as a factor to you?"). Within the gray literature, the discussion was typically comparative, with the relative influence of different benefits clearly laid out. There too, however, it was not made clear whether survey responders were asked to rate or rank a pre-determined list of benefits or if they were asked to independently generate a list of the benefits as they perceived them.

fuel and maintenance cost savings were highly influential considerations in the purchase of EVs (Viswanathan, 2024). Another survey of 1,200 existing users in the U.S. state of Maine revealed that saving money on gasoline was the second most important reason for users to buy or lease an EV, following the reduced environmental impact of EVs (Natural Resources Council of Maine, 2022). Notably, a 2020 study based on a survey of 367 potential EV users in China concluded that financial savings have a greater impact on users' value perception of EVs than any other aspects, including environmental benefits (Hu et al., 2023).

Lack of noise

Lack of noise was another distinct advantage valued by EV users. Lack of noise was variously described in the literature as a comfort factor (e.g., Nagpal et al., 2023), a psychological benefit (e.g., Hu et al., 2024), and an aspect that increases the pleasure of driving the car (McCarthy et al., 2025). Noise reduction may be particularly compelling to users living in urban environments, where travel speeds are low and powertrain noise constitutes the majority of overall vehicle noise; with quieter powertrains, EVs create less noise than ICEVs (Arenas, 2025).

A 2023 survey of 1,200 EV users and non-users in the U.S. state of Indiana revealed that lack of noise was the second highest perceived advantage of using an EV after cost savings (Moras et al., 2024). A 2023 survey of potential EV users in Indonesia showed similar results (PricewaterhouseCoopers, 2023). Another survey of over 23,000 existing EV users across 18 countries found that lack of noise was the third most-cited reason for buying an EV after cost savings and climate benefits (Haugneland, 2024). Moreover, in a survey of potential EV users in Tamil Nadu, India, low noise ranked higher than cost savings as a stated reason for EV adoption (Nagpal et al., 2023).

Ease or enjoyment of driving

Another frequently cited benefit was the ease or joy of driving an EV. The research indicated that associations of EVs with enjoyment and fun were often expressed in terms of EVs' fast acceleration or performance (e.g., CR Survey Research Department, 2022; McCarthy et al., 2025). For instance, in a series of two studies conducted with a total of 12,000 existing EV users in the United States in 2021 and 2023, "fun to drive" was the third most important consideration behind users' purchase decisions, ahead of both cost savings and convenience (Plug in America, 2022, 2023). Similarly, in a 2019 survey of 164 potential users in the United States, consumers highly valued the "driving excitement" associated with EVs (Featherman et al., 2021, p. 5). In a study focused specifically on "Generation Z" user attitudes toward EV uptake, a survey of 108 university students in Hungary revealed that "enjoyment and perceived ease of use" was the highest-rated relative advantage of EVs (Kovács & Wolf, 2025, p. 98).

Convenience

The literature cited a diverse range of benefits that could broadly be categorized as pertaining to convenience. These were typically expressed in the form of time savings accrued from not having to make trips to the gas station (e.g., Dubey et al., 2025; Featherman et al., 2021) or the ability to charge at home (e.g., Vijayalakshmi et al., 2024). Furthermore, users also frequently cited less periodic maintenance as a benefit both in terms of convenience as well as cost savings (e.g., Deloitte, 2023; Sahoo et al., 2022). For instance, in a study conducted with 432 potential and current EV users, users rated reduced maintenance requirements as the highest personal positive motivation for EV purchase, ahead of cost savings (Sahoo et al., 2022).

The findings indicating that users value the time-savings associated with ZEVs may be counterintuitive: compared with refueling a petrol or diesel car at a gas station, it takes more time to charge an EV at a public charging station, a relative difference that is popularly perceived as a key barrier to EV uptake. However, this comparison largely applies to users who primarily or frequently depend on public rather than private charging infrastructure, such as users who are traveling long distances or who lack access to home charging. But for those with access to home charging who do not regularly commute distances in excess of 150–200 miles, EVs can be relatively more convenient and time-efficient than ICEVs. EV users can begin their day with a fully charged vehicle, and they do not have to make the regular (typically one or more times per week) trips to the gas station required of ICEV users. Prior ICCT research has shown that these users comprise a significant segment of commuters: in 2023, 88% of battery electric vehicle (BEV) drivers in the United States had access to home charging (Pierce & Slowik, 2024), and in 2021, 75% of EV owners in France and 79% in Germany in 2021 had home charging access (Rajon Bernard et al., 2022).

Safety

In some of the literature, users stated that they perceived EVs to be safer to use than ICEVs and cited this feature as a benefit (e.g., Gupta et al., 2024; Lashram & Alkabaa, 2024). Although no studies analyzed which safety features of EVs were rated higher than ICEVs, one EV user interviewed in an ICCT study stated, "their heavier bottoms (due to the battery) make it 'practically impossible for the car to rollover' in a crash" (Dubey et al., 2025: p. 19). In a 2021 survey of 3,000 potential users in Australia, the safety features of EVs were rated as the second highest encouraging factor ahead of the environmental benefits and convenience of charging at home (Electric Vehicle Council & Carsales, 2021).

Relative influence of perceived benefits: Implications for consumer narratives

Beyond identifying which benefits consumers cited, several studies provided insights into the relative importance of different benefits and how these perceptions varied across user groups. Understanding these patterns can inform how policymakers and advocates design effective consumer messaging around ZEVs.

Relative ranking of perceived benefits

The studies reviewed for this paper employed diverse methods and parameters for the consumer surveys. In addition, the survey samples in most studies covered a wide range of user groups categorized by gender or age, with users' perceived benefits typically reported at an aggregate level. This made it challenging to conduct a robust, synthesized assessment of the benefits most influential to consumers and an examination of how these perceptions differ across user groups.

Bearing such limitations in mind, Table 2 compiles the relative ranking of benefits from studies that analyzed at least two of the five major benefits within a comparable framework. Studies were excluded if they discussed multiple benefits in separate contexts (e.g., cost savings within one set of factors and convenience within another), making their relative influence on consumers not directly comparable. Although the subset of benefits covered in different studies varied, we were still able to draw several key inferences from the literature:

- Cost savings were the highest-rated benefit in the majority of studies.[4] Further, the high ranking of this benefit cut across potential and current users. Considering that cost savings were also the most frequently cited benefit, leading with cost savings would likely be a helpful approach to designing positive consumer narratives.

- Compared with potential users, current EV users seemed to give higher rankings to benefits linked to ease or joy of driving. This could indicate a potential awareness gap whereby usage or experience with the technology accords a higher appreciation of some of its positive characteristics. These findings suggest that it may be beneficial to adopt experience-based campaigns (e.g., test drives) that can help bridge the awareness gap among potential EV users.

- Lack of noise was a distinct perceived benefit that users in a few studies rated higher than cost savings. Viewed together with joy of driving, this indicates that awareness campaigns could consider highlighting how EVs overall make for a more comfortable and enjoyable ride.

4 As discussed previously, this comparison does not consider environmental benefits, which in some (but not all) studies ranked higher than cost savings.

Table 2. Relative influence of perceived benefits

Year of survey	Country of survey	Sample size [a]	User type [b]	Rank of perceived benefit (if discussed), 1 being highest					Study reference
				Cost savings	Lack of noise	Ease or joy of driving	Convenience	Safety	
2021	Australia	3,000	Potential	1		3	4	2	Electric Vehicle Council & Carsales (2021)
2024		2,000	Potential	1				2	Dawes (2024)
2020	India	500	Potential		1	3		2	Gupta et al. (2024)
Unclear		150	Both	1		2			Viswanathan (2024)
Unclear		100	Potential	1		2	3		Vijayalakshmi et al. (2024)
Unclear		450	Both	2	3		1		Sahoo et al. (2022)
Unclear		Unclear	Potential	2	1		3		Nagpal et al. (2023)
2023	Indonesia	Unclear	Potential	1	2	3			PricewaterhouseCoopers (2023)
Unclear	Italy	1,500	Potential	1	2				Lanzini (2024)
2022	Multiple (24)	26,000	Unclear	1		2	2		Deloitte (2023)
2024	Multiple (18)	23,200	Current	1	2				Haugneland (2024)
2020	Netherlands	1,700	Current	1		2			Association of Electric Vehicle Drivers (2021)
2023	Saudi Arabia	650	Potential	1				2	Lashram & Alkabaa (2024)
2024	United Kingdom	750	Potential	1			2		The Consumer Council (2024)
2019	United States	150	Potential	2		1			Featherman et al. (2021)
2020		4,000	Current	2		1	3		Plug in America (2021)
2021		8,000	Current	2		1	3		Plug in America (2022)
2022		1,200	Current	3	1	2			Natural Resources Council of Maine (2022)
2022		8,000	Potential	1	2	3			CR Survey Research Department (2022)
2022		2,200	Both	1			2		CarGurus (2022)
2023		4,000	Current	2		1	3		Shell Recharge (2023)
2023		1,200	Current	1	2	3	5	4	Moras et al. (2024)
			Potential	1	2	3	5	4	
2024		3,300	Current	1		2	4	3	Plug in America (2024)

[a] Sample sizes were rounded off to the nearest 50. These sizes reflect the total valid sample for the consumer survey and not necessarily the number of survey participants who specifically responded to questions related to perceived benefits.

[b] This reflects the type of users covered in the study or, in studies covering both potential and current users, which group's opinions were specifically cited with regard to the perceived benefits.

A few studies also reported on the comparative influences of different benefits across user groups and geographies. These findings offer valuable insights for tailoring consumer narratives, as summarized in the following sections.

Potential versus current users

In a 2023 survey of 1,200 respondents conducted in the United States (Moras et al., 2024), current and potential users were asked to rate various perceived advantages of EVs. A summary of their responses is presented in Table 3. There was a significant gap among user groups in the perception of most benefits, with lack of noise showing the narrowest gap. Potential users consistently rated all benefits lower than current users, with particularly large differences observed for maintenance costs (17% vs. 78%), refueling convenience (21% vs. 59%), and driving comfort (30% vs. 78%).

Table 3. Differences in perceived benefits between current and potential EV users

EV characteristic	Potential EV users who consider the characteristic as a major advantage	Current EV users who consider the characteristic as a major advantage
Fuel cost	54%	85%
Maintenance cost	17%	78%
Life cycle cost	17%	65%
Lack of noise	52%	79%
Refueling convenience	21%	59%
Safety	22%	73%
Driving comfort	30%	78%

Note: Figures are rounded to the nearest integer. Adapted from *Electric Vehicles: Public Perceptions, Expectations, and Willingness-to-Pay* (Joint Transportation Research Program Publication No. FHWA/IN/JTRP-2024/25), by B. C. K. Moras, X. Chen, K. C. Wijaya, S. Ukkusuri, S. Labi, & K. Gkritza, 2024, Purdue University (https://doi.org/10.5703/1288284317766).

Furthermore, while around 54% of potential users considered fuel savings to be a significant benefit of EVs, only 17% considered the total cost of ownership to be a major benefit. This may indicate two possibilities. It could suggest that there is an awareness gap regarding the low operational costs of EVs, which result in lower overall costs over the lifetime of the vehicle compared with ICEVs. Alternatively, it might suggest that there are contextual factors impacting the upfront costs for different consumers (e.g., applicability or availability of purchase incentives).

These findings suggest that certain benefits—such as reduced maintenance costs, driving comfort, and convenience of home charging—may only be fully appreciated upon actual usage of an EV. As mentioned earlier, these findings indicate that ZEV awareness campaigns may benefit from focusing on experiential approaches that can enhance the appreciation of these relative advantages by potential users.

Cross-country comparison

A 2022 survey of 26,000 EV users[5] reported the ranking of various encouraging factors for EV users across 24 countries, as shown in Table 4 (Deloitte, 2023). Of the three main benefits discussed within the report (shown in the first three rows of the table), lower fuel costs emerged as the primary driver for EV adoption, ranking first in each of the 10 countries shown. Better driving experience and less maintenance showed more variation across countries, with average rankings of 4.1 for both factors. The consistent prioritization of fuel cost savings across different geographies and markets indicates that this benefit has broad appeal and may serve as an effective anchor for consumer messaging across diverse markets.

5 The report did not specify whether the respondents were current or potential EV users.

Table 4. Cross-country comparison of perceived benefits

Factors	Austria	Belgium	France	Germany	Italy	Poland	South Africa	Spain	Turkey	United Kingdom	Average
Lower fuel costs	1	1	1	1	1	1	1	1	1	1	**1**
Better driving experience	6	5	5	4	7	2	3	4	2	3	**4.1**
Less maintenance	4	2	3	5	4	6	4	5	3	5	**4.1**
Concern about climate change	3	6	4	2	2	4	2	2	6	2	**3.3**
Government incentives / subsidies / stimulus programs	2	4	2	3	3	5	8	3	4	4	**3.8**
Potential for extra taxes/levies applied to internal combustion vehicles	4	3	6	6	5	7	7	7	5	6	**5.6**
Concern about personal health	8	7	7	7	6	3	5	6	7	7	**6.3**
Ability to use the vehicle as a backup battery / power source (e.g., for home)	7	8	8	8	8	8	6	8	8	8	**7.7**
Peer pressure	9	9	9	9	9	9	9	9	9	9	**9**

Note: In the ranking above, 1 represents the highest ranking and 10 the lowest ranking. From *2023 Global Automotive Consumer Study*, by Harald Proff, 2023, Deloitte (https://www.deloitte.com/southeast-asia/en/Industries/automotive/perspectives/global-automotive-consumer-study-2023.html).

Gender

A 2022 study of 8,000 potential users in the United States examined responses to different encouraging factors for buying or leasing an EV by gender (CR Survey Research Department, 2022). A summary of the responses is provided in Table 5. There were not significance differences between men and women for most benefits. However, male respondents did place a higher emphasis on the acceleration capabilities of EVs compared with female respondents (11% vs. 5%). Cost savings emerged as the most cited benefit for both genders, with similar percentages citing various cost-related advantages. This suggests that core messaging around fuel and maintenance cost savings can be broadly effective across gender demographics without requiring significant differentiation.

Table 5. Gender-based comparison of perceived benefits

Perceived benefit		Percentage of users who cite the benefit as an encouraging factor (%)	
		Male	Female
Cost savings	Costs less to charge an EV than fuel a gasoline-powered ICEV	33	32
	Lower maintenance costs of EV than gasoline-powered ICEVs	28	28
	Lower overall costs over the lifetime of the EV compared with a gasoline-powered ICEV	29	26
Noise	No engine noise	11	9
Ease or enjoyment of driving	EVs have better acceleration than gasoline-powered ICEVs	11	5
	Attractive styling or other aesthetic features of EVs	7	5

Note: Benefit categories in the left-most column are author elaboration. Adapted from *Battery Electric Vehicles Survey by Gender Differences: A Nationally Representative Multi-Mode Survey*, by CR Survey Research Department, August 2022 (https://advocacy.consumerreports.org/wp-content/uploads/2022/08/2022-Battery-Electric-Vehicles_by-gender-1.pdf).

Discussion and conclusions

This study conducted a review of ZEV consumer survey literature published between January 2021 and April 2025, focusing on consumer perceptions of the non-environmental benefits of ZEVs to offer insights for creating a broader and positive consumer narrative for the transition. We identified five major categories of non-environmental perceived benefits: cost savings, lack of noise, ease or enjoyment of driving, convenience, and safety. Our results support the following key findings and considerations for governments or other stakeholders designing ZEV awareness campaigns aimed at persuading potential users to switch to ZEVs.

Cost savings were key for consumers, with fuel-cost savings having better resonance than life-cycle cost savings. Cost savings emerged as the most-cited non-environmental benefit for all categories of users across countries, widely ranked as the top-rated perceived benefit across the majority of consumer surveys reviewed for this study. Further, although limited insights are available, our results suggest that a focus on direct fuel cost savings may have better traction with consumers than focusing on savings over the lifetime of the vehicle (total cost of ownership) or long-term financial benefits. In particular, there is evidence that fuel cost savings had a greater sway over potential consumers, while current users were relatively more appreciative of cost savings over the lifetime of the vehicle.

Consumers valued the enhanced comfort, enjoyment, and potential safety that EVs provide. Consumers viewed driving EVs as more comfortable, fun, and enjoyable compared with driving ICEVs. Some of these factors were linked to performance characteristics, such as faster acceleration, while others, such as lack of noise, were considered distinct and highly rated benefits in and of themselves. There is also evidence in the literature of that users perceived EVs to be safer vehicles than ICEVs, potentially because the heavy batteries give EVs heavier bottoms, thereby making them more dynamically stable.

Consumers deemed EVs to be more convenient to use than ICEVs. Users valued the convenience and time savings associated with being able to charge their car at home and avoid frequent trips

to gas stations. This benefit particularly applied to a significant section of consumers who have (potential) access to home charging and who do not regularly make long trips, therefore enabling them to avoid heavily relying on public charging. Furthermore, consumers valued that EVs require less frequent maintenance, seeing this as a benefit both in terms of convenience as well as cost savings.

Based on these findings, we offer the following considerations for policymakers designing ZEV awareness and promotion campaigns:

- Policymakers can consider campaigns that make **fuel-cost savings the key theme around which to create positive narrative**. Although emphasizing fuel cost savings remains open to counternarratives about high upfront cost, it also has the potential to be direct, crisp, and more appealing to potential users than narratives around savings in life-cycle costs.

- **Stressing the benefits of convenience and enjoyment would be helpful for campaigns that could employ experience-based strategies to address any awareness gaps.** Our results suggested that current EV users valued certain benefits—such as driving comfort and convenience of charging at home—more than potential users. While this could indicate that current EV drivers have specific preferences concerning what they expect from their cars, it might also represent an awareness issue whereby one may only fully appreciate these benefits upon actual use. Insofar as this is an awareness issue, policymakers could consider focusing on **experience-based campaigns, such as test rides, and testimonials from current users**.

- Policymakers can consider tailoring campaigns by **zeroing in on different benefits for different consumer segments**. For instance, suburban or rural users with easy (potential) access to home charging would likely appreciate refueling convenience element more than urban users living in multi-floor apartments. Campaigns focusing on younger users could zero in on the fun and enjoyment accorded by better performance characteristics of ZEVs. Within regions or markets where safety is a major concern, such as in rural areas with narrow roads, policymakers might design campaigns focusing on the safety of ZEVs.

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Appendix A: Methodology for literature review

The study aimed to cover both academic and gray literature. Accordingly, the search was conducted on SCOPUS to cover academic literature and Google Web Search for gray literature. In light of the different search capabilities offered by the two platforms, we used different variations of search criteria, as explained next.

For SCOPUS, we conducted a search for all articles bearing the following keywords in the article of the title.

> *All in title – ("electric vehicle" OR "zero emission vehicle" OR "zero-emission vehicle" OR "zero-emission-vehicle" OR "EV" OR "BEV" OR "ZEV") AND (consumer OR user OR driver OR buyer)*

These search criteria, which used essentially all possible combinations of similar terms for EVs and consumers, allowed us to find a wide range of studies that examined EV users' attitudes, behaviors, and preferences.

For Google Web Search, we used the following keywords with an additional filter of "filetype:PDF" so as to directly return publicly available gray literature, and the top 50 results of each search were used to shortlist articles. Here, we used a more specific search criterion than in case of SCOPUS to ensure that the results returned were relevant. We assumed that Google's internal algorithm would ensure the results reflected commonly understood variations of the search terms, such as "attitude" and "preference."

> *"Electric vehicles consumer survey study"; Electric vehicles consumer survey report"; "Electric vehicles user survey study"; "Electric vehicles user survey report"; "Electric vehicles driver survey study"; "Electric vehicles driver survey report"; "Electric vehicles consumer preference study"; "Electric vehicles consumer preference report"; "Electric vehicles user preference study"; "Electric vehicles user preference report"; "Electric vehicles driver preference study"; "Electric vehicles driver preference report"; "Electric vehicles consumer purchase study"; "Electric vehicles consumer purchase report"; "Electric vehicles user purchase study"; "Electric vehicles user purchase report"; "Electric vehicles driver purchase study"; "Electric vehicles driver purchase report"*

We selected January 2021 as the early cutoff to reflect the substantive uptick in EV sales shares globally from 4.4% in 2020 to 9.3% in 2021 (International Energy Agency, 2025). We conducted the search in mid-April 2025 and considered all articles published after January 2021. We examined all accessible studies and reports returned by the search ($n \approx 900$) for spurious or irrelevant articles that were not related to this study's objective, omitting any that we found at the outset. We screened the resulting list of articles based on the following two parameters:

- Is the study based on primary consumer survey data collected as part of the study?
- Does the study at least consider cars within the range of vehicle segments it examines?

This stage of screening returned a total of 145 academic papers (published either in peer-reviewed journals or conference proceedings) and 35 reports (published by research organizations or consumer forums) as shown in Figure A1. These were subjected to a secondary screening that

examined whether the paper specifically contained any discussion on perceived benefits. We selected for the review the academic papers (27) and reports (16) that passed this screening.

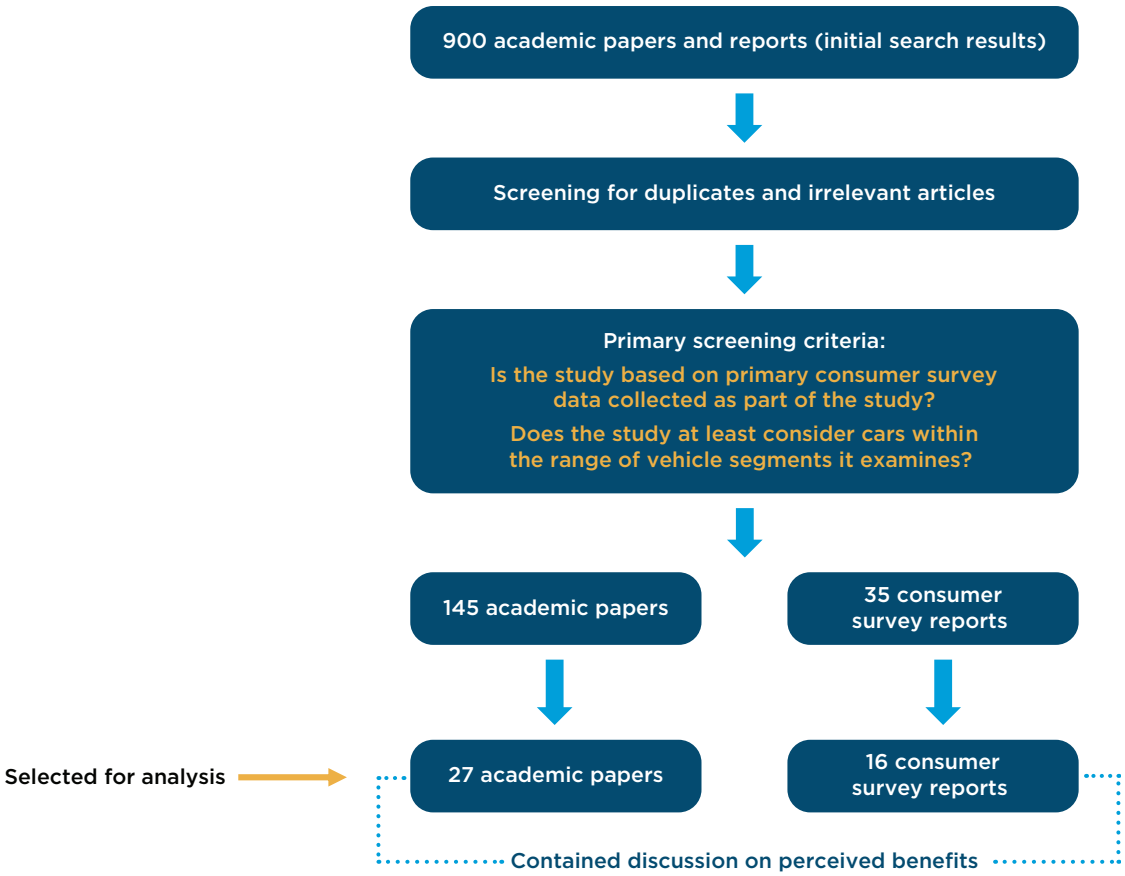

Figure A1. Selection process for articles for literature review

Appendix B: Studies reviewed in this paper

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