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EV Explorer: Educating and Persuading Consumers with an Online Vehicle Energy Cost Calculator

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Authors

Sanguinetti, Angela
Salmon, Kiernan
Nicholas, Mike
et al.

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EV Explorer: Educating and Persuading Consumers with an Online Vehicle Energy Cost Calculator

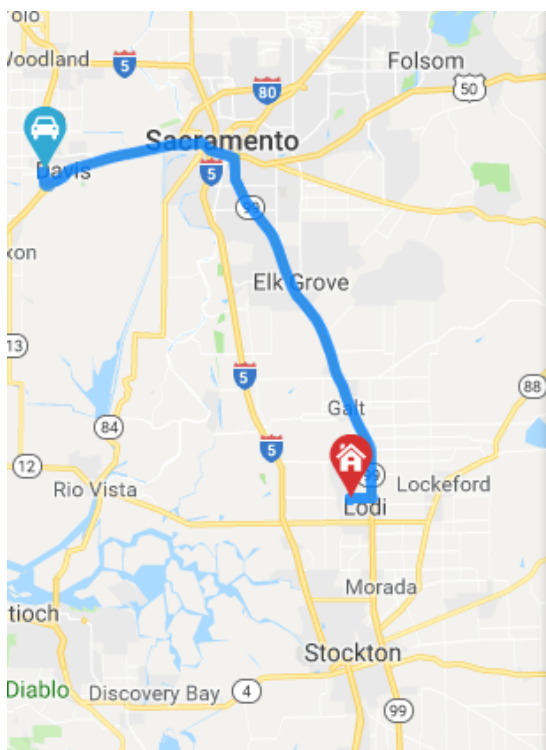
Angela Sanguinetti, Kiernan Salmon, Mike Nicholas, Gil Tal, and Matt Favetti
Consumer Energy Interfaces Lab, UC Davis Institute of Transportation Studies
Contact Information: asanguinetti@ucdavis.edu

Issue

Vehicle electrification is an important strategy in moving toward a more sustainable transportation future. Replacing gasoline with electricity to power vehicles enables reduced dependence on fossil fuels and can dramatically reduce greenhouse gas emissions when clean energy sources are used to produce electricity.

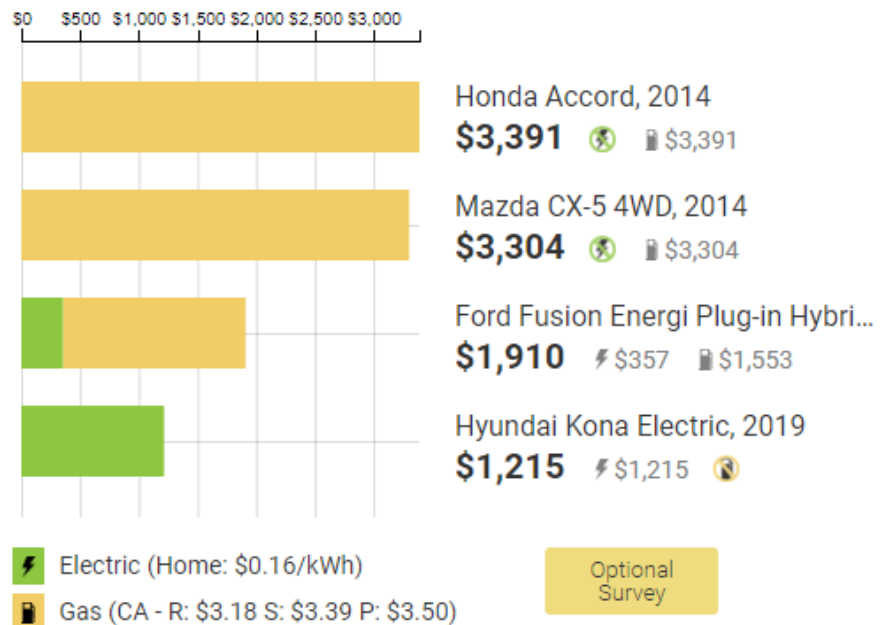
Barriers to consumer adoption of plug-in electric vehicles (PEVs) include relatively higher purchase prices and limitations in vehicle range and charging infrastructure. Much research has focused on these barriers. There has been relatively less focus on how to convey the benefits of PEVs to prospective buyers.

Reduced energy costs can be a significant benefit for consumers who adopt PEVs. However, the complexity of comparing gasoline and electricity prices makes it difficult for consumers to quantify this benefit. Online vehicle energy cost calculators are one strategy to help consumers calculate potential savings and perhaps persuade them to adopt PEVs. For example, UC Davis ITS researchers developed an online tool called EV Explorer that enables users to compare personalized estimates of annual energy costs for multiple vehicles.



Annual Vehicle Energy Costs

Calculated using data from fuelconomy.gov and eia.gov



EV Explorer's main output with annual energy cost comparisons for up to four vehicles.

In this research, UC Davis Consumer Energy Interfaces Lab evaluated EV Explorer through an online experiment. The study assessed 108 participants' perceptions—before and after using the tool—of their current energy costs, potential savings with electric vehicles, attitude toward vehicle charging, and intention to buy or lease an electric vehicle in the future. This study is the first to examine the effectiveness of an online vehicle energy cost calculator in promoting PEV adoption.

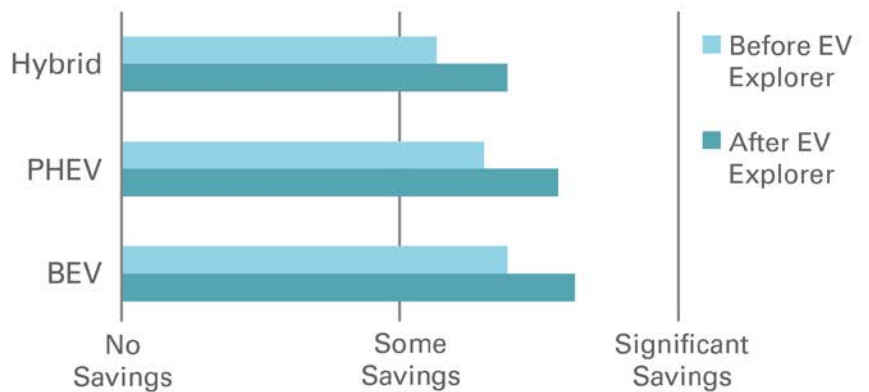
Key Research Findings

EV Explorer educates users about long-term energy costs and potential savings with PEVs. Before using EV Explorer, about 20% of respondents were “not sure” how much they could save with a PEV compared to their current vehicle. Only 6% remained unsure after using EV Explorer.

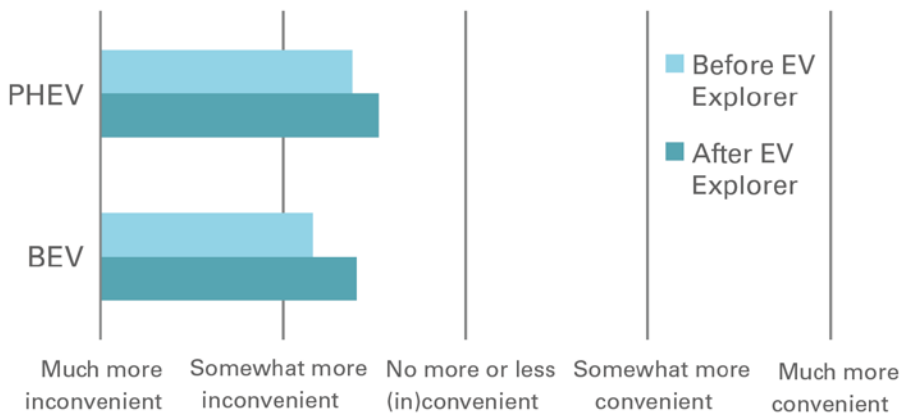
EV Explorer has a positive influence on users’ attitudes toward hybrid, plug-in hybrid, and electric vehicles. After using EV Explorer, participants reported a greater potential for personal savings from gas-only hybrid vehicles and both types of PEVs [plug-in hybrids (PHEVs) and battery all-electric vehicles (BEVs)], compared to their responses before using the tool. Perceptions of the in(convenience) of charging also changed in a positive direction. Finally, participants reported greater intention to buy or lease PEVs (PHEVs and BEVs), as well as hybrids, after using EV Explorer, and less intention to buy or lease conventional gas-only vehicles.



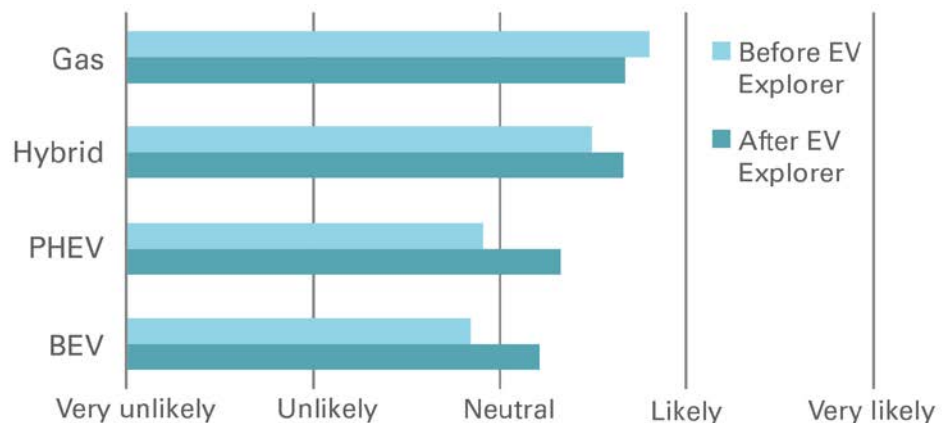
Given your driving patterns, how much would/do you save in fueling costs by driving a hybrid, plug-in hybrid, and an electric vehicle compared to a gas only vehicle?



Given your driving patterns, how (in)convenient are the charging requirements of plug-in hybrid electric and electric vehicles compared to fueling a gas only vehicle?



How likely are you to buy/lease gas only, hybrid, plug-in hybrid, and an electric vehicle in the future?



The impact of energy cost calculators depends on the features available and used. Impacts of using EV

Explorer were more pronounced when users who took advantage of the ability to personalize their energy cost estimates by inputting (a) their commute frequency, (b) details about charging infrastructure at commute destination, and (c) gas and electricity prices, implying that these are important features to include in any such tool.

In sum, EV Explorer and similar tools can educate consumers about PEV energy costs and charging requirements. These knowledge gains can promote positive attitudes toward, and increase users' intention to adopt, PEVs. The Sustainability Energy Authority of Ireland Behavioral Economics Unit recently evaluated EV Explorer by having attendees at an Energy Show use it; these users shifted their intention to invest in a PEV in a positive direction at a statistically significant level. ITS researchers' latest project with EV Explorer will involve usability testing of EV Explorer and similar tools with prospective car buyers to further understanding of how and for whom energy cost calculators can promote PEV adoption.

Further Reading

This policy brief was drawn from a conference paper for the Human-computer Interaction International Conference, which is available here: https://link.springer.com/chapter/10.1007/978-3-319-58637-3_8.