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Barriers and Preferred Information Sources Among Low-to-Moderate Income Groups: A Case Study in California, U.S.

McCormack, R.[1], Henkin, Z.

[1]*Center for Sustainable Energy, energycenter.org, regina.mccormack@energycenter.org*

Summary

Focus groups of over 30 low-to-moderate income Californians, focusing on demographics typically underrepresented in the California Vehicle Rebate Project: aged up to 39, no college degree, renters, Hispanic or Latino, female, Black or African American and White or Caucasian. Costs and charging issues were the most cited barriers. Participants preferred to learn about vehicles online or through experience.

Keywords: communication, incentive, state government

1 Introduction

To understand the extent to which low- and moderate-income (LMI) Californians participate in the Clean Vehicle Rebate Program (CVRP) and what barriers prevent them from choosing electric vehicles (EVs), the Center for Sustainable Energy (CSE) conducted a series of focus groups in 2021 with 31 LMI individuals in total. We facilitated discussion to understand their perceptions of EVs and why they may or may not want to purchase or lease an EV. The main concerns of participants were a lack of access to charging, the cost of vehicles and the cost of charging. Specifically, the top five categories of concern are the following:

- Costs (e.g., EVs, charging, maintenance): 27%
- Charging (e.g., lack of charging stations, charging takes too long): 25%
- Range (e.g., fear of being stranded, range is too short): 10%
- Information (e.g., lack of comprehensive EV sources, uninformative ads): 9%
- Dealerships (e.g., dealers pressure customers, salespeople are not knowledgeable about EVs): 8%

The following tables provide more details about these categories of concerns. Within the focus group analysis, we examine differences among people by education and dwelling type. We found the following:

- College-educated individuals are primarily concerned with charging issues, while high school graduates and those with associate degrees are more concerned about costs.
- People who live in detached houses and apartments are most concerned about costs, whereas those in attached houses or townhomes are most concerned about charging.

In addition to barriers, we asked participants how they preferred to learn about vehicles, and most of the preferences included the desire to understand and experience how to drive and maintain EV models. Most

participants prefer doing online research, and while reading information about various models was popular, many enjoyed reading and watching videos of reviews comparing the features of various models. Many participants were also enthusiastic about interactive experiences with vehicles such as non-pressured test drives. Other preferences included social media, discussing with personal contacts and personal mechanics and going to dealers to learn more about vehicles and EVs.

Recognizing that some demographic groups are proportionally underrepresented and listening to the concerns LMI individuals have and the resources they prefer, we suggest the following approaches:

- Evaluate outreach and marketing and determine if there are opportunities for increasing awareness of the CVRP among underrepresented populations. Similarly determine if there are opportunities for experiential learning about EVs in conjunction with CVRP outreach, particularly non-pressured test drive events and media discussing features and logistics of driving various EV models.
- Expand the informational resources about concerns identified by LMI individuals including costs of EVs and charging, lack of accessibility of charging stations and time commitments for charging. Similarly, provide additional information or suggestions about the logistics of EV maintenance and charging practices for those of various dwelling types, including those that may not have chargers at their residences.

2 Background

Focus groups allow us to "look beyond" the statistics of survey research and to gather more detailed, nuanced data directly from a small group of participants in their own words [1]. In this section, we present the results from 6 focus groups consisting of 31 total participants. The goal of these focus groups is to better understand LMI individuals' perceptions of EVs and perceptions of barriers to EV adoption and how they may impact their vehicle decision making.[1] We also ask participants to describe their preferred information sources for learning about EVs and vehicles in general to develop additional strategies to reach various groups.

We recruited individuals that largely reflect the LMI population of California with a slightly higher proportion of underrepresented groups [2]. We note that gathering a few responses from Californians of specific demographics such as apartment dwellers does not necessarily mean that we are capturing a representative sample of apartment dwellers' sentiment; however, what the focus group approach lacks in generalizability, it makes up for in narrative detail.

We design questions to encourage discussion of LMI individuals' preferred sources of information for learning about vehicles and their barriers toward purchasing or leasing EVs [3]. Questions introduced by the moderator include:

- What is your most frequent type of transportation and why?
- When you are thinking about getting a vehicle, whether its leasing or purchasing, where do you find information? Online? Newspapers? Friends or family? Car dealers?
- Have you considered purchasing or leasing electric vehicles before? Why or why not?
- What would you need or what would need to change in order for you to consider an EV?
- What ideas do you have about ways your city, state or electricity provider could do to help you purchase or lease an EV?
- What ideas do you have that dealerships or manufacturers could do to help you buy an EV?
- How do you prefer to learn about EVs? Do you think you'd look at the same places as you do for car shopping or would you prefer something else?

After transcribing the responses, we code them and associate them with each participant's demographics. We use our knowledge of the literature to create categories of barriers and information sources discussed. Frequency of

[1] Focus groups were conducted in March and April 2021 by CSE's Transparency and Insights team.

barriers and information sources discussed are mapped to specific demographics, identifying which LMI groups tended to voice those opinions more frequently than others.

3 Analysis of Barriers

To complete the analysis, we count the number of mentions of each barrier within the focus group discussions; we approximate the level of concern for a barrier by how many times it is mentioned. The numbers should be interpreted with caution and used as suggested interpretations of the data rather than absolute conclusions about barriers within the LMI population of California. In many cases, there are alternate reasons that may explain the frequency of some concerns.

For example, without prompting, often the first concern brought up is charging. While this could indicate that charging is the main concern, it could also indicate that people feel less comfortable discussing costs, a generally sensitive topic. Additionally, other barriers like maintenance, range, etc. may be less understood among consumers in general and thus may not be prevalent topics of conversation. Furthermore, while the moderator worked to include all participants equally in the conversation, more talkative participants may still contribute more to the number of mentions than their peers.

Analysing the frequency of barriers mentioned, we find strong evidence that barriers regarding charging and costs are the most prevalent concerns among the focus group participants. Range concerns, lack of information, issues with dealerships and battery concerns are less prevalent but still widely discussed by focus group participants. Unfamiliarity with EVs, maintenance concerns, personal reasons and safety are the least mentioned. Table 1 presents the barrier categories by frequency.

Table 1. Categories of barriers ranked by frequency of mentions.

Barrier Category	**Frequency of Mentions (n=327)**
Costs (e.g., EVs, charging, maintenance)	27% (n=89)
Charging (e.g., lack of charging stations, charging time too long)	25% (n=83)
Range (e.g., fear of being stranded, range is too short)	10% (n=32)
Information (e.g., lack of comprehensive EV sources, ads are uninformative)	9% (n=29)
Dealerships (e.g., dealers pressure customers, salespeople are unknowledgeable about EVs)	8% (n=26)
Battery (e.g., concern about battery life, concern about manufacturing and recycling affecting the environment)	6% (n=20)
Unfamiliarity with EVs (e.g., unsure about trying new technology)	5% (n=15)
Maintenance (e.g., do not know what maintenance entails, cannot diagnose problems in the car as easily as a gasoline car)	4% (n=13)
Personal (e.g., EVs are not easily hobbies, not interested, already content)	3% (n=11)
Safety (e.g., unsure about reliability and safety)	3% (n=9)

3.1 Cost Concerns

The following are quotes selected from participants that demonstrate concerns about costs. Most individuals assume the costs of EVs are higher than gasoline vehicles and that maintenance is bound to cost more due to concerns about battery reliability. Most individuals are concerned about the cost of charging not only because they think their electricity bill will increase but also because they are concerned rates will increase and public charging stations will charge a premium.

- Quoted by a focus group participant with the following characteristics: female, age 54, resident of Riverside County in a household of 2, high school graduate, prefers to speak English, identifies as Other Race, lives in a detached house

  "I would love an electric car. I would love it. And the reason I don't have [one] is because they cost so much more than a regular gas car. That's the only reason. I would love it. I love all my new stuff. It's just fun. And now they have all those charging stations like at malls and at rest stops. That's flipping cool, like, seriously. So that's the only reason why not, honey. I would love to."

- Quoted by a focus group participant with the following characteristics: male, age 56, resident of San Joaquin County in a household of 2, some college or associate degree, Hispanic or Latino, prefers to speak English, identifies as Bi-racial or Multi-racial, lives in an attached house or townhome

  "So they're going to have to- they're going to have to really make the cost of charging that almost nonexistent. I mean, if I didn't get charged to use electricity to do it, I'd really consider an electric vehicle, assuming we had the range and the capacity, and, you know, stuff like that. But I think that the cost of charging is going to be cost-prohibitive."

- Quoted by a focus group participant with the following characteristics: female, age 26, resident of Shasta County in a household of 4, college graduate, prefers to speak English, identifies as White or Caucasian, lives in a detached house

  "Is it just more expensive to have those pieces fixed? Or is it cheaper than usual? I mean, I just, I don't understand that. I haven't done much research into electric vehicles, but all I heard was that batteries were crazy expensive."

Common among these quotes is the theme that considering an EV is an interesting idea but the practicalities of paying for and maintaining a vehicle are concerns. This may indicate that OEMs and CVRP program managers can modify their information and marketing strategies to better eleminate these concerns. Preferred information sources among focus group participants are discussed in the next section.

3.2 Charging Concerns

The following quotes are those of focus group participants who describe scenarios in which charging an EV appears to be inconvenient or anxiety-inducing. Participants are concerned about the placement of charging stations along their routes and the possibility there may not be a charging station when you need one. Additionally, participants are concerned about the time it takes to charge, especially on long trips.

- Quoted by a focus group participant with the following characteristics: male, age 32, resident of Shasta County in a household of 4, some college or associate degree, Hispanic or Latino, prefers to speak English, identifies as Other Race, lives in an attached house or townhome

  "Well, maybe [charging stations do] not necessarily [need to be] as often because I do understand it; there is a transitioning point. It's not going to be like a gas station that had like a 80-year head start or

50 years or something like that so. But at least enough to know that I don't have to have the worry in the back of my head that, 'Hey, if I skip this charging station, am I going to miss out and be stranded on the side because I'm not going to be able to find another charging station?' That on top of, 'Am I going to have to wait an hour or two hours to have a full charge when baby girl is crying because she wants to get out and she's tired of driving?'"

- Quoted by a focus group participant with the following characteristics: male, age 23, resident of Los Angeles County in a household of 2, college graduate, prefers to speak English, identifies as South Asian, lives in an apartment or condominium

"I think kind of what everyone else said, it is kind of scary because you see charging stations more but you don't see that many and you know, sometimes I forget to get gas, so it's like you have to be really on top of it if you have an electric car so I don't - you can't be as spontaneous probably with your travel so that too."

Uncertainty about driving and charging are characterized in these quotes. The participants value the freedom and ease of driving a gasoline car; EVs appear to be restrictive due to the time it takes to charge and the perception that there is lack of infrastructure to charge EVs at will.

3.3 Concerns by Educational Background

We analysed the barriers mentioned by college graduates separately from participants with less education to determine if there were differences in perceived barriers. Cost concerns are more prevalent for individuals with some college education or high school degrees.

Table 2. Concerns of focus group participants of differing educational backgrounds.

Categories	College Graduates and Above (n=126)	Some College Education and Below (n=158)
Costs (e.g., EVs, charging, maintenance)	25% (n=32)	35% (n=55)
Charging (e.g., lack of charging stations, charging time too short)	32% (n=40)	26% (n=41)
Range (e.g., fear of being stranded, short range)	13% (n=16)	10% (n=16)
All Other Barriers (e.g., issues at dealerships, concerns about batteries and maintenance, unfamiliarity with EVs, safety concerns)	30% (n=38)	29% (n=46)

The following are quotes regarding cost from both educational groups. Note the quotes show concerns about the costs of EVs and charging. The participants have several questions and suggestions regarding the topics, and the common theme is that using an EV, whether the cost is associated with charging or the EV itself, feels unaffordable. Assistance with charging and/or the EV itself may help individuals consider EVs more seriously.

- Quoted by a focus group participant with the following characteristics: female, age 33, resident of Alameda County in a household of 2, college graduate, prefers to speak English, identifies as Black or African American, lives in an apartment or condominium

"I feel like it should be affordable and it should be marketed affordable. We don't even really know the real price of all these vehicles. We're just assuming. And I don't think that it's marketed to be affordable. So when you think of electric cars, you think of the Teslas or the very expensive cars and the Elon Musks, but you don't know there's other brands, there's other affordable options. So I think just making it be

more like an everyday thing in your household and having people, like you said, I guess it's your environment."

- Quoted by a focus group participant with the following characteristics: male, age 28, resident of San Diego County in a household of 3, postgraduate education, prefers to speak English, identifies as South Asian, lives in a detached house

  "And trust me, a lot of people don't know anything about federal tax rates or anything when they go on to purchase a vehicle. When they see this $45,000 price tag, they'll be like backing out because it's too much for a nearly coming up technology because the cells are not manufactured here. They're manufactured somewhere else; they are imported. There are importing charges; there is production issue. There are so many factors we need to consider."

- Quoted by a focus group participant with the following characteristics: male, age 41, resident of San Diego County in a household of 3, some college or associate degree, prefers to speak English, identifies as Bi-Racial, lives in a detached house

  "Well, I feel everything would be electric. I still don't know if I'm charging the car publicly, am I paying somebody? Is there a credit card slot? And if I'm living in Texas, and they shut off my power, where do I charge my car? It can get real pricey to charge the car, I imagine, I don't know. Not things I want to have to consider, but got to. Yeah. There's not a whole lot of charging stations around here. I've never used one and I don't know how they work."

- Quoted by a focus group participant with the following characteristics: female, age 39, resident of Riverside County in a household of four, some college or associate degree, Hispanic or Latina, prefers to speak Spanish, identifies as Other Race, lives in a detached house

  "Maybe put in charging stations that are free."

3.4 Concerns by Dwelling Type

We also examine the barriers discussed by residents of various dwelling types. We group the focus group participants into three resident types: those who live in detached homes, those who live in apartments or condominiums and those who live in attached homes or townhouses. Those in detached houses are most concerned about costs, whereas those in attached houses or townhomes are most concerned about charging. Note also that residents of apartments or condominiums have many varied concerns; charging and costs are important but there are other barriers that come to the surface. Note also that apartment and condominium dwellers have very low concerns about range.

Table 3. Concerns of focus group participants of differing dwelling types.

Categories	Residents of Attached Houses or Townhomes (n=62)	Residents of Apartments or Condominiums (n=63)	Residents of Detached Houses (n=159)
Range (e.g., fear of being stranded, short range)	16% (n=10)	6% (n=4)	11% (n=18)
Costs (e.g., EVs, charging, maintenance)	23% (n=14)	24% (n=15)	36% (n=58)
Charging (e.g., lack of charging stations, charging time too short)	35% (n=22)	11% (n=18)	26% (n=41)

All Other Barriers (e.g., issues at dealerships, concerns about batteries and maintenance, unfamiliarity with EVs, safety concerns)	26% (n=16)	41% (n=26)	26% (n=42)

The following are quotes from apartment or condominium dwellers about their cost concerns. Affordability of charging and costs are common themes. Those in detached homes are more concerned about the costs of EVs in comparison to other costs, and those in attached houses or townhomes have a variety of cost concerns.

- Quoted by a focus group participant with the following characteristics: female, age 52, resident of San Jose County in a household of four, some college or associate degree, Hispanic or Latina, prefers to speak Spanish, identifies as Other Race, lives in an apartment or condominium

  "If they only give it to you – you buy the car, and that year that you're going to pay taxes, they give you that incentive. But what about the other years that you're going to keep paying for the car? Also, as far as the light bill goes, if they were to give you – for example, with my electric company, I'm in a program where I pay less for the electricity. If they did it like that, where they give it to you for a whole year, and you're going to have your car, maybe it would benefit you. Otherwise, you'd be paying a lot of electricity because of charging your car. Well, that's my way of thinking. I don't know."

- Quoted by a focus group participant with the following characteristics: male, age 48, resident of Imperial County in a household of 4, high school graduate, Hispanic or Latino, prefers to speak English, identifies as Other Race, lives in an apartment or condominium

  "But like, for example, first new buyers they get discounts. Or if they're buying a year- Like, a car has been sitting there- a new car is sitting there for a year and the new one came. But they give all those deductions like $5,000 rebate, something like that. I believe like on electric cars they should do something like that. Like first-time buyers should get probably, I don't know, a discount or they can charge their car at the dealership if they live near, like, for a whole year. I don't know. It's just something that can stimulate to buy a car."

The following are quotes that describe charging issues among various residents.

- Quoted by a focus group participant with the following characteristics: female, age 32, resident of Fresno County in a household of 6, high school graduate, Hispanic or Latina, prefers to speak English, identifies as Other Race, lives in an attached house or townhome

  "If I have to recharge it every day then yes, it'd be an issue. You pump gas, you're in and out within 10-20 minutes to max, imagine being stuck there for an hour, two hours. It's just not OK for me at the moment."

- Quoted by a focus group participant with the following characteristics: female, age 23, resident of Fresno County in a household of 1, college graduate, prefers to speak English, identifies as Black or African American, lives in an attached house or townhome

  "I've thought about it but … like just the unknown factor of how long it takes to charge, the unknown factor of how far you could go. I think if you're a person like me, likes to travel, who likes to drive, it becomes more of a hindrance because you can't really go that far with the battery before you have to stop and then you have to stop for a while and then you have to get to where you're going and you have to charge again. So it's just like it sounds cool but I need them to get further into it before I can just say, 'I want one.'"

"I think that the price being expensive is a key factor in the rebates, make it more of an incentive to get it. But I also think that the rebates don't overshadow those concerns on the range of the battery and how fast it is to charge, because it's all about having something that is quick, something that you can be efficient in So, it's like, you don't want to have to rush somewhere and it's like, 'Oh, shoot. My car battery is about to die. What am I going to do? I need two hours to charge it.' Whereas in the gas car's like, 'OK, I'm about to run out of gas. Let me stop right here get some gas going about my way.' Five minutes, 10 minutes out of your day, that might have - being their cause of problem."

4 Preferred Information Sources

The focus groups also discuss preferred resources for learning about EVs and vehicles in general. Online resources prevail most during the discussion. In-person experiences with EVs are also largely preferred. Social media, personal contacts and working with dealers are on par with each other. There are a few other sources like TV, apps, print and phone that are mentioned but are not the overwhelming preferences. See Table 4 for the categories of information sources preferred. Top preferences include doing online research, talking to people one knows and taking test drives in non-pressured environments (not a dealership).

Table 4. Information source categories preferred by focus groups.

Information Source Category	Frequency of Mentions (n=109)
Online (e.g., doing online research, YouTube videos, reviews of vehicles)	34% (n=37)
Experience (e.g., test drives in non-pressured environments, seeing EVs on display, informational events)	17% (n=19)
Social Media (e.g., campaigns and ads on Facebook, Instagram, Twitter, TikTok)	13% (n=14)
Personal Contacts (e.g., talking to people and mechanics the customer already knows)	12% (n=13)
Dealer (e.g., test drives at dealerships and talking with dealer)	11% (n=12)
TV (e.g., informative, engaging ads)	5% (n=5)
Print (e.g., Autotrader and Consumer Reports magazines)	4% (n=4)
Online Dealer (e.g., CarMax)	3% (n=3)
App (e.g., apps that compare vehicle features)	1% (n=1)
Phone (e.g., receiving calls about new vehicle models)	1% (n=1)

The following are comments from participants that comment on prefered information sources. Participants are interested in various methods with online resources prevailing. Common among these sources is the desire to compare specifications among various models. Participants appear interested in comprehensive and accessible information about EVs as well as interactive experiences with EVs (e.g. test drives, seeing models, etc.).

- Quote from a focus group participant with the following characteristics: male, age 45, resident of San Joaquin County in a household of 1, college graduate, Hispanic or Latino, prefers to speak English, identifies as Other Race, lives in a detached house

  "I do my research online, I compare the cars I look at what kind of car I might want, what might be out there. I will do also … the YouTube videos because there are experts out there that actually get the cars,

I don't know how they get all these cars, maybe they make a deal with the dealership, but they test drive it, they have video cameras in the car telling you what they think about it, what their thought is, how's it compared to other cars, if you're looking for a hybrid, they compare it to other hybrids, or plug-in hybrids, and vice versa. So I do all that ahead of time so I can be well informed and the final step is going into [the] dealership, even if I'm just still in the research phase, and you have to deal with [it] but it's better to go to the dealership being well informed and then when you get there, you just have to deal with their pushback..."

- Quoted by a focus group participant with the following characteristics: male, age 42, resident of Fresno County, high school graduate, prefers to speak English, White or Caucasian, lives in a detached house

  "It's a lot easier to buy something that you actually sat in, tried out, versus just reading the specs and comments. Comments from honest people are really, really helpful, but any more, you don't know what's a comment and what's a paid advertisement."

- Quoted by a focus group participant with the following characteristics: female, age 54, resident of San Joaquin County in a household of 1, college graduate, prefers to speak English, identifies as White or Caucasian, lives in an apartment or condominium

  "...if you did something like [an informational event] at the state level, I would think it would be much easier to have multiple manufacturers in the same place as opposed to a dealer who only focuses on their brand. So it would be much easier to compare across brands in something like that where there's multiple dealers or multiple manufacturers in the same place. ... Because if somebody's looking at an electric car, I would think they would mainly be looking at electric cars. So they'd want an easy way to compare the different kinds of cars without having to do all the research here for one and all the research here for another if there was an easier way to compare them against each other."

- Quoted by a focus group participant with the following characteristics: female, age 52, resident of San Jose County in a household of 4, some college or associate degree, Hispanic or Latina, prefers to speak Spanish, identifies as Other Race, lives in an apartment or condominium

  "You always watch commercials on TV or the internet. It's much easier. That way, you go, and you're sure about what you like. You just go to the dealership, and look at it, and decide what's good for you to buy."

- Quoted by a focus group participant with the following characteristics: female, age 23, resident of Fresno County in a household of 1, college graduate, prefers to speak English, identifies as Black or African American, lives in an attached house or townhome

  "I think it's very important to make the knowledge accessable. When you walk into a car dealership, they're going to show you the newest car, but most of the time it's not going to be an electric car. They're not going to go into detail with that type of information. So, I think those details need to be more accessable. They need to be more promoted so people know, and we're not ignorant towards the fact of what an electric car can do. And we don't just think of the what-ifs."

- Quoted by a focus group participant with the following characteristics: male, age 41, resident of San Diego in a household of 4, some college or associate degree, Hispanic or Latino, prefers to speak Spanish, identifies as Other Race, lives in a detached house

"I think the internet is fine as well. It'd be nice if they put an electric car on display and let you see it. Just let us see them more."

5 Conclusions

We conducted focus groups to better understand what LMI Californians think of EVs and what barriers they perceive when considering adopting EVs. Our team asked questions about how they choose vehicles and how they prefer to learn about vehicles. Costs and charging emerged as the main barriers among the participants.

Focusing on the demographics of education and dwelling types, we learned that all groups share similar concerns, but some concerns are more important to certain groups. For example, college-educated individuals are primarily concerned with charging issues and the costs of EVs, while high school graduates and those with associate degrees are more concerned about the costs of charging and the availability of charging.

Similarly, people who live in detached houses are most concerned about the costs of EVs, whereas those in attached houses or townhomes are most concerned about lack of charging stations and to a lesser extent the time it takes to charge.

In addition to understanding concerns participants had about EVs, we wanted to understand how participants preferred to learn about vehicles and consequently, how we may consider outreach and marketing for LMI individuals. Most participants prefer doing online research (e.g., reading and comparing models, watching YouTube reviews, etc.). They also have an interest in interactive experiences with vehicles such as non-pressured test drives, social media, discussing with personal contacts and personal mechanics and going to dealers to learn more about vehicles and EVs.

Common among these preferences was the desire to understand and experience how it would be to drive and maintain various EV models. Participants were enthusiastic about test drive events in which consumers could test various makes and models and ask questions about EVs without being pressured to lease or buy right away. Similarly, participants expressed that same enthusiasm for video reviews on YouTube or related media in which reviewers compared and contrasted the features of various models. Offering such experiential outreach and marketing for LMI individuals may be an ideal strategy to consider as a method to increase LMI participation in CVRP. We suggest that CVRP consider the following approaches:

- Evaluate outreach and marketing toward underrepresented groups to determine if there are opportunities for increasing awareness of the CVRP among these populations. Similarly, determine if there are opportunities for experiential learning about EVs including non-pressured test drive events and videos discussing the features and logistics of driving various EV models.
- Along with information about the CVRP, provide additional information about concerns identified by LMI individuals including costs of EVs and charging, lack of or accessibility of charging stations and time commitments for charging. Similarly, provide information or suggestions about the logistics of EV maintenance and charging practices for those of various dwelling types, including those that may not be able to have chargers at their residences. Alternatively, increase partnership or engagement with educational organizations to address these concerns.

In summary, our analysis has highlighted concerns of LMI Californians regarding EVs and what information sources they use to research car purchases or leases. Our research finds that targeting underrepresented groups and tailoring information on EVs for these groups could address some equity concerns by expanding the participation of LMI individuals in the EV market.

Acknowledgments

John Gartner, Ben MacNeille, Nick Cain

References

[1] F.H., Leung & R. Savithiri., *Spotlight on focus groups.* Canadian family physician Medecin de famille canadien, 55(2), 218-210. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2642503/

[2] J. Gartner, N.J. Cain, B. MacNeille, & R. McCormack. (2021). *Analysis of LMI CVRP Participation.* https://cleanvehiclerebate.org/en/content/analysis-lmi-cvrp-participation

[3] L. Noel, G. Zarazua de Rubens, J. Kester, & B. K. Sovacool. (2020). *Understanding the socio-technical nexus of Nordic electric vehicle (EV) barriers: A qualitative discussion of range, price, charging and knowledge.* Energy Policy, 138(111292). https://doi.org/10.1016/j.enpol.2020.111292.

Authors

Regina McCormack is a Senior Research Analyst in the Center for Sustainable Energy's (CSE) Transparency and Insights department. She manages research projects regarding participation of low income individuals in EV markets and rebate programs. Regina brings ten years of both industry and academic experience to her research. She managed regulatory affairs of several energy markets for independent power producer Invenergy, primarily regarding battery storage and renewable energy. Regina has a Masters in Marine Policy in which she researched policy aspects of offshore wind energy and vehicle-to-grid (V2G) at the University of Delaware.

Zach Henkin is the Director of EV/EVI Program Research at the Center for Sustainable Energy (CSE), where he leads research and analysis focused on adopting and using electric vehicles and infrastructure at scale. Zach brings more than ten years of experience researching transportation electrification and distributed energy resources and has served as the principal investigator for demonstration deployments, infrastructure projects and lectured on EV and charging programs worldwide. Zach has an MBA specializing in renewable energy, formerly served as a planning commissioner and economic development commissioner and is a Third Derivative (D3) cleantech mentor.