

Assessing Consumer Market Potential for Electric Vehicles: Focus-Group Approach

DAVID O. NELSON, MELANIE S. PAYNE, AND TIMOTHY J. TARDIFF

A demonstration of focus-group techniques in analyzing transportation energy-conservation program activities is described. The Electric Vehicle Commercialization Project of the Electric and Hybrid Vehicle Program of the U.S. Department of Energy (DOE) was the test case for the demonstration. This application builds on previous focus-group studies in transportation as well as previous electric vehicle (EV) market studies. During the winter of 1981, six focus-group meetings were held, two each in Tampa, Spokane, and Sacramento. The cities were selected to complement the cities used in previous DOE focus-group research. Respondents were recruited based on criteria to identify the most likely purchasers of new EVs. The focus-group meetings were structured around a discussion guide that covered topics such as adjustments to down-sizing, perceptions of future energy shortages, and, most importantly, reactions to EVs likely to be available in the short to medium range. The results of the focus groups are consistent with previous quantitative studies of EV market potential, in that the market for vehicles likely to be available in the near term appears to be very limited. The major impediments to market penetration are limited range, long battery recharge period, and high costs.

Various approaches have been used to analyze the market potential of new products, services, or technologies. This paper describes a study that applied the focus-group technique, a qualitative market research tool, to assess the potential market for electric vehicles (EVs).

The study was built on two recent lines of transportation research. First, focus groups have been used to study problems such as ridesharing (1), intercity passenger rail service attributes (2), transit marketing (3), and fuel-efficient new cars (4). Second, quantitative modeling approaches have been used to estimate potential market shares for EVs (5,6). Inasmuch as new products such as EVs may involve attributes that are difficult to quantify, the qualitative approach in focus-group research is complementary to the quantitative studies.

The remainder of the paper is organized as follows. First, background information, which includes the objectives of the study and the particular EV issues of interest, is presented. The second section briefly describes focus-group methods and is followed by a discussion of the specific research design used in the EV study. Specific findings of this study are then described in detail. The final section highlights the conclusions drawn from the study.

BACKGROUND

The U.S. Department of Energy (DOE) has implemented a wide variety of programs that relate to the use of energy in transportation. One program is the Electric and Hybrid Vehicle (EHV) Program created by the Electric and Hybrid Vehicle Research Development and Demonstration Act of 1976. The legislative intent of the Act was to accelerate the commercialization of electric and hybrid vehicles to reduce petroleum consumption and the related dependence of foreign oil sources. As part of a larger consumer representation project for DOE, the EHV Program's Electric Vehicle Commercialization Project was selected as a demonstration case to test the usefulness of focus-group techniques in planning transportation energy-conservation-program activities. The focus-group task was planned and supervised by Charles River Associates and conducted by the marketing research firm of Elrick and Lavidge, Inc.

The purpose of this research was twofold: First,

to demonstrate the use of focus-group techniques in planning transportation energy-conservation programs and to determine if these techniques will be useful in subsequent research, and second, to gain a preliminary understanding of consumers' perceptions of EVs as they exist now and as they might fit into daily driving in the future. The research objectives of the focus groups include

1. Improved understanding of potential consumer markets for EV technology,
2. Identification of fruitful consumer markets for EVs, and
3. The updating of existing data bases on consumer preferences relative to EVs.

The objective of the EV commercialization program is to aid private-sector decisionmakers in developing market strategies for commercial EVs. The focus-group program will enhance the understanding of several issues for the EV market. These include

1. Consumers' perceptions of the threat of a gasoline shortage;
2. Consumers' perceptions of EV technology and its availability, practicability, advantages, and disadvantages;
3. Consumers' evaluations of the important design trade-offs in EV production, which include range versus payload, range versus cost, and recharge period duration; and
4. Consumers' general utility for a limited-purpose vehicle such as EVs, and market segments likely to purchase an expensive limited-purpose vehicle.

The results of this study provide background information and input for possible further quantitative studies on EV commercialization.

NATURE OF FOCUS-GROUP RESEARCH

This section provides a brief description of focus-group techniques. For the interested reader, additional detail is provided in several other sources (7-15).

Focus-group interviewing is a common marketing research technique. Small panels of consumers discuss their attitudes toward a product or service. The panels usually consist of 6 to 12 participants led by a moderator. The format is open-ended but loosely structured around a discussion guide, which the moderator uses as a plan for prompting discussion. The guide outlines major themes or questions designed to elicit consumers' attitudes and feelings toward the service or product. The sessions usually last 1-2 h, are generally tape-recorded, and are often transcribed for analysis. A variety of qualitative and quantitative techniques have been used to interpret the results.

Because the focus-group technique does not require a large number of respondents, it can be relatively inexpensive. However, because the sample is often small, the primary data are qualitative, and focus-group respondents may self-select in a biasing fashion; care should be taken in generalizing the

group results to the population at large. Decision-makers and analysts should be careful not to place as much confidence in focus-group data as they would in the results of a major quantitative field survey. Focus groups should be used as exploratory tools in conjunction with other field research techniques. For instance, they may be used to develop a survey instrument or to design a pilot program for later evaluation.

The social or peer context of focus-group sessions encourages candid, informal expression of concerns and sheds light on the methods by which consumers communicate their impressions of the service, product, or proposed policy to each other. These communications data may provide insights not available through individual or household interviewing.

There are a number of applications in which focus-group techniques can be used effectively by transportation planners or policy analysts to improve their understanding of complex attitude and behavior interrelations. These include the following:

1. Exploratory research: Focus groups can be used to develop and test the analyst's conceptual model of the ways in which consumers think about and use the program, product, or service in question.
2. Questionnaire design: Focus-group data can be used to suggest hypotheses for qualitative analysis and to refine the language used to gather survey data.
3. Program development and evaluation: Focus groups of prospective users can help improve the usefulness and market acceptability of a new program or service. Focus groups of users and nonusers of a current service may suggest changes to enhance the general acceptance and utility of the service.
4. Marketing refinement: Focus groups can provide feedback on a program's public image and suggest marketability strategies to increase the program's acceptability to target users.

RESEARCH PROCEDURE

Six focus-group sessions (with a total of 51 people) were conducted in January and March 1981. Two sessions each were completed in Sacramento, Spokane, and Tampa. In each city, one group was composed of women and one of men. Other requirements specified that participants be

1. The principal drivers of new, small fuel-efficient cars that were purchased during the past 12 months;
2. Responsible for and/or have participated in the decision to buy that car;
3. Members of households that own two or more automobiles that were purchased new by members of the household; and
4. Between the ages of 18 and 65.

If EVs were to become widely available, it was envisioned that market penetration in this consumer segment would be significant. The study team anticipated that households that owned two or more automobiles purchased new would be wealthy enough and have sufficient investment in automobiles to afford an expensive limited-performance vehicle such as an electric car. Because a commercial EV would compete most directly with compact and subcompact automobiles, the study team chose to interview drivers from these households who recently purchased new small cars. We hoped to find to what extent an EV could serve as a substitute for the participants' new small vehicle.

The particular sites were selected for a variety

of reasons. First, they represented generally smaller communities than had been sampled in earlier DOE consumer focus-group research on EVs (6). Second, these sites extended the climatic range represented in the earlier data (Spokane is cooler and Sacramento and Tampa provide hotter climates). Third, these sites were chosen because of their low reliance on fossil fuels for electric power. Consequently, significant EV penetration in these communities could have a noticeable effect on oil consumption. Finally, since some of the research issues dealt with consumers' responses to gasoline shortages, each of the selected sites had some fuel supply interruptions or rationing in 1973-1974 or 1979.

The moderator's discussion guide consisted of several distinct sections. First, at the start of each group the moderator briefly introduced herself and the focus-group concept. She then went around the table asking respondents to introduce themselves and asked questions about their new cars, about what they had replaced, and about the other vehicles in the households. Second, respondents were briefly questioned about their awareness of gasoline shortages and how shortages and price increases have affected their driving habits. Respondents were also polled on their expectations concerning future fuel shortages and price hikes. Third, the moderator queried the group concerning their awareness and opinions of alternative transportation fuels and innovative technologies to replace the internal-combustion engine vehicle (ICEV). Fourth, after considerable discussion of the alternatives, a standardized EV concept sheet was passed to each respondent and read aloud. [For a complete text of the discussion guide and concept statement, see report by Charles River Associates (15).] This concept was used as a basis for a specific discussion of the unique features of electric cars. Finally, open discussion of the EV was closed and some quantitative consumer preference data on various attributes of EV and ICEV technologies were gathered for later analysis. This paper only reports on the qualitative results.

The basic EV concept described to the respondents in the concept sheet was contrasted to the conventional ICEV on 11 dimensions: range, recharge time, hook-up availability, noise and pollution, fuel cost, cargo capacity, speed and acceleration, purchase price, battery replacement cost, total operating cost, and fuel availability. The concept scenarios for each of the considerations are briefly described below. Respondents were told that EVs available in the next 5-10 years will be different from today's ICEVs in several important ways:

1. EVs would not have the range between refuelings that we have come to expect from gasoline cars. In normal city driving, the batteries would run down after about 75 miles.
2. Recharging would take up to 8 h, depending on how far they had traveled and how long it had been since the last recharge. After a relatively short trip, it would only take 1-2 h to fully recharge.
3. Recharging would require a special electric hook-up that power companies would install free in owner's homes. In the first years of the electric car, owners would not expect to be able to recharge anywhere but at home. Quick charges and spare batteries would not exist.
4. Unlike gasoline cars, the new EVs would be virtually noiseless and pollution free. They would be at least as comfortable as today's small cars. All the usual options would be available.
5. Fuel in the form of electricity would only

cost half as much as gasoline would for the same miles traveled.

6. The batteries and motor would take up a lot of room. There would be one-quarter less cargo capacity in the back of electric cars because of the space required for the battery.

7. Partly because of the weight of the batteries, electric cars would not be quite as fast as gasoline cars, but they would have a top speed of at least 60 mph. They may accelerate more slowly than a gasoline car.

8. The purchase price of the electric vehicles, not including the batteries, would be comparable to today's small four-passenger automobiles such as the Honda, Chevette, or Toyota; they would cost between \$5500 and \$6500.

9. Batteries would cost between \$2000 and \$2500 to purchase. Battery leasing arrangements would also be available at a cost of approximately \$80/month. Every two or three years the electric car's battery would need to be replaced.

10. The high cost of batteries would be partly offset by the lower cost of electric fuel. The average monthly cost of ownership and operation (including purchase, financing, maintenance, fuel, and battery replacement or battery lease) would be between \$220 and \$250 (in today's dollars). A small four-passenger gasoline-powered automobile currently costs about \$200/month. The operating costs of gasoline vehicles would increase more rapidly than EV operating costs as oil prices rise.

11. Unlike gasoline-powered cars, electric cars would not be affected by gasoline lines, gasoline price hikes, or oil embargos. Because most recharging would take place overnight, when demand for electric power is at its lowest point in the day, electric cars would not be affected by "brownouts" or electric power shortages.

FOCUS-GROUP RESULTS

This section presents the qualitative analyses of the focus-group results. These analyses are based on the participation of the first two authors in each session (Nelson as an observer and Payne as the moderator) and analyses of the tapes and transcripts from the sessions. Because the qualitative analysis is based on the impressions formed from the available evidence, there is necessarily a larger component of judgment than is the case in quantitative analyses. Although this fact indicates that generalizations should be made somewhat cautiously, a richer variety of findings emerges than is likely from standard quantitative methods.

The quantitative data for trade-off analyses gathered at the end of each session were designed to update the data available from an earlier analysis (5). Quantitative analysis of these data would result in utility or demand models similar to those developed by Morton and others (6) and Beggs and others (16). This analysis is a topic for further research.

Focus groups are useful for conducting research on alternative vehicles, but locating and recruiting qualified participants can be extremely difficult.

This research, as is often the case with focus-group studies, was a pilot project. One of the project's goals was to determine the feasibility of using group discussions for EV research.

It can be said without qualification that the method, per se, is both appropriate and productive as a means of investigating attitudes toward alternative vehicles. When homogeneous groups are involved (as was the case here), people can share

ideas and attitudes based on their experiences, comment critically in response to new ideas in the form of concept statements, and handle the trade-off assignment with only minor difficulty.

Recruiting the respondents was much more difficult than conducting the focus groups. It will be recalled that to qualify for inclusion in these groups, men and women must have purchased a new fuel-efficient vehicle within the previous year and also have another automobile in the household that had been purchased new (although not within the past year). This combination was exceedingly difficult to find. Because contacts were not made in a strictly random manner, accurate incidence figures were not available. The experience of the field services suggest, however, the incidence was little more than one or two percent.

The respondent recruiting method varied by city. In Tampa, the field service was able to locate and invite enough qualified men and women via their own card files and informal referrals. The study team experienced the fewest problems finding people in Tampa. Interviewers in Spokane, after having little luck with cold calling and referrals, were able to obtain names of new car buyers from area car dealers. The worst frustrations took place in Sacramento, where a total of 815 contacts were made via card files, referrals, and cold calling but yielded only 8 qualified individuals who agreed to participate in the groups; there were 22 qualified refusals. Strict privacy laws prevented recruiters from obtaining names from car dealers. Finally, for a fee of \$1500, names of 5000 new car buyers were secured from a company in San Francisco to which the California Department of Motor Vehicles sells its listings. There was a two-week lag between the request and the receipt of the lists.

This experience suggests that in any future studies of this sort, where incidence is likely to be low, provisions should be made in terms of both time and money to obtain recent motor vehicle registrations before attempting any recruiting.

Many felt they had been pressured--by financial considerations--to downsize in their most recent automobile purchase. But other considerations, such as size, handling, and image, also affected their choice.

Many respondents said that soaring gasoline prices had caused them to look for a car with better gasoline mileage. There were many characterizations of comments concerning full- or mid-sized cars as gasoline "hogs". But simply buying a smaller car that got better gasoline mileage than previous cars was not a satisfactory answer for some respondents. They had other considerations, such as roominess and front-wheel drive, which are considered useful and valuable resale features. Others, however, had more emotional reasons for choosing their small car, e.g., the image of the car.

Consumers' newer, more economical automobiles seem to balance out their household's fleet. Many save their beloved Cadillac for long trips and zip around town in their small cars. Also, most participants were making other efforts to cut gasoline expenses.

Participants often owned as many as four vehicles for use by members of their households. Their fleets usually included at least one older, larger car (truck or van), which seems to be considered a relic from the days of inexpensive gasoline and long Sunday drives in the country. The smaller cars were generally driven by the family member who does more

driving around town (i.e., commuting to work, chauffeuring children to school and meetings, grocery shopping), thereby leaving the larger vehicles for longer trips when comfort becomes more important than good gasoline mileage. The larger vehicles were also used for carpooling or trailering boats and other recreational vehicles.

However, it should be noted that there were exceptions to the trend mentioned in these groups. In some instances the smaller car was used for longer trips where gasoline economy takes a precedence over comfort. One Tampa resident packed his family into the Toyota Tercel for the family vacation and left the Chrysler Newport in the garage; the family protested, but it was either "we go in the economical car or we can't afford the vacation".

As prices have risen, focus-group respondents have become more aware of the gasoline they are buying. Filling up the tank is now considered a significant expenditure. Cutbacks in driving seem most apparent in personal travel. Many people said that if shopping trips can be consolidated, they may wait several days and run their errands all at one time. Leisurely drives are being eliminated. A few respondents noted that they attempt to trim commuting costs by occasionally trying a bus or some other transportation alternative to the personal automobile. It also should be noted that for some, the idea of cutting back on driving is still just that--an idea. Others noted that they have made very minor but relatively painless changes in their driving habits, such as reducing freeway speed.

Some participants said that because they now own cars that get higher gasoline mileage, they have not seen the need to cut back on their driving. Others are simply willing to absorb the high cost of gasoline to be able to continue to drive whatever, whenever, and wherever they want to.

Although some respondents felt that Americans must alter their travel habits, most will not readily accept the available alternatives such as transit and alternative fuels.

There was discussion of gasoline rationing during World War II and during the gasoline shortage of 1973 when consumers had to stand in line--sometimes for hours--to fill up their tanks. But there was an air of disbelief concerning a severe shortage occurring in the foreseeable future. Several participants felt that oil supplies were dependent on the whims of American oil companies. There were a few people who believed, however, that the American perception of the automobile was going to have to shift, i.e., it must be used more efficiently and economically.

Although public transit was noted as an alternative travel mode, focus-group respondents were quick to point out that few public transit services are oriented to serving many of the trips they make. Bus service, in all cases, was described as inconvenient, slow, and undependable.

Alternative fuels, such as methanol and propane (or even solar or hydro power), were mentioned as a means of reducing the American public dependence on gasoline. However, these fuel technologies were seen as still in the early stages of research and far away from widespread use. Diesel-powered vehicles were also discussed. It appears there are many barriers to widespread consumer acceptance of diesel technology for family cars. Individuals who had owned (or known someone who had owned) a diesel car reported a variety of problems, including a noisy, sluggish engine; frequent mechanical problems; unavailability of diesel fuel; and too little savings (about 10¢/gal) at the pumps for the extra trouble.

In theory, the EV concept seems to be an acceptable transportation mode; however, consumers seem disturbed by limited range, long recharge periods, and high battery replacement cost.

When the moderator mentioned EVs as an alternative mode of transportation, the immediate reaction was that the dependence on batteries would pose a problem. Others speculated that even if consumers could cope with the time span needed to recharge the car's batteries, power companies would not be able to handle the increased demand for electricity that would result from the appearance of EVs.

A few participants recalled hearing about or seeing EVs being used by a local company (e.g., utilities) that was experimenting with the concept. Many of the group members felt that such in-town use for deliveries or short-distance commuting was the ideal use for the cars. Otherwise, they said that some rethinking of life-styles would be necessary before the vehicles could be mass-marketed for personal travel.

After hearing the concept statement, respondents generally agreed that EVs represent a workable transportation idea. Many of the participants felt that electric cars might be practical for them at some point in the future.

There appear, however, to be several wrinkles to be ironed out of the existing product. Very few participants indicated a willingness to bother with frequent battery recharging, particularly when they were on business trips that exceeded the range of the vehicle. There was also some concern about the price of regular maintenance. Some respondents expected to find a "technological fix" over the horizon. They felt that technological problems regarding the frequency of recharging and the cost of replacing batteries will soon be resolved. In addition to showing concern for how the EV would run, some group members were interested in the automobile's body styling for aesthetic as well as safety reasons.

Respondents in Tampa, especially the men, spent much time in the group ruminating about the hazards inherent with the batteries in EVs. They worried about inhaling the acid after an accident, explosions, the effect of the weather on performance, and atmospheric pollution.

Respondents seemed unwilling to accept the realities of EV technology.

For decades Americans have been led to believe that with the scientific expertise we have at our disposal, there is no problem we cannot solve. The significant breakthroughs that have been accomplished seem not to be viewed as marvels but rather as commonplace and routine. Solutions to complex problems are expected, and when they do not occur, consumers express intolerance. The standard complaint is, "If they can put a man on the moon, I don't see why they can't...." This attitude was certainly evident in these groups. There was resistance to accept the descriptions in the concept that EVs will have only a limited range, will take up to 8 h to recharge, that batteries will be large and heavy, and quick charges and spare batteries will not exist.

Many respondents had their own easy solutions. Some said the answer was to turn to the sun and the wind, which were certainly viewed as lower in cost than both gasoline and electricity and perhaps glamorous as well. The example of the battery-powered watch was heard more than once. Of all the drawbacks posed by EVs, limited range is the one that upsets people the most. Thus, the idea of self-re-

charging batteries was offered as a logical solution by several participants. Some people wanted to turn the EVs into miniature trolleys.

Participants appeared resistant to any major change in their driving habits, but grudgingly noted that they could see a limited use for an electric car within the American life-style.

In the final analysis, none of the respondents seemed to really want to have to make dramatic changes in their travel habits. Most admitted that they would probably have to be pushed into buying an EV by changes in exogenous factors such as gasoline availability.

Even as they said that they may not have a future choice in the matter, some participants still qualified their acceptance of the EV concept. In addition, many thought the electric car would be a limited-use vehicle.

Although the participants in these groups had more than one car at their disposal, they seldom thought in terms of fleets, except perhaps for long versus short trips. Even more remote from their thinking is the idea of special-purpose vehicles. People are now accustomed to thinking of their cars as essentially interchangeable, especially with regard to range, and it is their desire that EVs also fit into this mold. Carrying this logic further, if a vehicle is going to be less versatile than its counterparts, it certainly should not have as high a price tag. Individuals are unwilling to pay as much, or more, for an EV that has such limited usefulness compared with gasoline-powered cars.

Inherent in the EV concept is the idea of having to give up something. The higher costs of owning and operating conventional cars already seem to be perceived as sacrifices. The prospect of having to resort to limited-performance EVs cuts further into another corner of the American dream.

It was clear that self-interest, rather than concern for some greater common good, will be the driving force if EVs are ever to be accepted. No one in these groups saw EVs in a positive light because they will decrease our dependence on foreign oil. People do not think in such global terms (literally or figuratively). People are concerned about their own (often short-range) needs, which typically translate into, Will gasoline be available to me and how much is it going to cost? To promise vehicle owners that they will not have to worry about gasoline shortages because they will use electricity instead did not interest them. This was not viewed as an opportunity for freedom but simply changing the name of the captor.

Respondents speculate that electric power may be an appealing alternative now because it is generally in plentiful supply. But what will happen, they ask, if EVs really catch on and the demand for power increases dramatically? They envision power shortages in the same way we have experienced gasoline shortages in the past. Such concerns came to the fore especially in Tampa, which has apparently experienced brownouts in recent years.

In addition to availability, consumers worry about cost. Again, this issue was discussed more vehemently in Tampa, in part because electricity there is considerably more expensive than in the other cities surveyed. The rate in Tampa is 5.34¢/kW-h, more than twice the rate in Sacramento and almost three times the rate in Spokane. Spokane residents realize that they now enjoy some of the cheapest electric power available anywhere in the country. But at a time when energy sources seem to be a here today, gone tomorrow phenomenon, they do not take that reasonable cost structure for granted.

There was definite reluctance to believe that, as the EV concept presented to the respondents states, "fuel in the form of electricity will only cost half as much as gasoline would for the same miles traveled." Thus, given the choice between the known (high gasoline prices for vehicles with high flexibility and long range) and the unknown (EVs, which are perceived to be costly and have severe drawbacks), consumers appear to be more likely to opt for the known. Without the motivation of a crisis in gasoline supplies, encouraging many consumers to consider EV alternatives is going to be a very tough sale.

CONCLUSIONS

The focus-group results suggest some tentative conclusions on the potential market for EVs and on the factors that are important for the consideration and choice of such vehicles. The qualitative findings are consistent with many of the previous quantitative analyses that estimate a very small market share for the type of EV likely to be available in the near to medium range (5).

The analysis of the focus-group data suggests that there is at best a very limited market for EVs in the near term. Barring major transportation fuel supply interruptions, EVs will remain largely a novelty. The principal barriers to consumer acceptance are limited range, long recharge periods, and the high costs of batteries. Among women, especially housewives, limited passenger room and cargo space may also be an acceptance barrier.

Some of the conclusions from the focus-group studies are as follows:

1. Responding households tend to use their smaller cars for the bulk of their around-town driving, but often bring the older, larger vehicles out of the garage for longer trips.

2. As gasoline prices soar, many people have been attempting to trim their bills by cutting back on short shopping trips, riding in company vans to work, or easing up on the gasoline pedal. Because their new cars do not guzzle gasoline, a few participants noted that they feel that they can now drive more than before without feeling guilty.

3. Many believe that Americans may have to lessen their dependence on the automobile, but alternative forms of transportation to the gasoline-powered car do not seem to be very attractive. Public transportation is generally perceived as inadequate, and new fuels such as diesel, methane, or propane (or even those generated from the sun or water) are considered too experimental to be useful to the public in the near future.

4. In theory, the EV concept seems to appeal to consumers as an acceptable means of transportation. However, they do view the EV's battery limitations as posing major barriers to acceptance. These limitations include limited range, long recharge period, and high battery replacement cost.

5. Car owners admit they will not easily accept radical changes in their driving habits, but some seem to see a potential limited use for EVs.

6. The market segment studied in this project contains some subsegments that might be more amenable to EV use than other subsegments. The more likely EV subsegments are better educated, younger, and of higher-income households of related individuals. However, households of individuals with these demographic traits, but not related as a family, probably do too much independent traveling and too little ridesharing to accommodate an electric car.

There were noticeable differences in responses of

participants to the EV concept between cities. Tampa respondents tended to be most negative and Sacramento participants were most positive toward (but certainly not wholeheartedly embracing) the EV concept. However, it is premature, based on this limited evidence, to flatly assert that Sacramento presents the most favorable market for EVs. Many alternative explanations for the perceived differences in response between sites are possible. These explanations include differences in recruiting techniques, changes in the discussion guide, and moderator skill improvement. Differences in the socioeconomic composition of the driving population, driving patterns, and cost of electricity (which is high in Tampa compared with Spokane and Sacramento) may have also influenced responses across sites. The group results suggest a hypothesis that attitudes, life-styles, travel patterns, and economics may favor EV acceptance in Sacramento and Spokane relative to Tampa, but this hypothesis remains to be rigorously tested by using quantitative data. On some dimensions (e.g., fuel cost and air-conditioning availability), it may be that the EV is more attractive in Spokane than in Sacramento, but this also remains to be tested. Such hypotheses could be quantitatively explored by using the consumer preference card ranking data collected from respondents at the end of each session.

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