

Research Report – UCD-ITS-RR-13-11

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ABSTRACT

Plug-in electric vehicles (PEVs) are now being offered for sale to consumers. Contemporaneously, multi-way social interactions among individuals, groups, businesses, governments, and other actors are increasingly facilitated by communication technologies: we take this to be “social media.” Can this confluence facilitate the formation of new interest-based communities among plug-in electric vehicle (PEV) buyers? How might this be important to promoting PEVs? This paper presents the results of 28 in-depth interviews with household PEV drivers in San Diego, California. These PEV drivers show wide variation in their descriptions of who they believe PEV drivers to be, conceptualizations of a PEV, uses of social media to engage other members of the community, and socially mediated and face-to-face interactions with other PEV drivers. Better understanding of the relationship between emerging PEV markets, social media and consumer-based communities will affect the ongoing management of transitions to electric-mobility.

INTRODUCTION

Plug-in electric vehicles (PEVs) are, once again, increasingly relevant to automotive, environmental, and energy markets and policy. In the US, air quality goals pushed PEV agendas in the 1990s; in the 2000s, energy security goals of the 1980s have been reinvigorated and climate goals are increasingly pressing. Conditions under which PEVs can help to achieve these goals have been analyzed (e.g., Axen, Kurani, McCarthy & Yang, 2011; Kromer & Heywood, 2009; NAS, 2010; Silva, Ross & Farias, 2009). Most such studies assume a PEV market size, e.g., a given number or proportion of PEVs, to estimate the effects on emissions and energy consumption. Here, we start to address the question of how to achieve PEV markets of sufficient size to make PEVs relevant and effective. We start with the experiences of early buyers and lessees of PEVs, circa 2012.

The sociological theory of economic “embeddedness” asserts the “quality of ties between actors, the general shape of the social networks they are part of, and their own position within these networks, determine many individual and collective market outcomes, such as the circulation of information, the enforcement of norms, the capacity for creativity and innovation, and economic performance” (Fourcade, 2007, p. 1017). Given their “embeddedness”, social actors do not make atomistic purchasing decisions but are enmeshed in a series of strong and weak social relationships. It follows that PEV demand will be shaped, in part, through interpersonal influence and social networks. Therefore we explore social relations between PEV drivers, whether and how social media facilitate those relations, and what these tell us about the prospects for continued PEV market development.

LITERATURE REVIEW

The literature on mobility and social interaction is growing as researchers begin to understand the importance of social connections and context in relation to travel behavior. Empirical data collected in laboratory experiments suggests that social interaction directly influences decision-making processes (Dugundji et al, 2011). Wilton, Páez, and Scott (2011) demonstrate that the decision to telecommute to work is influenced by social contact and context. Mote and Whitestone (2011) illustrate the importance of social factors in the informal practice of carpooling called slugging. Looking at a small group of cyclist commuters Bartle et al (2012) found that social processes were influential in the transmission of information and subsequent attitudes and behaviors.

Prior research of participants in plug-in hybrid electric vehicle (PHEV) demonstrations also makes a strong case for the influence of interpersonal relationships on consumers’ perceptions of electric vehicles. Axen and Kurani (2011; 2012) found that participant valuation and assessment of PHEVs emerges through processes of social interaction and review how different theoretical perspectives may be used to explain the variety of social interactions that influence people’s perception of PHEV technology. Their research suggests that the development of PEV markets would benefit from increased understanding of the social processes that guide consumer adoption.

Consumer evaluation, adoption, and use of PEVs are embedded in social processes including offline and online interaction that are increasingly intertwined in ways that affect ideas and

definitions of a consumer community. Bickart and Schindler (2001) and Karakaya and Barnes (2010) demonstrate the importance of online consumer communities to information gathering, product purchases and participation in community-related activities. Research in communications has also found that the level to which consumers identify with information sources affects the influence of the information received (McGuire, 1969; Deuze Price, Feick, & Higie, 1989). Bickart and Schindler (2001) found that “exposure to online discussions, such as Internet forums, generates more product category interest than does exposure to marketer-generated sources of information available on the Internet. Online forums of consumer feedback and experience were distinctly more effective in generating product interest than were corporate websites for consumers” (p. 3). Thus consumer-generated information—made widely available because it can be found on-line—may prove to be more important and persuasive to potential consumers.

This paper focuses on the buyers and lessees of plug-in hybrid electric vehicles (PHEVs) and electric vehicles (EVs) marketed to consumers starting at the end of 2010. This emerging household market for PEVs raises questions of continued marketability and consumer acceptance. Moreover, this new PEV market is emerging at a time of growing relevance of social media to everyday life (Deuze, 2011). Broadly, social media—sometimes called peer production or participatory media—is the integration of communication technology and social interaction. This new confluence of mobility and communication suggests the possibility that social media and resulting communities may play a role in the experience of early PEV drivers of the 2010s that was absent from the experience of early PEV drivers of the 1990s. A better understanding of the relationship between emerging vehicle and energy markets, new vehicle and communications technology, and consumer communities will aid policymakers, automobile and energy industries—and the socially mediated consumers—to manage and negotiate this emergence.

Though consumers began to increasingly interact online in the 1990s (Kozinets, 1999), the social media that have emerged a decade later change the possible forms, functions, and meanings of those “virtual” interactions. Social media represent new forms of communications technology that offer alternative mechanisms of information production and dissemination. Growing numbers of consumers use online mediums to interact with businesses, marketers, and importantly, one another. Information consumption is increasingly becoming production as consumers move away from being passive recipients of information to producers of knowledge, expertise, and opinions about products (Fiona, McQuarrie, & Neilson, 2011).

Present efforts to market PEVs differ from prior efforts not only in terms of policy context, e.g., the addition of climate goals to air quality goals from the last period of PEV market opening in the 1990s, and PEV technology, but also in the information context in which consumers can participate. Unlike the 1990s, the Internet in general and social media in particular are used by manufacturers and marketers to communicate to, and with, customers. Further, social media create new opportunities for consumers to communicate with each other through buyer recommendations, on-line forums, and the numerous social media platforms. The Internet has become an important source of information in consumers’ car shopping. According to a survey of over 4,000 US households who had bought a new or used car from a dealer in the six months prior to the survey, 71 percent used the Internet while car shopping (PolkView, 2011). However,

the survey results also reveal that of those who use the Internet, 97 percent said social media did not influence their decision.

The literature on internet use and automobile marketing has focused on communication between manufacturers (or marketers, brands or some other representation of supply) and consumers to the exclusion of communication between consumers. Listening to PEV drivers talk about their use of social media in their vehicle purchase and use, we hear their role as producers of information (i.e., user-generated content), social capital, and consumption. Stewart and Pavlou's (2002) effort to redefine marketing metrics around the interactive relationship between suppliers and consumers afforded by the Internet does not explore the potential for multi-way interactions between consumers. Heinonen's (2011) typology of consumer motivations (information, social connection, entertainment) and consumer activities (consumption, participation, production) with regards to social media use recognizes the possibility of consumer production of information.

There is much prior research on the effect of the Internet on automobile information search, demographics of those who do and don't use the Internet in the vehicle search and purchase process, prices paid for automobiles, and other related topics; see Kulkarni et al (2011) for their review. Bond et al (2010) examine consumer use of social media with the primary goal to inform marketers how to deploy interactive advertising within social media. Aspray (2011), despite its recent publication and specific focus on markets for automobiles, makes very little mention of the Internet in general or social media in particular. Van Rijnsoever et al (2011) examine the role of the Internet, but not social media, as a consumer information source regarding car purchases; they ask only about their survey respondents' use of Internet websites. Still, their results are intriguing as they identify different information search channels for those interested in environmentally more benign automobiles (though not for PEVs specifically) than for those people who are not.

Prior research regarding the role of the internet in automobile purchase has as yet to capture the effects of social media specifically, primarily focuses on lessons to be learned by manufacturers and marketers, and has only begun to explore whether research on automobile purchase is germane to PEV purchase and use. Our research seeks to answer the question: what role social media, as sites of social interaction, play in citizens' sense of community and consumers' product purchase and use behavior? Drawing on PEV drivers' descriptions of such interactions, this study explores PEV community identification and their participants' involvement in the context of social media use among these PEV drivers. We investigate how and why they may identify with a community of PEV drivers, especially as their participation (or lack of, or even objection to participation) relate to ideas and perceptions of a PEV community.

Social Media and Community

How PEV communities are defined, participant's engagement in them, and how both the existence of and interactions within such communities are constituted by social media are significant to not just early adopters but successive generations of PEV drivers as they use may social media to find out about PEVs, contribute to knowledge bases about new makes and models and changing charging networks, engage their off-line and on-line social networks in intentional or incidental exchanges about their experiences with their PEV, or in any other way participate in the nexus of emerging electric-drive and social media. Before we describe the

specific context for the study including the forms of social media and other social interactions, we review the development of decentralized information systems and their expression in social media. Then we review concepts of community: what are communities, how are they constituted, and what do they constitute?

Information produced on a small-scale, at a local level by individuals either on their own or loosely connected in large groups can now be distributed on a global level. Over the last thirty years, information production shifted from an industrial information economy to a networked information environment. The industrial information economy was characterized by passive consumers and proprietary strategies of information producers. The networked information economy is typified by non-market and non-proprietary models of information production (Benkler, 2006).

Individuals now possess the ability to “share material with one another on an immense scale and at negligible cost.” (Litman, 2001, p.167) As a result we see a “radical increase in the number of information producers and the qualitative diversity of information available” (Benkler, 2006, p.166). These processes accelerate as smartphones replace the personal computer for internet-based information and communication. Sources of information begin to move away from the centralized (often commercial) producers and towards decentralized model of production; millions of individuals can manage their own information labor. These individual actions rapidly aggregate into large-scale informational public goods.

Social media represents a salient model of information production in the networked information economy. In the context of this paper, social media is internet-based consumer-generated content regarding their PEVs that is produced and reproduced through the collaboration of multiple creators and multiple users, and potentially multiple simultaneous creators and users. Social media represents a platform for an information production strategy based on decentralized and self-selected individual—albeit, embedded—action. As such, social media may offers PEV drivers a virtual place to search for, share, and store information about a product, service, social structure—anything that might be of value to the community that creates the virtual place.

Community is, “a web of relationships that encompasses a group of individuals—relationships that crisscross and reinforce one another, rather than simply a chain of one-on-one relationships... [It] requires a measure of commitment to a set of shared values, mores, meanings, and a shared historical identity—in short, a culture” (Etzioni & Etzioni, 1999 p. 241). Scholars point to three characteristics of community: communion, and interest, and place (Lee & Newby, 1983; Crow and Allan, 1994; Hoggett, 1997). Communion is a sense of attachment and belonging. Communities are characterized by their members’ shared interests. A community consists of members who occupy the same physical or virtual place in which their interactions are carried out. A community based upon common interests creates a sense of shared self-identity and in turn paves the way for the emergence of a virtual community who interact through electronic media such as a chat room, listserv, or forum. Communication technologies enable the development of virtual communities not limited by physical proximity. They facilitate virtual gatherings where (and when) participants can enact their community as they share their common interests. Often virtual communities are formed around interest in a consumer good and

community interaction focuses on topics that reflect this common interest (Dholakia, Bagozzi, & Pearo, 2004).

These emergent internet communities offer new alternative practices for engaging with PEVs. In the networked information environment commons-based and non-proprietary (social sharing) production models exist online. These behaviors are characterized by reciprocity, social sharing, and exchange. Though reciprocity has always existed in social relationships it now extends beyond the “domains of building social relations of mutual interest and fulfilling emotional needs of companionship.” (Benkler 2006, p. 92) Reciprocity is central to the production strategies in the networked information economy as a motivating, informing and organizing behavior.

Preece (2004) discussion of communities of practice is a useful way of conceptualizing and explaining online interest-based consumer communities engaged in information production. She explains that a community of practice as “a group of people who come together to learn from each other by sharing knowledge and experiences about the activities in which they are engaged” (p. 294). According to Preece, reciprocity is a central feature of communities of practice that works at two levels. At the individual level, specific reciprocity plays out between two members of the community. On the other hand general reciprocity is the participation of any individual acting in the interest of another with the expectation of reciprocation from the general community at some point in time. The community is simultaneously constructing and constructed by a shared system of knowledge, behaviors and practices that characterize the group.

With the advent of social media, existing understandings of markets, the development of new markets and new technologies, and consumer behavior and communities are being reexamined. Understanding social media use is important because depending on the valence of the discussion, the knowledge and information produced can have a different impact on potential consumers or the direction of market development. This is significant because consumer will play an increasingly important and complex role in co-constructing electric vehicle markets

The PEV Forum and Meet-up

Two of the community-formation processes constructed by the PEV drivers are an on-line PEV forum and in-person meet-ups organized through social media. The PEV forum is an online discussion site where members may post messages and questions, as well as read and respond to other posts. The posts are organized and archived into “threads” on the same topic. Anyone can access and read the archived posts but only PEV forum members are able to post and respond to posts. Any member may contribute to a thread and multiple members may post to the same thread. Conversations do not occur in real time as they do in a chat room but occur over time due to the post and response format of the forum.

Online activity is understood in the context of embeddedness, that it coexists with, is shaped by and depends on social relations. Members of an embedded online community may also be connected through a variety of offline social relations and networks. For example, some PEV drivers use the on-line forum to organize offline social interactions including face-to-face meet-ups. Frequently, notes and pictures from the meet-ups are posted on the forum afterward.

This discussion motivates our research questions. How do PEV drivers define themselves as a community and how do they describe their relationships with one another? How do these communities extend offline? What is the focus of discussions within the community offline and online? How are PEV consumers using social media? How do early PEV drivers relate to one another and their vehicle? What role does specific forms of social media play in these interactions?

METHODS

Interview Design

Data are from interviews with owners and leasers of PEVs in San Diego County, CA in March and April 2012. Four researches participated in the interviews; two per interview. The interviews were semi-structured. A list of topic areas guided the interview: purchasing the PEV, driving and charging, information sources including the vehicles' instrumentation, community identification, and social media use. The interview questions were open-ended to encourage participants to discuss issues they believed important, to expand on the topics, and raise topics not included in the protocol. This approach allows drivers to convey in their own language their experience with their PEV, communities of PEV drivers, and use social media. Interviews lasted between one and two hours. Most were conducted in the home of the PEV driver though some were conducted the respondent's place of business. In recruiting and scheduling, households were encouraged to make everyone available who drives the PEV.

Participant Sampling

San Diego County, California was one of the regions in Ecotality's, Inc.'s EV Project; households who participated in that project in this region provided the population of PEV drivers from which our sample was drawn. The EV Project offered PEV owners and leasers a free home PEV charger and subsidized installation in exchange for the household's PEV charging data. These households had to own their home and have a suitable parking and charging location on their premises. The PEV drivers sampled for the interviews were selected from a group of nearly 500 households who had received a free charger by early 2012. On average, the population of households from which participants were sampled has higher income, age, and education levels than the general San Diego population. These differences are similar to those between other samples of new car buyers and their corresponding general populations (Axsen and Kurani, 2008; Axsen and Kurani, 2013). Given this general description, households for these interviews were selected from across the available variety of PEV owners, defined by: 1) income; 2) gender; 3) age; 4) without or with home solar photovoltaic systems, and 5) employed or retired. Most of the interviewees owned or leased a Nissan Leaf; a few owned or leased Chevrolet Volts. As such, the majority of this discussion reflects the experiences of drivers of a particular EV, within a single region, at an early time in the sales of vehicles and deployment of charging infrastructure.

Data

Each interview was audio-recorded and supplemented by field notes and observations taken during the interview. As the interviews were completed, the pair of researchers who conducted the interview reviewed the audio recording and compiled a summary of each household. The summaries included the major themes, common experiences, ideas, and valuations discussed in the interview and specifics of each person's experience with their PEV. To identify shared themes the interview summaries were compared across households in a three-part process of open, axial, and selective coding (Braun and Clarke, 2006). Researchers begin by identifying themes and assigning them initial codes. These initial codes were reviewed and verified through axial coding. Finally selective coding is used to look for illustrative examples of the identified themes (Neuman, 2003).

RESULTS

Results are presented in four sections. The first focuses on descriptions by PEV drivers of who they believe PEV buyers are. The second covers the variety of ways PEV drivers describe a PEV community and how they position themselves in relation to any perceived community. The third discusses how drivers engage social media. The fourth describes the ways in which PEV drivers interact offline, with one another and with non-PEV drivers, in particular the role of social media in these off-line interactions. These four sections provide a descriptive account of the online and offline social relations among PEV drivers and how these social relations are produced, reproduced, and altered by social media.

Who Do PEV Drivers Think PEV Drivers Are?

The majority of interviewees offered descriptions of who they thought new PEV drivers are. Our respondents offered a wide variety of descriptions—whether or not they actually knew any PEV drivers other than themselves. Peoples' descriptions of other PEV buyers often were stated in comparison or contrast to themselves using phrases such as “like me” and “not like me.” Within this general comparison and contrast, three themes emerged from these descriptions of other PEV drivers: 1) Like/unlike Prius drivers; 2) Technologically oriented; and, 3) Risk takers and pioneers. The separation into distinct themes is not as clear-cut in the respondents' descriptions; frequently multiple interrelated themes were found within descriptions of other PEV drivers by a single respondent. These themes identify the interests around which PEV communities of interest may form, with possibly one important exception: while several PEV drivers described themselves as concerned about energy security or petroleum use, none ascribed this characteristic to other PEV drivers.

Several PEV drivers believed that PEV drivers were just like Prius drivers. In general, they meant politically liberal, affluent, and environmentally oriented or at least concerned with projecting a green image. One PEV driver said,

The Leaf is probably an extension of sort of the Prius. You know, like when the Prius came out, there were people...[who] had the means to buy maybe something more expensive than a Prius for instance. But the Prius was a new type of status symbol, the badge of ‘I’m being green; I’m doing what I can.’ The

newer commercially available electric vehicles, I think are probably sort of an extension of that.

Among our interview subjects many were previous or present owners of hybrid cars, including the Prius. In this sense, some respondents were describing themselves as PEV owners and ascribing their vehicle choices and motivations to other people.

However, others believed PEV drivers were dissimilar to Prius drivers. Some agreed with the association of the Prius with environmentalism, but connected the emergence of PEVs to other interests such as cost savings. Some respondents suggested that given rising gasoline prices and growing concern around energy security and petroleum use, PEV drivers may have different motivations than Prius drivers. Others distinguished the new PEVs from the Prius based on their belief the new PEVs have not yet become a symbol of any particular belief or lifestyle. One driver elaborated,

It hasn't gone to the Prius level... The Prius has become kind of a social symbol in a sense. If you have a Prius it indicates something about you. So far I don't think Leaf has gone that far to be a social symbol.

Some respondents who compared PEV drivers to Prius drivers believed that PEV drivers, as a whole, are environmentally conscious. One term frequently offered by these respondents to describe PEV drivers was "environmentally minded"; a set of beliefs they thought corresponded closely with liberal political views. Those who tended not to compare PEV drivers to Prius drivers did not necessarily view the new PEV buyers as environmentally conscious.

Regarding the second theme, here was greater agreement among the respondents that the "new technology" of PEVs were a greater draw for PEV drivers than the vehicle's environmental impact. Another term that came up frequently to describe PEV drivers was "technology oriented." One driver explained, "At least right now... the people who are interested in [Leafs], happen to be somewhat technical people." Others described PEV drivers as "techie" or people who had scientific or engineering interests. Some respondents who worked at technology companies explained they, and their colleagues, were interested in the car because it was "the new big thing." Often they were excited to associate themselves with this group and what they saw as like-minded people.

Some respondents thought an interest in technology stood in opposition to a concern about environmental issues, dividing the types of people who drove PEVs. One household explained this dichotomy, "[PEV drivers are] mostly nerdy liberals. [However,] there are actually a few really conservative people and they're just technologically interested in the whole scheme or whatever."

The third theme arises from the labels "risk takers" and "pioneer" that came up in several descriptions of PEV drivers. Many respondents believed that new PEV drivers are willing to take new risks. One driver said, "I think, you know, there's a sense of being a little bit of a pioneer. And of doing something that's probably ecologically beneficial." Another driver identified herself an early adopter, taking a risk with a new technology. She explained, "I'm usually not an early adopter because I work in technology. This is a rare thing for me to jump on the first model year." One PEV driver related this pioneering spirit to gender in describing who buys PEVs, "Mostly men. I guess it's a man's car. It's not a muscle car. It's just the technology and I think

that men are willing to take more of a risk.” Many drivers associated this risk taking with a desire to improve society, the environment, or an emerging technology. Some of these drivers connected being an early adopter with a responsibility or aspiration to promote the vehicle and engage in outreach to larger populations.

Community

Given these disparate views of who other PEV drivers are, is it possible that these PEV drivers, or subsets of them, are forming viable communities? While descriptions, definitions, and even belief in the existence of PEV community varied widely among these respondents, most of the PEV drivers interviewed believed there exists some sort of community of PEV drivers.

Descriptions of PEV community.

A few PEV drivers believed a community defined primarily by one of the three themes or shared interests existed. However, their descriptions were of communities with low communion. One driver suggested that PEV drivers were no different than any other interest group connected by the fact that they purchased the same car. Another explained that PEV drivers form a “community by association but they are not proactive.” In the words of another respondent, who offered an example of very loose cohesion, “[EV drivers] wave to each other,” implying little interaction beyond this.

Others believed a more robust and proactive PEV driver community was beginning to form. One driver explained his desire for communion with other PEV drivers,

“I am very interested in other people who have one ... I’ve never spoken to anybody else who has one. But I see them. I know they’re out there... Of course if I ever met anybody else who has one I’d really want to talk to them.”

For some of these PEV drivers, the PEV community exists online. One driver explained that the PEV community “is online, I mean the [LEAF] forum is that kind of community. There are people who love to get together with other people just because they own the same thing.”

Two respondents from the same large company with several employees who drive PEVs referred to a work-based PEV community as the primary one with which they identified. This small, localized PEV community and its online activities are limited to workers in their company. One spoke about members of this PEV community as “problem solvers.” Before buying his PEV, he spoke with members of his work-based PEV community but did not talk to any PEV drivers outside the company. This work-based PEV community may be primarily interest-based, but it is also brought together by proximity; the group manages the parking and charging resources available to them on their campus. Even if their work roles don’t bring them into regular contact, they see each other’s PEVs parked and charging and may meet in-person when fulfilling the community’s etiquette about making charging available to other PEV drivers.

This is also an example of what many PEV drivers we interviewed believed, that multiple communities exist: a smaller local community based on proximity, e.g., work, neighborhood, or other non-virtual space, and a larger online community. One driver who works at the same company said,

“Yeah, I’m not the most active member. I’ve posted a few times to our little community here. There are some active members on our forums and they’re also active in the [larger,

public EV] discussion forum. They go to those meet-ups. I read the reports but I haven't ever gone myself.”

Another driver suggested that the online community represented one form of a PEV community while non-virtual interactions represented another,

“Is there a Leaf community outside of the web? There is a small Leaf community. Leaf owners tend to recognize each other, and you know, there is kind of a tribal stratification of Leaf owners.”

For others, the PEV community is more strongly represented by EV owners rather than PHEV owners. The few PHEV drivers interviewed believed that there was less of a sense of community amongst themselves than among the EV drivers. One PHEV driver explained,

My perception is that there's a lot more allegiance and sense of community with [EV] owners... the pure electrics as owners seem to have more passion and sense of purity. The [PHEV] owners are much harder to get to do outreach or to participate, so when they do connect there's a lot of enthusiasm but it seems much more difficult to have them kind of become a part of some sort of outreach or collective sharing.

In this respondent's opinion, the EV community formed as a result of the vehicle sales and distribution process. As EV drivers contacted one another and set up online spaces to share information about vehicle dealerships, and how to order vehicles, they began to form communities that carried forward even after they received their cars.

Belonging to a PEV community

While 21 of the 28 households interviewed believed PEV communities exist, only eight identified themselves as belonging to them at all. For some this meant interaction with friends and neighbors. One PEV driver said, “I have friends that have [EVs]. This community of San Diego has a fairly high penetration of [EVs]. There are three [EVs] on this street.” For at least one PEV driver, the community went beyond his neighborhood or circle of friends. He explained that he felt connected to a community of PEV drivers because San Diego is one of the early launch cities for PEVs and one of the EV Project cities: “I was very lucky to live in San Diego because one of the pilot programs is going on. If I lived in some other city and I was enthusiastic about electric vehicles, I would be frustrated.” For others, a sense of belonging came from participating in the online community. One respondent in particular said he felt like he was participating in a PEV community when he was on the forum. Another household strongly identified with the PEV drivers who attended the meet-ups that were organized through the online community. They explained that they relied on the face-to-face meet-up community to learn the norms and behaviors appropriate to the PEV community. In their words the PEV community “is a fun wacko group... There are people who tell you how to behave as an EV operator. They're a generous bunch; they give.”

Believing there is a community is thus tied to participating in that community; belief in a PEV community is a necessary but not sufficient condition for participating in said community. The proposition seems supported by those who do not participate; lower participation is tied to a lower belief in the existence or strength of a community. Some of PEV drivers identified themselves as observers who maintained some connection with other PEV drivers but viewed themselves as only partially engaged participants in a PEV community. The reasons for this lack of engagement varied. A few of these respondents expressed an interest in participating but maintained that a lack of time, citing work or children, was an obstacle to engaging fully in a

PEV community. Others indicated that participation in a PEV community did not fit into their lifestyle. For example, a few households explained that they did not see themselves as the kind of people who participated in communities or interest groups and they were not particularly social people. A few drivers felt that not knowing other PEV drivers personally excluded them from the community. Going even further, some drivers specifically identified themselves as not belonging to a PEV community. They offered a variety of ways in which they were involved with or connected to other PEV drivers, but said they did not belong to a PEV community.

Online Interaction

Online Forums: Staying Informed; Building Community

The online forums represented an important resource for many of the PEV drivers. Of the households interviewed, eight reported using and contributing to the forums and twelve more reported they read but did not contribute content to the forums. Those who used the forums but did not contribute offered a variety of reasons for not participating further. There was a consensus among the non-contributors of the usefulness of the forums and many related feelings of obligation and guilt connected to their lack of active involvement. One driver explained he thought everything he could contribute had already been discussed, and he did not want to appear to be a “whiner” by bringing up too many issues on the forums.

In several ways, the PEV drivers accessed the forums for information, contributed information to it, and thus began a database on vehicles and chargers that not only informs the community, but is one of the activities that is vital to forming and sustaining the community. One of the most important uses of the forums for all users was initial fact checking and information search during their vehicle purchase process. Before buying or leasing the car, drivers looked to the forum for information and tips about dealers, rebates, leasing details and purchasing options, charging infrastructure and parking, the vehicle ordering process, and driving range. Some drivers also used the forums to “check in” or “keep-up” with developments such as charging infrastructure or vehicle modifications, to read drivers’ narratives about trips they had made in their PEV, and to find out about upcoming meet-ups or read about meet-ups after they had happened. These drivers explained that they often looked at the forums to see what people have done with their PEVs in a wide range of topics. Several of the interviewees kept up with the forums as their primary way of finding out about charger locations including the progress of charging infrastructure and the status of chargers.

After they got their cars, the PEV drivers used the forums to ask questions or find out more information about several other topics such as: 1) the car’s user interface; 2) driving modes and behaviors; 3) range and batteries; 4) charging, charging infrastructure, and ways of accessing charging infrastructure; 5) time-of-use (TOU) electricity rates; 6) energy consumption; 7) safety and reliability issues; and 8) maintenance. For many of the drivers these questions were related; they searched out narratives that connected range and driving behaviors, how to use the interface to find charging infrastructure, and how driving modes or energy consumption in the car (A/C use) affect the range or state of charge. One driver explained his search for understanding how driving behavior was related to range and battery charge:

The discussions about range and, you know, some of the things I’ve picked up on those boards. It really hits you over the head how much difference you can get going slower,

like 35 miles an hour versus 65... I use that as a technique when I know I've got to stretch things out.

The forums offered information about PEVs and experiences gained from driving and owning them that some drivers could not, or chose not to gather themselves. Two drivers reported finding answers on the forum that they were not able to get from a dealership. The first recounted an experience trying to turn off an overhead light in his car and his ultimate success in finding the answer on the forum, "I finally called the dealership and said 'what's up with this light that won't go off' and he said 'I don't know, you'd better bring it in.' I went...to the forum and immediately got the answer." Another driver's interest in technology led her to the forum and what she believed was a community of scientific and engineering oriented PEV drivers. The forum allowed her to more fully engage with her vehicle and learn more about its capabilities in ways she believed she did not have time for otherwise:

"The forum is really a great place for finding information...I just love the scientific and engineering community when they get their hands on something like this they will analyze it down to the last fraction of a kilowatt hour and there are some people out there who have done some cool investigative work...I love that kind of stuff...I'm not quite interested enough to actually go out and do it myself but I know there's people out there who do it. It's great, you can find some great information that way."

One driver expressed an interest in reading more narratives about other driver's experiences beyond the discussions on the forum. He explained,

I would definitely be interested in other peoples' experiences and if there were a place I could go to read about that I would definitely do that...What they thought in their own words, that's like a blog kind of thing.

For all its usefulness to PEV drivers, they also describe diminished use over time. After the initial purchase and adjustment period, regular forum use decreased and many drivers began to visit the forum only for specific questions or topics. One driver explained:

"I used to go there before buying my car quite a lot...But after I got the car I haven't really visited that frequently but occasionally I go just to see what's the latest, let's say in batteries, for example."

Workplace mediated and supported PEV networks: adding proximity to interest

As discussed above, some of our PEV interviewees participate in a PEV community at their workplace. The corporation's internal messaging system, a wiki page, and a listserv devoted to PEV drivers facilitate their interaction. One of the employees explained that the listserv started among co-workers who drove PEVs and who were already familiar with one another; it then spread throughout the company as more people signed up for PEVs.

All three of the PEV drivers at this company with whom we spoke used work-based social media in ways that are similar to the way in which the larger, public online EV forum is used. At least one of the drivers uses only their company's social media to access information pertinent to his car. The other two revealed that they were more involved in the company's PEV-related social media than the public forums but they did use the public forums, too. All three drivers spoke about company specific charging etiquette developed through the message system, listserv, and face-to-face interaction. Creating, negotiating, and upholding this set of guidelines is one of the defining characteristics of the workplace-PEV community that distinguishes it from the more

solely interest-based public community. That the PEV drivers at this workplace are in proximity to each other and have a local charging resource to manage gives them additional impetus to form and sustain their smaller community.

Offline Interaction

Using social media to create interaction in the “real” world

PEV drivers do use social media to organize and publicize local, in-person meet-ups; the online forum is often used for this purpose. Participation in these meetings by our sample members was limited. Four households reported they attended a meet-up and many other households have attended a demonstration or PEV event not organized through the forums. One driver who had attended one meeting expressed interest in attending more but cited time for his children as a reason for not having done so. In contrast, another driver attends a monthly meeting, but said he was intimidated by engineers and technically-knowledgeable PEV drivers,

When I go to these meetings ... it's very intimidating. Half of [the other attendees] are engineers. They talk about things... I don't know what they're talking about. So a lot of them got it because of the technology. I got it because I thought it was a great concept. These experiences are frustrating for him because he likes the car, would like other non-technical people to be interested in the car, and would like the meetings to be less technical.

One household was particularly involved in the meet-ups and strongly identified with the PEV drivers that attended the meetings. They explained why they first attended:

I think the first one we went to we didn't have a car yet. We might have even gone to maybe even two before we got a car. It was to desperately find out information about when [the cars were coming]... It was probably in January when we went to the one and just to see people that had them and how they liked them, and get tips on them, and what they're doing.

However, most of the PEV drivers interviewed had not attended a meeting. Some expressed interest in attending meetings but cited a variety of reasons for not yet attending one. One driver expressed interesting in starting to attend the meetings,

[I] saw an article... about a Leaf user group somewhere up in Orange County and I'd kind of like to go to that... either that group or the one in San Jose has some hacks to the system so you can get more accurate reading on your available range and have done some other things. So I'd be really interested in finding out what other people know about these cars.

Another driver indicated that his coworkers attended the meetings but that he has not yet gone, “I don't have too much discussions but I know a lot of people from my company they go to some of these events. They have these events once a month...” Many drivers expressed little interest in attending any meet-up or gathering. Some explained their lack of interest stemmed from dissimilarities between themselves and other PEV drivers. Those who identified with other PEV drivers expressed more interest in attending meet-ups or gathering while those who saw more dissimilarity between themselves and other PEV drivers expressed less interest in attending.

CONCLUSION

We discuss the connection between perceptions of PEV drivers, a PEV community, and interest in interacting with a PEV community both online and offline. We describe engagement with the idea of community and online social media both of which reveal the diversity of social interactions among these PEV drivers. Further, we describe what these communities are producing—in addition to producing themselves. We conclude in brief that social media are facilitating but not sufficient for the creation of PEV driver communities with high levels of communion or shared interest. Social media do change the idea of a community being located in a physical place, expanding the possibilities to include virtual places.

The PEV drivers we interviewed show wide variation in their descriptions of who they believe PEV drivers to be, conceptualizations of a PEV community, uses of social media, and social interactions with other PEV drivers. Respondents often described other PEV drivers in relation to themselves: like or not like. PEV drivers are far from united in their belief in “PEV communities.” Those who affirmed or conditionally affirmed the existence of a PEV community are divided as to their active participation in such a community—even to the extent to whether they want to participate. The reasons for identifying with or not identifying with the community varied. At present there is no singular description of PEV drivers or a PEV community, however the shared themes indicate some common ideas of both. These results indicate that most of the participants are still in a process of discovery: they are evaluating other PEV drivers, their ideas of a PEV community, and how they position themselves in relationship to both.

As with their ideas about other PEV drivers and the existence of a community PEV drivers varied in their use of online social media related to PEVs. Respondents who used and contributed to or used online social media reported a wide variety of uses. These results suggest the workplace and public social media used by PEV drivers are multifunctional, i.e., able to fulfill a variety of goals across different community members (Matzat, 2009). Even most of those who claimed to not participate in the on-line community used the on-line resources that community produces for information about PEVs, the purchase and lease process, location of charging infrastructure, and other information crucial to their acquiring and using their PEV.

Respondents reported a wide variety of offline social interactions or interest in expanding offline interactions both with PEV drivers and with wider audiences. For some drivers, disinterest in participating in offline social interactions with other PEV drivers was combined with their ambivalence toward both other PEV drivers and a community of PEV drivers. In particular those who did not identify with other drivers or a PEV community did not value offline social interactions. Participation in an offline community was tied to identification with a PEV community or PEV drivers. PEV drivers who enjoyed attending the meet-ups identified with the PEV community. Those who did not enjoy attending the meet-up did not identify with the community.

Respondents also expressed interest in or reported interacting offline with non-PEV drivers and future PEV drivers. Some connected this interest with their experiences with or perceptions of a PEV community online, or their experiences with or perceptions of other PEV drivers. Others tied this interest to their perception of PEV drivers as pioneers or early adopters. These

respondents connected their early adoption of a PEV with an obligation or desire to expand the PEV market and provide information to potential PEV drivers.

Taken together, these insights present the early PEV buyers as a varied set of people. Even if most of these PEV drivers disclaim membership in a PEV community, most use resources created by a PEV community whose existence they recognize. This suggests the importance of interpersonal interactions and social media in the early market for PEVs even if pro-active participation in a PEV community is far from universal amongst these PEV drivers. The interactions between ideas of community and perception of other PEV drivers suggest possible avenues for understanding how and why consumers participate in online social media or offline social interactions. It seems clear that participation in community builds, and is built upon, identification with community.

Social media is important in this case as it allows people with a common interest but not common location to create a higher level of communion than they might otherwise be able. Social media are used to facilitate personal interactions amongst a subset of PEV drivers and reflect those face-to-face interactions to a larger, if overlapping, subset. Social media are serving as the platform upon which some early PEV buyers are building an information resource for their own use that will be available for future PEV buyers.

We acknowledge research on these early buyers may be interpreted by some as irrelevant to future consumers. In response we posit that an understanding of the emergence of a PEV community—and as it appears, at least partly through social media—will shape how the PEV market may unfold in the future. The rise of a mediated network communications environment is removing spatial and temporal constraints on effective information production and dissemination by and to consumers; it is facilitating consumers to act also as producers of knowledge and expertise. This change has implications for how consumers make sense of the world, form opinions, and communicate with one another. Social media helped to create a community among at least some of the PEV buyers in San Diego and social media makes access to that community easier for potential PEV buyers anywhere and anytime.

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