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Wired for Gasoline: Consumers and Value Construction in the Plug-in Hybrid and Electric Vehicle Market

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Wired for Gasoline: Consumers and Value Construction in the Plug-in Hybrid and Electric Vehicle Market

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DISSERTATION

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ABSTRACT

The development of Plug-in electric vehicles (PEVs) represents the introduction of an alternative technology into a deeply embedded market—as automobiles and gasoline have been linked to one another through multiple and overlapping cultural, political, and technological developments since the early 1900s. The emergence of a market for PEVs takes place within an existing transportation system based on privately owned individual internal combustion engines that is entrenched in myriad symbolic, material, spatial, and habitual ways, and influences nearly all aspects of social life. This dissertation explores the matrix of political, economic, and cultural elements that combine to create a historically contingent context for the PEV market, and analyzes consumption within this context to offer a case study of consumer behavior in an emerging market. This research uses qualitative data, collected from semi-structured in-depth interviews, group workshops, and focus groups during a three-year period, to identify the prevailing qualities consumers attribute to PEVs, and explain how they provide symbolic and functional value for consumers.

This dissertation advances theories of valuation using the PEV market as a case study to illustrate how consumers negotiate value in an emerging industrial market. I argue that consumers perceive that a given quality (or qualities) of a PEV produces a particular performance which becomes, if viewed as desirable, a source of value. The value an individual consumer derives from the expected performance of a PEV is translated into an amount which they can then compare to the price of the vehicle when deciding whether to make an exchange. PEV drivers make their purchase expecting their vehicle to provide simultaneous performances in their physical state, their social position, and their imaginative world. I find that the

environmental and technological qualities consumers assign to PEVs offer important sources of physical, positional, and symbolic value beyond the financial benefits often assessed in studies of PEV adoption.

I argue that much of what is valued in the PEV market reflects the broader social values informed by sustainability ideology and the entrenched system of automobility. Moving from explaining sustainability policy narratives to describing dominant trends in analyses of consumers in the PEV market, I find that sustainability discourse, including analyses of pro-environmental behavior, acts as an influential discourse that shapes consumers' processes of valuation and evaluation of PEVs. In their narratives of (e)valuation, consumers attributed qualities (and subsequently value) to PEVs in ways that reproduced the myths of individual responsibility and technological utopianism based on ideological commitments to sustainability, even as they negotiated the boundaries of both. The relationship between sustainability ideology and PEVs reveals how institutions, ideology, and the socio-historical context of a market shape value creation as much as the interpretive activities of consumers.

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GLOSSARY OF ACRONYMS

AFV	Alternative Fuel Vehicle (e.g. PEVs, hydrogen fuel cell vehicles, natural gas vehicles)
BEV	Battery Electric Vehicle
CARB	California Air Resources Board
CCT	Consumer Culture Theory
CI	Convergent Interviewing
DOE	(United States) Department of Energy
EVSE	Electric Vehicle Supply Equipment (i.e., charging station or charging dock)
FCEV	Hydrogen Fuel Cell Electric Vehicle
GHG	Greenhouse Gas
HEV	Hybrid Electric Vehicle
ICEV	Internal Combustion Engine Vehicle
IEA	International Energy Agency
LEV	Low Emission Vehicle
MAC	Markets-are-Culture
MHC	Markets-Have-Culture
PEV	Plug-in Electric Vehicle (includes both BEVs and PHEVs)
PHEV	Plug-in Hybrid Electric Vehicle
RP	Revealed Preference
SP	Stated Preference
TPB	Theory of Planned Behavior
VBN	Value-Belief-Norm theory
ZEV	Zero Emission Vehicle

CHAPTER 1: INTRODUCTION

A Magical Space Car

In his well-known online comic, *The Oatmeal*, artist Matthew Inman (2014) recently released a comic prophetically titled: "What it's like to own a Tesla Model S: A cartoonist's review of his magical space car." After explaining many of the car's features he gleefully declares, "And I love my 'Intergalactic Space-Boat of Light and Wonder. My Electric Cruise-beast of Protons and Wormholes." A few years later Inman's analogy became reality when, in December of 2017 founder, CEO and lead designer of SpaceX[1], Elon Musk, announced on twitter that the company would launch its Falcon Heavy rocket into orbit with Musk's own bright red "midnight cherry" all-electric Tesla Roadster as the rocket's dummy payload. As I write this paragraph Musk's Roadster successfully launches from the Kennedy Space Center to begin an Earth-Mars orbit around the Sun. In the driver's seat is the human-sized doll "Starman", dressed in a SpaceX prototype space suit and listening to what else but David Bowie's Space Odyssey. The launch is livestreaming on the Space X website and reported on by a number of other media outlets both on television and online.

Conveniently, Musk is also the co-founder, CEO, and product architect of Tesla Inc.[2], the company that manufactured the Roadster—an all-electric vehicle whose production initially ran from 2008 to 2012, though Tesla anticipates reintroducing the Roadster to the market in 2020. The Roadster is not the only electric vehicle to boldly go where no one has gone before. Mid-20th Century, the extraterrestrial Lunar Roving Vehicle, which the Apollo astronauts used to travel on

[1] SpaceX is a private American aerospace manufacturer and space transport company.
[2] Tesla Inc, formerly Tesla Motors, is an American automaker and lithium-ion battery energy storage producer as well as a solar panel manufacturer through its subsidiary SolarCity.

the moon, represented the most-high profile EV of that era. That the Lunar Roving Vehicle holds little technological importance for terrestrial transportation reflects the concurrent social significance of the electric vehicle after its initial boom at the beginning of the 1900s. In contrast the Roadster, as not only the first mass-produced vehicle in space, but also the first highway-legal, lithium-ion battery, all-electric vehicle with a previously unheard-of range, represents the much more significant re-introduction of consumer electric vehicles into light-duty transportation and the start of the third era of Electric Vehicles.

Teslas are not the only luxury all-electric vehicle to gain notoriety. In 2016 Saturday Night Live ran a sketch with Julia Lewis Dreyfus advertising Mercedes' new electric vehicle, the Mercedes AA. In the sketch, Dreyfus saunters around the car narrating the unique features of a luxury battery electric vehicle. She begins, **"**introducing the Mercedes 'Double A' Class. The first fully electric luxury sedan powered entirely by double A batteries. No more plugs. No more charging stations." She pauses for the big reveal, "just 9,648 double A batteries!" Dreyfus continues her pitch, "Zero emissions, life-time drivetrain warranty and a top speed of 52 miles per hour. Everything you've come to expect from Mercedes… On board satellite navigation. Bose stereo system. And ample trunk space to store extra batteries. And it is the only luxury sedan to receive the prestigious double A plus Grade from *Batteries Magazine*. You can replace one battery at a time or all at once, with the ribbon release dump feature…" After the sketch aired Mercedes responded favorably to the spoof by offering a complimentary "charging station", an AA battery wall outlet charger, to go with the Double A class vehicle (Plante, 2016).

By the time of the Saturday Night Live sketch in 2016 mass produced electric vehicles had been on the market for eight years and were beginning to emerge as a small but steady presence across media platforms and, if not universally, in the consciousness of at least some

American consumers, particularly within certain high-profile segments of society. The high-tech industry and tech-enthusiasts represent one such group. In early December 2017, *Wired* magazine boldly declared that 2018 represented the beginning of the age of the electric vehicle. "At last, the age of the electric car really arrives" (Stewart, 2017). As though the myriad elements integral to the success of the electric vehicle market have finally come together to provide consumers with the long awaited and much anticipated superior alternative to internal combustion engines—which in the case of tech enthusiasts may very well be true. Electric vehicles are also making an increasing appearance among celebrities. For example, the BMW i8 (a plug-in hybrid electric vehicle) is becoming popular among hip hop artists. Several well-known celebrities including, Ashton Kutcher, Taylor Lautner, Alicia Keys, Joe Jonas, and Justin Beiber, who received his as a birthday present on the TV show *Ellen*, own the (now defunct) luxury all-electric Fisker Karma[3] (Tijhuis, 2017). Leonardo DiCaprio drives a Fisker Karma, a Tesla, and a Toyota Prius and actively promotes electric vehicles. Just last year actress Margot Robbie, known for her roles in the Wolf of Wall Street and Suicide Squad, became the official "E[lectric] V[ehicle] ambassador" for the all-electric Nissan LEAF (Lambert, 2017).

One early LEAF driver we spoke with in 2012 was overjoyed to discover the LEAF being used on a television show, and initially started watching the program just for that fact. She explained that she loved how the driver on the show, who worked for the FBI, talked about needing to charge the car and other aspects of incorporating a PEV into her daily transportation needs. Though PEV media representation occupies a tiny path in the large, fertile landscape the automobile traverses in American culture, the examples given above illustrate how the emerging PEV market is accompanied by the increasing presence of electric vehicles in popular culture.

[3] Fisker Automotive produced the luxury all-electric Fisker Karma from 2011-2012 until the company went bankrupt in 2013.

The category of plug-in electric vehicles (PEVs) contains both plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs). A traditional hybrid, like the early Prius models, uses a small battery to improve fuel economy, but cannot be plugged in to recharge. PHEVs have both an electric motor and an internal combustion engine integrated to allow the vehicle to be fueled by either or both electricity from the grid or a liquid fuel such as gasoline or diesel and has low tailpipe emissions. A BEV is powered solely by electricity from the grid, uses only a rechargeable battery as a fuel source, and has zero tailpipe emissions.

In the United States, PEVs have a strong online presence through social media, several electric-vehicle-dedicated blogs and news sources, discussion forums, government websites, and manufacturer websites. They increasingly appear in print media, films, television, and advertisements. Since, on the one hand, media is one of the means through which ideas are disseminated in society and on the other, popular culture often reflects larger social trends, the growing media representation of PEVs suggests a parallel growing awareness of PEVs among consumers. Since 2008 and the release of the Tesla Roadster, over half a million electric vehicles have been sold in the United States (insideevs.com). The zeal of PEV buyers manifests palpably in a variety of ways. When the first Nissan LEAFs became available buyers avidly tracked their individual vehicle as it traveled from Japan to San Diego and then to the dealership for pick-up; an experience made all the more anticipatory with delays due to the 2011 earthquake and subsequent tidal wave that hit Japan. On March 31, 2016, when Tesla released the Model 3 for reservation, people across the country, from Minnesota to California, lined up outside of showrooms to lay claim to a vehicle that had, at the time, only a tentative delivery date in 2017 (Lindelof, 2016). The Model 3 had over 350,000 reservation deposits before its release (Fehrenbacher, 2016). The PEV market, though still small, occupies a not insignificant place in

the larger automobile industry, and PEVs are simultaneously growing as a desirable cultural good alongside the internal combustion engine vehicle (ICEV).

During the early automobile industry, electric vehicles initially stood on equal footing with other motorized mobility technologies, and yet, were never taken up in great numbers. Markets for electric vehicles materialized three times during the history of the automobile industry in the United States. The first market emerged with the beginning of the automobile industry in the late 19th Century but waned in the early 20th Century, as internal combustion engine vehicles gained popularity. At that time, electric vehicles failed to gain traction in a substantially more fluid early automobile market where gasoline, electricity, and steam fueled vehicles, mass transit, privately owned fleets of vehicles, and individually owned vehicles all represented possible pathways for the development of motorized mobility in public spaces. The second market, fomenting since the 1970s, came about briefly in the mid-1990s as concerns about air quality piqued interest in zero emission vehicles. Finally, the ongoing PEV market originated in the late 2000's, stimulated in part, by a growing sustainability discourse as flagging environmental issues from the 1990s were revitalized alongside energy security concerns.

In recent years, a wide variety of mass-produced plug-in electric vehicles (PEVs) constitute the burgeoning electric vehicle market in the United States. First in the market, Tesla Motors began selling the Roadster in 2008, though as noted above, the company discontinued the model in 2012. In 2010 Chevrolet released the Volt, a PHEV, and Nissan began selling the LEAF, a BEV. In the same year, Tesla Motors received a loan of $465 million from the United States Department of Energy to fund the design and production of a specialized PEV and the building of a manufacturing facility (U.S. Department of Energy, n.d.). The Tesla Model S became available in the Spring of 2012. In the seven years since the introduction of the Nissan

LEAF and the Chevy Volt the number of mass-marketed PEVs increased from 2 to 30. As of January, 2018 17 PHEVs and 13 BEVs, excluding discontinued models (e.g., the Roadster) and sub models, comprise this expanding market (U.S. Department of Energy, 2018). Consequently, even in the face of favorable market trends and growing consumer eagerness, the history of electric vehicles and the socio-cultural context of the current automobile market brings into question the staying power of this market. As I explain in Chapter 3, the adoption of electric vehicles faces an existing transportation system based on privately owned individual internal combustion engines— as automobiles and gasoline have been linked to each other by multiple and overlapping cultural, political, and technological developments since the early 1900s. This context makes especially salient the questions: What does the incorporation of PEVs into the existing transportation system look like for consumers? What is the role of these consumers in the resurgence of PEVs and development of the market?

The development of PEVs and related infrastructure represents a larger phenomenon of early markets, especially those around a new technology. PEVs, however are unique, because they represent an alternative technology coming into an existing mobility regime that is deeply entrenched in myriad symbolic, material, spatial, and habitual ways and influences nearly all aspects of social life. Consequently, the PEV market piques the interest of academics, industry stakeholders, market analysts, and policymakers. For some, PEVs offer a case study of a new-ish technology entering an established market at a more narrow, economic level, and a socially embedded, well-developed technological system based on private, individual internal combustion engine vehicles at a broader social level. Others have a vested interest in ensuring the success of PEVs whether this is defined by toppling the existing mobility regime or by negotiating a space for AFVs within the current socio-technical system of automobility.

Research Aims & Theoretical Contributions

This dissertation explores the matrix of political, economic, and cultural elements that combine to create a historically contingent context for the PEV market and analyzes consumption within this context to offer a case study of consumer behavior in an emerging market. I explain how PEVs provide value for consumers and how consumers determine this value. This includes identifying the types of value individuals attribute to PEVs and the forms that they take, as well as the different dimensions along which PEVs become economically valuable to consumers and the way consumers translate across value types. The arguments presented in this dissertation come from my individual analysis of the data collected during my participation in a research team, though they are undoubtedly influenced by the team-based grounded theory methodological approach to collecting and analyzing data.

The data collection and analysis for my dissertation took place over a period of several years, beginning in 2011 and ending in 2017. Initially I worked with an interdisciplinary research team employing qualitative methods of inquiry alongside large-scale surveys to study consumer behavior in PEV markets. This research team designed studies with the express goal of balancing out the predominance of transportation analyses, which are based on statistical quantifications of individual preferences and attitudes, by using qualitative research methods to study the mechanisms and social processes involved in PEV purchase and use. This purposive design tactic enabled my dissertation to move beyond the current framing of consumers as instrumentally rational actors pursuing maximum utility used by transportation scholars and policymakers.

As a team, my colleagues and I engaged with transportation literature prior to creating and implementing our projects so we could direct our work to address the gaps in existing PEV consumer research. At the same time, we used grounded theory, which calls for minimal engagement with theoretical literature, to guide our research. Despite our knowledge of transportation research, we could use emergent methods because there existed very little qualitative transportation research on social processes and at the time, very little application of social science theories to PEV consumer behavior. The research team I worked with used grounded theory as an initial data collection and analysis method. As I conducted my own, individual analysis of the data, I also took a grounded theory approach. It was only after I began generating theoretical categories from the coding process that I turned toward the sociological literature to situate my finding within the broader academic literature on markets and consumption.

Over the course of three discrete mixed method studies conducted between 2011 and 2015, patterns of consumer evaluation and patterns in why and how consumers assigned value to PEVs emerged from the data. Struck by this, I began to form questions about the processes of assigning value to PEVs: How are PEV consumers convinced to purchase (and use) PEVs? In what ways do individuals attribute worth to PEVs? How is this individual process of consumer preference socially mediated? Initially I looked to the sociology of markets and the sociology of consumption to guide my answers to these questions, and though both fields of study offered enlightening empirical evidence and theoretical insights at first, neither provided a satisfying theory of consumer preference in markets. Ultimately, I found that valuation studies (which draw from both economic sociology and consumption research) offered the best tools for my analysis of PEV consumption. I drew on sociological analyses of preference formation and valuation of

products (Aspers & Beckert, 2011; Beckert, 2009, 2011) along with literature on valuation processes and devices (Karpik, 2010) to help me make sense of my data on consumer behavior in the PEV market. This allowed me to further refine my research questions as I returned to my data. What are the different dimensions in which PEVs become economically valuable to consumers and how do consumers translate across value scales? What is the process of assigning value and what forms does it take (economic, moral, aesthetic)? How do purchasers of PEVs arrive at value judgements and what judgement devices do they use?

As one of the only in-depth sociological analyses of the PEV market and by answering these research questions my work contributes to transportation literature and sociological inquiry in several ways:

First, my background in sociology, the analytical tools I bring to the data, and my theoretical contributions provide an alternative account to the conceptual approaches that dominate transportation explanations, which are heavily influenced by theories from the fields of economics and psychology. There exists a significant amount of transportation research and sustainability research in both political and academic arenas focusing on PEV consumption but within this body of research a limited number of analyses draw on qualitative research methods and sociological theories of markets (see Liao et al., 2017 for a review). By explaining how consumption in the PEV markets is socially structured, my dissertation brings new insights to transportation research and helps reframe how policymakers view consumer behavior. Additionally, some research on PEV consumers takes a pro-environmental cause and effect approach, locating the purchase and use of PEVs within the category of 'ethical behavior'. Rather than define PEV consumption as pro-environmental behavior I look at PEV consumers as market actors behaving in a specific socio-historic context where pro-environmental (or

sustainability) discourse constitutes one of many influences on market processes. Which is to say, I understand sustainability discourse, including analyses of pro-environmental behavior, as an influential discourse that shapes processes of value attribution and evaluation, not as a rigorous theory of consumer motivations.

The current renewal of light-duty PEV sales brings issues of marketability and consumer acceptance to the attention of transportation policymakers and scholars. Transportation researchers generally adopt a rational actor model using statistical modeling of large-scale data sets to explain and predict consumer adoption of new energy and sustainable technology (see Rezvani et al., 2015 for a review). In this model, substantively rational actors make choices based on maximizing utility, subject to external constraints such as budget, preferences, and knowledge of alternative choices. Within the discipline of transportation, a small but transformative body of research on new vehicle drivers challenges the rational choice model, suggesting that most consumers have little experience or understanding of electric vehicle technology (Axsen & Kurani, 2009), and have difficulty quantifying their valuation of fuel economy (Turrentine & Kurani, 2007). Analyses of PEV consumers indicate that consumer assessment of PEVs emerges through processes of social interaction rather than only through isolated calculation (TyreeHageman et al, 2014). Prior research using participants in PHEV demonstration fleets makes a strong case for the influence of interpersonal relationships on consumers' perceptions of electric vehicles (Axsen & Kurani, 2011; 2012). In the literature on vehicle type choice in PEV (and HEV) markets, economic and market researchers have typically focused on vehicle attributes, household characteristics, and principal driver characteristics while not considering the political, cultural, and social influences on consumers. Exceptions that prove the rule offer a more complex understanding of consumer behavior as transportation researchers

attempt to answer the question: why would anyone buy an alternative fuel vehicle? Heffner, Kurani, and Turrentine's (2007) analysis of the social and personal symbolic meanings drivers associate with the purchase and use of traditional hybrid electric vehicles (HEV) finds that households associated HEVs with values including social awareness, responsibility, concern for others, frugality, and intelligent consumerism. Caperello & Kurani (2011) use narrative analysis to catalogue the practices, behaviors, and values each household interviewed associated with their plug-in electric vehicle.

Qualitative methods allow researchers to access the priorities and considerations behind mobility choices. However, in transportation literature, social and psychological studies of driving behavior emphasize individual cognitive and affective determinants of transportation choices to the neglect of a broader understanding of the underlying social structures that shape consumer behavior. This makes even more necessary further qualitative research models that explain how such 'internal' psychological attitudes and preferences are constituted collectively as well as individually. Mobility scholars established that the meanings of car use are fundamentally embedded in social relations of everyday life (Böhm et al., 2006; Featherstone, 2004; Freudendal-Pedersen, 2009) and that an understanding of the interrelationships between the plural discourses associated with car use provide an alternative means of analysis than those that attempt to bridge the so-called "attitude-behavior" gap. Even individual emotional and cognitive attachment to cars are a function of social and cultural factors, processes of socialization, and the meanings ascribed to artifacts and practices of automobility. How individuals declare themselves socially and individually through automobiles reflects their social embeddedness not just their psychological nature. It is clear that alternative vehicle transportation research will benefit from understanding the role of social processes in the

development of PEV markets; and the sociological approach my dissertation provides takes a step in that direction. Better understandings of the cultural and emotional constituents of personal patterns of automobility, which themselves reveal the relationship of transportation consumption to the state, to the political economy, and to historical processes enriches transportation literature as a whole.

Second, my dissertation expands sociological literature on markets and consumption, combining insights from economic sociology and the sociology of consumption to address missing elements in the literature from both sub-disciplines. The current sociology of markets emerged as a response to the growing dominance of neoclassical analysis of markets, produced by market fundamentalists, as economists moved to prestigious positions in the state. Consequently, recent economic sociology has largely been a study of markets, focusing on production rather than consumption (Fligstein & Dauter, 2007; Smelser & Swedberg, 2005) with some notable exceptions (e.g., Zelizer 2005). In doing so, the sociology of markets often neglects consumers and the role of consumers in co-constructing market order. Many economic sociologists analyze markets as comprised of buyers and sellers but focus on how firms operate within these markets (DiMaggio & Powell, 1991; Granovetter & Swedberg, 2011) or the structuring of production (Dowd, 2003; Fligstein, 1996, 2001a) to the neglect of consumption. When economic sociologists take consumption into account, consumers are often treated as passive receivers of goods, or are relatively unnoticed targets for producers' efforts, or as one constituency of organizations among many. Analyses of consumers tend to define consumption as the act of purchase, but not the processes that lead to or follow exchange (Burr, 2004). My work contributes to the broadening of the economic and consumption literature by focusing on

the consumption side of markets. At the same time, I develop my analysis by drawing on the sociology of markets to move beyond an individualist, interpretivist account of consumers.

The actions and interactions of both producers and consumers in early markets are important to understanding how markets form. Burr's (2004) study of the early bicycle market in the United States and France, and Fischer's (1992) analysis of the early market for the telephone clearly demonstrate that in order for a cultural product to be legitimated, consumers must act alongside producers in ways that support this legitimacy. Zelizer (1979) links broader social values and ideologies with consumer acceptance of a product in her research on ideological alignment and framing on the part of the emerging life insurance industry. As noted by Fligstein and Dauter (2007), this work emphasizes how a "production-focused sociology of markets fails to consider consumers and consumer marketing and, in doing so, misses an important aspect of where markets come from" (p. 615). I address this neglect by examining PEV consumers, envisioning the constitution of demand as fundamentally a social activity.

Around the beginning of the millennium, economic sociologists began to push for the reconceptualization of market embeddedness, moving away from the Parsonian foundations which presuppose the separation of economy from broader realms of social life (Fourcade & Healy, 2007; Krippner, 2002; Krippner et al., 2004; Zelizer, 2005). Krippner (2002) argues that the foundation of market embeddedness has led sociologists to reify the concept of a market without elaborating the concept of the market as a theoretical object in its own right. In her opinion the consequence of this trend is an intellectual split between market behavior and social life. Zelizer (2005) demonstrates that people live "connected lives," where they incorporate economic activity into everyday practices that create and sustain social relations. She claims that people combine social relations (shared understandings, practices, obligations and rights) with

transactions and media (accounting systems and their tokens) in order to manage the inevitable mix of economic activity and intimate relations that exist in intimate settings. Fourcade and Healy (2007) suggest that markets are sites of moral conflicts between social actors committed to different justificatory principles and the locus of political struggles between various interests. This work points to a resurgence of the Polanyian insight that markets are fully social institutions that reflect a complex of politics, culture, and ideology which combine to produce common institutional patterns: reciprocity, redistribution, and exchange (Polanyi, 2001/1944). My dissertation fits alongside this research, framing markets as sets of transactions that occur in an everyday social reality where people simultaneously negotiate economic activity and social relations. Applying the premise of markets as social institutions, I explain how existing cultural frameworks and social ties inform the orientations of consumers toward exchange in the PEV market.

Studies of consumption emphasize the symbolic functions of goods, and their ability to carry and communicate cultural meaning, suggesting that the meanings behind the products being bought and sold shape exchange relations. Market sociology has demonstrated that the construction of demand is undoubtedly influenced by supply side entrepreneurial framing, classification processes, commensuration, producer networks and orientations, and institutional standards. But, as Beckert (2009) argues, "value attachments, however, are also created in the life-worlds of consumers, and producers must react to new and often unpredictable trends that emerge. This implies that market sociology must put much more emphasis on the demand side of markets" (p. 256-257). Individual preference, then, for PEVs depends in part on the social, functional, and affective meaning of both the product and the purchase. This emphasis led me to address two questions in my research: What kinds of value do consumers attribute to PEVs? And

how are individual actors convinced by their own valuations to want to acquire the PEVs as buyers in the marketplace (i.e., what are the sources of economic value)?

In part a result of its historical trajectory of development, new economic sociology orients toward explaining the order of markets, the production of market value (on the supply side), and the commodification process while the sociology of consumption focuses on explaining why and how consumers consume, though there are notable exceptions among both groups. This bifurcation along with economic sociology's general disregard of consumers means that inquiry into the role of consumers in market processes, particularly product qualification processes, is limited. In sociology, consumption is often analyzed as a byproduct of other concerns or social phenomena (e.g., as the corollary of production and provision; as a utility function, as the reproduction of social order; as the result of capitalist manipulation). It is only recently that sociologists have begun to examine consumption in its own right (e.g., as agentic expression of self-identity, as meaning-making, as social practice). Unlike market sociology, sociology of consumption, per se, focuses on why consumers consume and how they use products rather than how they engage in processes of market construction. Examining the current market for PEVs by exploring how consumers construct economic value, my dissertation analyzes the production of value in an emerging market and in doing, so contributes to both economic sociology and sociology of consumption.

Third, I offer a unique perspective on PEV consumption by engaging with recent theories of valuation to understand consumer behavior rather than the theories of self-identity and theories of practice that dominate sustainable consumption research. As Evans and Jackson (2008) acknowledge, "sociological theories of consumption – with a few notable exceptions – have tended to shy away from an explicit concern with 'sustainability', eschewing in particular

its normative agenda" (p. 4). Much of the sociologically informed work on sustainable consumption is based on either a "lifestyles" approach that potentially dematerializes consumption, or a practice theory approach applied to routine forms of consumption, which runs the risk of reductionism if it ignores the affective and psycho-cultural aspects of consumer behavior. In contrast to these approaches, I use recent work from valuation studies to explain the constitution of demand in the PEV market. My dissertation takes into account the physical and symbolic sources of value and the agentic role of consumers in constructing value. In doing so, I maintain a critical awareness of the materiality of consumption as well as the cosmologies of beliefs, ethics, values, and feelings that inform collective and individual consumption processes.

Fourth, as an in-depth analysis of an exemplary case, my account of the construction of economic value in the PEV market advances a sociologically informed theory of value. Steinmetz suggests that a case study, in this instance the PEV market, "is as important a part of the overall sociological enterprise as comparison or sustained theoretical reflection. The plausibility of a given theoretical argument can be assessed only by studying complex, overdetermined, empirical objects" (as cited in Wherry, 2012, p. 115-116). The PEV market offers an important area for research because assessments of worth are particularly dynamic in new markets due to high uncertainty and the absence of pre-existing or accepted mechanisms for evaluations. New markets involve conflicting conceptions of value and often prompt explicit discussion of value systems. A rich, detailed account of value construction in the PEV market complements other market case studies, and enables future comparative inquiry to observe patterns in social processes, assess theoretical constructs, and examine how different political institutions and cultures shape evaluative practices.

In the first issue of *Valuation Studies* the editorial board calls for increased theory development over "a mere accumulation of case studies". "Moving to a higher degree of abstraction to identify the similarities and differences across studies" they argue, "would enable us to provide a comprehensive picture of valuation processes" (Kjellberg et al., 2013, p. 15). Though studies on valuation (attributing value to objects, and mechanisms of assessing value) include detailed ethnographies of the empirical cases, the scope of market valuation research, has chiefly concentrated on three types of markets: financial markets, markets for aesthetic goods (e.g., wine, art, fashion), and markets in which ethical issues figure prominently (e.g., fair trade, body organs, life insurance). These three types of markets hold a special attraction for sociologists because in them the value of a commodity is, in very noticeable ways, socially constructed and as such, appears separate from its materiality (Hendricks, 2016). Consequently, these markets have proved fertile ground for formulating theory on value constitution. Less well researched are markets for industrial goods, where the functionality of the product used to be paramount, but now products are increasingly valued based on symbolic meanings. As a result, we do not know whether or how valuation processes differ across different types of markets. A rigorous theory on valuation and pricing should prove applicable to the better part of market exchange and valuation research must expand its empirical scope if we are to see whether theoretical findings from studies of financial, aesthetic, and ethical markets can explain processes in other markets. My dissertation contributes to this expansion by applying existing theories of valuation to an industrial market.

Organization of Chapters

In Chapter 2 I provide important background information on the current PEV market and a more in-depth discussion of the related technology and infrastructure. Offering a brief description of the PEV market contextualizes the demographics of my sample and reveals the institutional environment in which PEV consumers engage in exchange. I then describe the multiple research methods I employed to get at the complexities of consumer behavior in this market. These include a series of large-scale surveys (of both PEV drivers and new car buyers in general), in-depth narrative interviews, focus groups, and workshops, as well as textual and secondary sources. I used modified emergent methods of grounded theory and convergent interviewing for analyzing the data and refining the collection instruments, both within and across research projects. After detailing these methods of collection and analysis, Chapter 2 also provides background about the three discrete research projects that provided the data for this dissertation. This chapter includes an account of the demographics of PEV buyers and a comparison with new car buyers to contextualize the data from my interviews, focus groups, and workshops.

A key claim of my research is that the purchase and use of PEVs are informed by non-instrumental motivations, values, emotions, self-conceptions, and cultural associations. My objective is to move beyond the concept of a rational, utility maximizing consumer paradigmatic of transportation research by exploring how consumers construct and communicate shared and individual meanings through their participation in the PEV market. My approach to understanding the PEV market abstracts from the sociology of markets, the sociology of consumption, interdisciplinary studies of consumption, valuation studies, mobility studies, transportation policy, and transportation research oriented toward PEVs. In Chapter 3 and

Chapter 4 I review the salient literature, drawing together these diverse bodies of work to contextualize the PEV market, to explain the questions that motivate my research, and to demonstrate how my work contributes theoretically and empirically to these fields.

For markets to operate as such, potential market actors must overcome the uncertainty of interaction sufficiently enough to accept the risk of exchange. As Beckert (2009) notes, "the contingencies of market exchange make markets precarious arenas of social interaction, the 'functioning' of which is anything but self-evident" (p. 248-249). To understand how markets "function" we need to understand how market actors address underlying problems of coordination. Of particular relevance to scholars of consumption is the coordination of value, which Beckert (2007) refers to as the value problem or the "difficulties that market participants have in forming clear subjective values for goods in the market" (Koçak in Beckert, 2007, p. 12). Consumer choice depends on potential consumers being sufficiently convinced of their subjective value of a commodity to enter the market as a buyer. As such, the process of choosing (purchasing) a commodity extends beyond the exact moment of acquisition, occurring before, during, and after the exchange. It follows then that to understand markets we must understand the processes through which consumers construct value. But where do we look to understand the basis for consumer decision making as value construction in market contexts?

Chapter 3 traces developments in the sociology of markets and the broader body of literature on consumers and consumption in the social sciences and humanities. I begin with a brief discussion of the sociology of markets, with a particular focus on how market sociologists have studied demand through a productivist orientation which neglects the agency of consumers and leaves a void in sociological analyses of markets. I then elaborate on the historical development of the sociology of consumption which has roots in other areas of sociological

inquiry (e.g., culture, stratification, pop-culture) and outside the discipline (e.g. cultural studies, critical theory, CCT). Finally, I explain how valuation studies provide a means of connecting the contributions from economic sociology and consumption scholarship, as well as serving as a heuristic for studying the PEV market.

In Chapter 4, I turn first toward research on automobiles in general before narrowing my focus to PEVs. I then look to the relationship between sustainability ideology and PEVs, moving from explaining sustainability policy narratives to describing dominant trends in analyses of consumers and the PEV market. Automobiles and major cultural discourses about mobility exist in a mutually sustaining relationship, fueling potent symbolic representations in culture and configuring distinct ways of moving, inhabiting, and socializing. Rather than shaping conceptions of motorized mobility, electric vehicles must compete with the provisionally stabilized materials, competencies, and meanings of mobility based on ICEVs. Since PEVs are as much a product of their context as an agent of change, an understanding of their social milieu is vital to an analysis of how and why consumers value electric vehicles. Moreover, as Muniesa (2011) suggests, valuation is a situated activity and mobility studies offer a fruitful resource for understanding the social context—the dominant cultural, material, and discursive mobility regime— of the emerging PEV market.

In Chapter 4 I draw on mobility research as well as studies of car cultures to explain significant aspects of automobility in the United States: the symbolism of automobility, the socio-technical complex of automobility, and the phenomenology of automobility. However, given the focus of this dissertation and the complexity of mobility systems I will not be addressing all of the facets of automobility, even within these three aspects. The symbolism of automobility refers to the sign values of automobiles and the meanings associated with car

related practices and infrastructure. The socio-technical complex of automobility refers to the material artifacts, the related infrastructure, and the political and institutional matrix that comprises the system of mobility built around the car. The phenomenology of automobility refers to the ways in which automobility shapes the subjective position from which people experience social reality. Although I am separating these concepts to allow for analysis, they are closely entwined and often difficult to separate out in everyday life. The point in this section is to provide a general contextual understanding of the cultural meanings, materials, and environment associated with travel and automobiles in the United States. Mobility research is vital to explaining how consumers construct the economic value of PEVs as they make use of and are influenced by existing sources of value and systems of evaluation.

An account of automobility in the United States lays the groundwork for the second section of Chapter 4 wherein I discuss the socio-political discourse of sustainability, which shapes both policy narratives and academic research on the PEV market, particularly as they are oriented toward consumption. The significant political, cultural, and civic presence of automobiles is not a new phenomenon in United States but PEVs represent a new type of car brought to the auto market. Already PEVs are increasingly relevant across the automobile and tech industries, academic disciplines, and among policymakers, governments, and special interest groups. Due in part to the predominance of automobility, much of this discourse positions the PEV as a solution to the costs of mobility, effectively positioning the PEV as a foil to the car, to be measured by a rubric oriented a priori to ICEVs.

In Chapter 4 I provide background on PEV oriented policy approaches and academic literature, including critiques of the assumptions about what can change and what must continue implicit in these transportation policy initiatives. Indeed, the meanings of car use in everyday life

reflect the language of sustainability as automobiles are increasingly intertwined with deep public concerns for both social and environmental consequences of increasing levels of car use. This suggests that policy and academic discourse represent significant variables in processes of meaning making. In the final section of Chapter 4 I discuss trends in current interdisciplinary research explaining the constitution of demand (or lack thereof) in the PEV market.

Chapter 5 looks at the construction of value in the PEV market, deconstructing the desirability of PEVs by identifying the dimensions in which PEV drivers assign PEVs value. It is useful to think of value as the expected performance of a good. Beckert (2011) states, "for a good to have value, its purchaser must have a positive view of what [they] expect the good to perform: the good "makes a difference" for the owner through its (potential) performance" (p. 108). I focus on three different dimensions of value that come together in PEVs: physical value, positional value, and imaginative value. A good holds physical value by allowing the user to alter the state of the world based on the physical effect of the good. Extending beyond the physical effects, symbolic value refers to the meaning a good holds for a consumer individually, and within their social environment. Beckert's approach to symbolic value offers a useful distinction between positional and imaginative value. The positional value of an object is relational and comes from the ability of the object to position consumers in differentiated social space. Imaginative value, though based on socially constructed moral values and meanings, exists within the consciousness of individual consumers as they symbolically connect ideals to the purchase and use of a good.

CHAPTER 2: PEV MARKET OVERVIEW AND RESEARCH METHODS

My interest in electric vehicles originated during my experience researching the funding provided by the American Research and Recovery Act (ARRA) of 2009 for the development of alternative fuel vehicles, specifically all-electric vehicle research and production. In 2011, as the first non-luxury mass-produced PEVs became available on the United States auto-market, I began working with an interdisciplinary team researching consumers (and potential consumers) in the PEV market, which allowed me to further pursue this interest. My work at the Plug-in Hybrid & Electric Vehicle (PH&EV) Research Center offered me unique access to the emerging PEV market, not only to consumers, but also to other market stakeholders such as regulatory agencies, federal and state agencies (the DOE; the CEC; CARB), research labs and university faculty, research groups at UC Davis and other academic institutions, and research, manufacturing and distributing firms. Moreover, the position added to the pool of potential data for my research, as Strauss and Corbin (1998) point out, reports and internal correspondence can add additional data which contextualize the area of study. My work with the PH&EV Research Center not only allowed me to interact with a variety of actors in the PEV market, it also allowed me to observe meetings, symposiums, workshops, and conferences oriented toward the development and uptake of PEV technology. It was this work that provided me with the opportunity to help design and implement the three research projects studying consumers and PEVs from which I draw the data for the analysis presented in this dissertation. Working with a PH&EV center research team provided resources that enabled me to access a larger sample population, apply a broader selection of research methods, and take a more processual approach to developing and refining data collection instruments and my analysis of the data.

I begin this chapter with a brief discussion on the background of PEVs including infrastructure, policy, and PEV market data to contextualize my sample and to provide information for readers unfamiliar with electric drive technology and the PEV market. Rather than overwhelm the reader with statistics, I focus on the regions from which my data was collected, while providing enough broader market data to give unfamiliar readers an idea of the PEV market compared to the new light-duty vehicle market in general[4]. The information on federal and state PEV incentives[5] and the state PEV registration numbers[6] came from the Vehicle Technologies Office website, which is a subdivision of the Office of Energy Efficiency and Renewable Energy, itself part of the United States DOE. The Information on fuel stations available in each state came from the Alternative Fuels Data Center[7], which is also part of the United States DOE.

The data for this dissertation comes primarily from California, though the final project includes interview and survey respondents from Oregon and Washington as well. In the early PEV market California represented the best choice for accessing buyers, with 55% of the national market in 2011 or about 4,645 PEVs, mainly Nissan LEAFs, Tesla Roadsters, and Chevy Volts (Tal et al., 2013). Additionally, California is the original ZEV state, with its Zero Emission Vehicle mandate in place since 1990. The ZEV program requires automakers to maintain ZEV credits equal to a set percentage of non-electric vehicle sales, where each ZEV

[4] The sales and on road stocks of electric vehicles are difficult to accurately determine as vehicle registrations are done by states and in California, motor vehicle registration data is not available to the public. Consequently, all of the statistical data about PEV market share, adoption, and use I cite here are estimates.
[5] Electric Vehicles: Tax Credits and Other Incentives: https://www.energy.gov/eere/electricvehicles/electric-vehicles-tax-credits-and-other-incentives
[6] https://www.energy.gov/eere/vehicles/fact-876-june-8-2015-plug-electric-vehicle-penetration-state-2014
[7] http://www.afdc.energy.gov/fuels/stations_counts.html. Accessed 11 November 2015.

sold earns credits based on the vehicle's specifications. ZEVs are any vehicle that releases zero emissions during on-road operation. They include battery electric vehicles (BEVs) and hydrogen fuel cell vehicles (FCEV). Other vehicle types, such as plug-in hybrid electric vehicles (PHEVs) can be considered as partial ZEVs. The California Air Resources Board (CARB) determines how many credits are required to satisfy its mandate each year. Notably, one vehicle does not represent one credit. For example, any given BEV can equal anywhere between one and nine ZEV credits depending on its driving range. As a means of promoting automaker compliance with CARB mandates, manufacturers are allowed to trade credits with one another and may meet their sales requirements through the promotion of a mix of vehicle technologies, for example, selling a certain number of ZEVs as well as partial zero emission vehicles and neighborhood electric vehicles. Automakers are also allowed to apply ZEV credits earned in one state to their ZEV requirements in other states as long as they sell a minimum number of ZEVs in each participating state (California Air Resources Board, 2014).

Ten other states, including Oregon, have adopted California's standards under the Federal Clean Air Act (CAA) section 177. As only ZEV states outright require automakers to sell electric vehicles, industry efforts have been directed at these states, California in particular. While Oregon has adopted California's standards, Washington has not, but is following California's Low Emission Vehicle (LEV) program. In 2012 Governor Jerry Brown signed an executive order to put 1.5 million ZEVs on the road by 2025 and to provide infrastructure to support 1 million ZEVs by 2020 (California Exec. Order No. B-16-2012, 2012). The metropolitan areas of San Jose, San Francisco, and Los Angeles represent three of the leading PEV markets in the United States (Lutsey, 2018) and Seattle and Portland are also among the top PEV markets in the United States. Even now California accounts for approximately half of the PEV sales in the

United States for 2017 and approximately 48% of the cumulative ZEV and PHEV sales in the United States from 2011 through mid-2016 (Lutsey, 2018).

The remainder of the chapter I devote to documenting the details of my research design, data collection, and data analysis. I begin with an overview of the different methodologies employed across all three research projects. Included in this section is a discussion of my experience working with a research team for all three projects. The primary data collected through these projects is qualitative, taken from semi-structured in-depth interviews, group workshops, and focus groups. I use quantitative data from surveys mainly to provide demographic information about participants and the sample consumer group population. I also provide an overview of the general sampling techniques used for all three projects. I then move on to describe each individual project in greater detail. Finally, I explain how I analyzed my data. Though I describe the data collection and analysis process separately, in practice they occurred concurrently through a grounded theory approach. Following standard practice to ensure a degree of privacy and anonymity, all of the names used in this dissertation are pseudonyms.

Understanding Plug-In Electric Vehicle Technology

Figure 1 illustrates the different types of PEV drivetrain technology compared to the gasoline powered ICEV and the HEV, which does not plug-in to an outlet. In this section I provide an overview of the different technologies, examples of PEVs, and the different charging options.

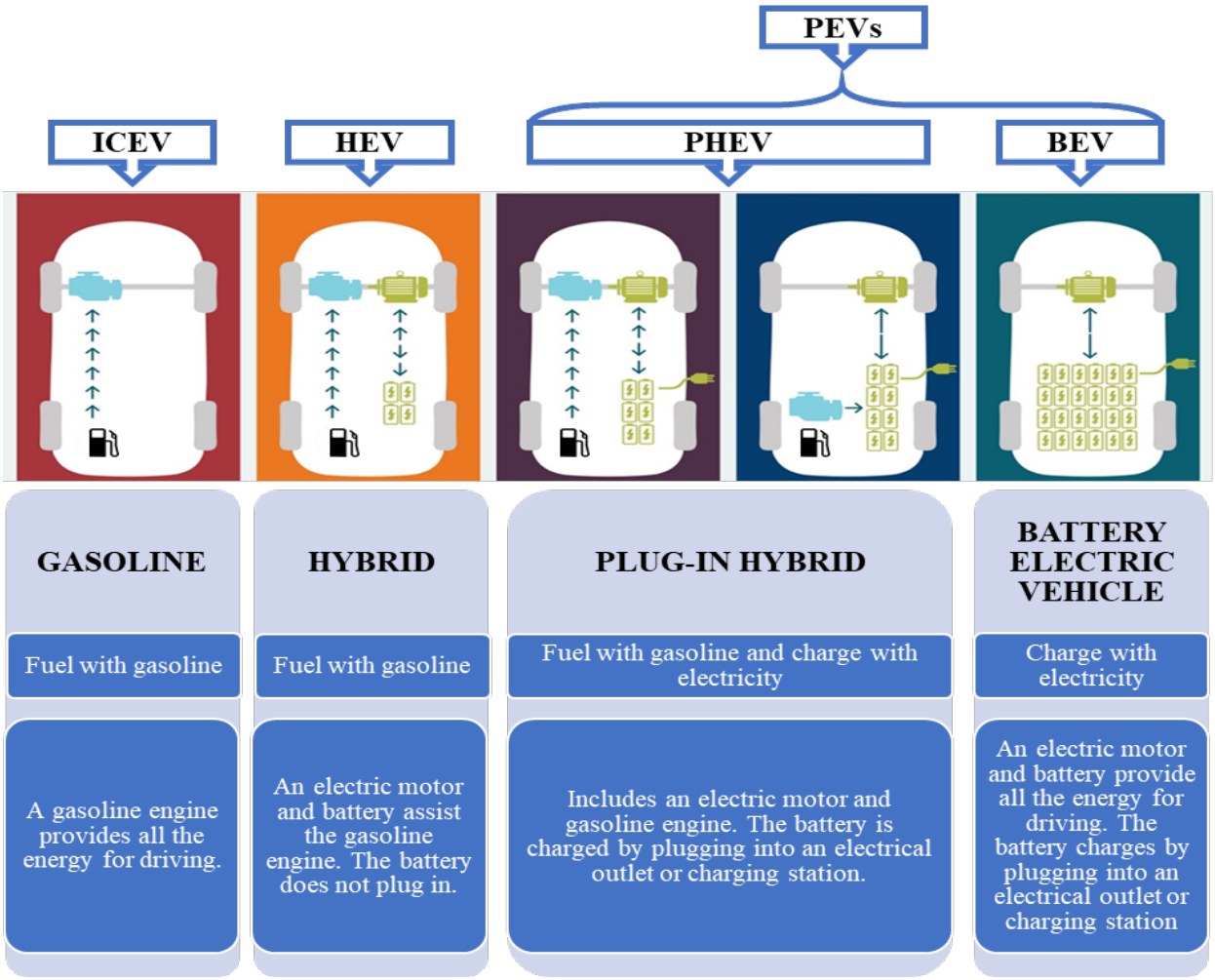

Figure 1: Vehicle Drivetrain Types

The category of plug-in electric vehicles (PEVs) contains both plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs or EVs). A traditional hybrid electric vehicle (HEV) uses an electric motor battery to enable several technologies which achieve better fuel economy and more power. A HEV may only be refueled with a liquid fuel such as gasoline or diesel and cannot be plugged in to recharge. The first mass-market HEV was the Toyota Prius, released in 1997 and introduced in the U.S. in 2000.

In late 2010 Chevrolet introduced the first PHEV, the Volt, to the U.S. market. PHEVs have both an electric motor and an internal combustion engine integrated so that a PHEV is

fueled by both electricity from the grid and a liquid fuel such as gasoline or diesel. There are two types of PHEVs: extended range electric vehicles and blended plug-in hybrids. Extended range PHEVs run solely on electricity until the battery needs to be recharged at which point the gasoline engine generates electricity to power the electric motor. In extended range PHEVs, only the electric motor is connected to the wheels, whereas in blended PHEVs both the electric motor and the engine are connected to the wheels. Blended PHEVs are simultaneously powered by electricity and gasoline, though an all-electric mode may occur at low driving speeds.

PHEVs may differ in how they use electricity stored from the grid (known as "charge-depleting" operation) and their charge-depleting driving range before reverting to operate as conventional HEVs do (known as "charge-sustaining" operation). An "all-electric" driving range describes charge-depleting operation that does not use the ICE and its fuel at all. A PHEV with all-electric charge-depleting operation requires an electric motor capable of providing all of the power and torque required to drive the vehicle and a battery capable of providing all of the power required for high demand situations, such as hard accelerations and climbing hills. An "assist" driving range refers to PHEV designs in which the ICE may be used to help power the vehicle even while the vehicle is in charge-depleting operation and consequently they do not require as powerful an electric motor or battery as an "all-electric" charge depleting PHEV. Thus, PHEVs designed for "all-electric, charge-depleting operation" are more expensive than those with "assist charge-depleting operation" as the batteries represent a significant price point for PEVs. For both these types of PHEVs, when the high-voltage battery (where electricity from the grid is stored) reaches some design minimum state-of-charge (SOC), the vehicle reverts to charge sustaining operation where the ICE provides more of the power for the vehicle and sustains battery state of charge near the design minimum. A PHEV returns to charge-depleting

operation, i.e., powered solely or mostly by electricity from the grid, only after the vehicle is plugged in to recharge the high-voltage battery.

A BEV is powered solely by electricity from the grid using a rechargeable battery. BEVs are charged by plugging in the vehicle to a regular 110v or 220v electrical outlet or a dedicated charging system also referred to as Electric Vehicle Supply Equipment (EVSE). The Tesla Model S and the Nissan LEAF are the first and second top-selling EVs in the U.S. The electric range and fuel economy of PEVs differ by the make and model of the vehicle and may be influence by external factors such as driving behavior as well as weather and road conditions.

There are three different types of charging methods available for PEVs, referred to by level, which is based on the voltage that the charging system uses. A PEV can be plugged into a standard (110 volt) outlet, like any general home electronic device. This is referred to as Level 1 charging, colloquially known as a "trickle charge" and as the name implies, it can take many hours for a vehicle to reach a full charge with a rate of 2-5 miles of Range Per Hour (RPH). Despite this, several PEV drivers interviewed, including a Tesla Model S owner, only used a standard outlet to charge their car when at home and relied on public charging stations when they needed a faster charge. A PEV can also be plugged into a high powered electrical outlet (220 to 240-volt) typically used for electric clothes dryers, electric stoves, electric furnaces, and central air conditioners. Though this is also referred to as Level 2 charging and has a rate of 10-20 RPH, generally the term is used to refer to the use of a dedicated charging system or a (240 volt) EVSE. There exists both public charging stations, run by a variety of charging network operators with their own pricing system, and charging stations that can be installed in a residential home. Level 3 charging, also known as Direct Current (DC) fast charging, connects directly to the vehicle battery and is capable of charging around 80% of the car's battery in about 20 minutes

(for most cars) which amounts to between 60-80 miles of range per charge. Level 3 charging stations are also publicly available. As of right now there is no standard for DC fast charging, instead there are three different types of charging stations based on different technologies: CHAdeMo stations, Combined Charging System (CCS) stations which is based off the SAE J1772, or the J plug (which all PEVs except Tesla use for Level 2 charging), and Tesla Supercharger stations. These systems are not cross compatible, meaning that depending on the manufacturer, the vehicle is designed to use only one type of Level 3 charger, although Tesla makes adaptors to allow their vehicles to be charged at any station.

The PEV Market

Markets for electric vehicles materialized three times during the history of the automobile industry in the United States. The first market arose with the beginning of the automobile industry in the late 19th Century but waned in the early 20th Century, as the internal combustion engine vehicle gained popularity. The second market came about briefly in the mid-1990s as concerns about air quality piqued interest in zero emission vehicles. Finally, the ongoing PEV market originated in the late 2000's stimulated by growing sustainability discourse and the revitalization of environmental issues alongside concerns over energy resources.

Just prior to the turn of the century, electric vehicles constituted a large part of the early automobile industry. At the time, most automobile drivers built their own vehicle or purchased one directly from a manufacturer. Affordable and convenient commercial access to electric vehicles originated in Philadelphia with engineers Pedro Salom and Henry Morris. In 1894 the pair designed the Electrobat, which became the model for the first electric carriage cab. Though electric carriages existed prior to the invention of the Electrobat, Salom and Morris were the first

to work toward incorporating electric carriages into city transportation (Ehsani et al., 2010). In 1895, to publicize their invention the two entered the second generation of their wooden-wheeled battery electric wagon, the Electrobat II, in the well-known Chicago Times-Herald motor vehicle road race, where it won a gold medal for excellence in design. The Electrobat II significantly improved on the design of its predecessor. The first Electrobat carried 1,600 pounds of batteries and weighed more than 4,200 pounds. In contrast the Electrobat II, built around a lightweight piano-box carriage, weighed only 1,650 pounds in total including the 160 pounds of batteries. In 1897 Salom and Morris' Electric Carriage and Wagon Company became the first the electric cab service, using a fleet of 13 vehicles to provide rides in and around the Manhattan area. With an average speed of 8 miles an hour, the fleet vehicles combined the Electrobat design with a standard horse drawn cabriolet riding on narrow pneumatic tires with spoked wheels (Kirsch, 2000). Between 1880 and 1900 significant developments in electric vehicle technology propelled the electric vehicle into larger-scale production and deployment, many of which represent the basis for a century of electric car technology (Anderson & Anderson, 2010).

Sales records and popular discourse of the time illustrate the popularity of electric vehicles in the early automobile market. In 1889 electric cars outsold both steam and gasoline powered vehicles (Kirsch, 2000). In the first 18 weeks of service the electric carriage cabs run by Salom and Morris traveled approximately 14,459 miles and likely made a small operating profit. Each cab averaged 11 miles per day, per vehicle and provided rides for 4,765 passengers. At its height, the Electric Carriage and Wagon Company ran a service of about 60 cabs. An 1898 article in *Electrical Engineer* reported the "rapid tendency toward the adoption of automobiles shown in the fact that it was the correct thing to go to Mrs. Astor's ball this week in an electric carriage" (Kirsch, 2000, p. 48). Opening in the same year, 1898, the first automobile dealership

in the United States sold only electric vehicles (Yanik, 2001). The first electric vehicle market reached its peak in 1912, its decline often associated with the discovery of oil reserves in Texas, the invention of a successful electric starter for gasoline powered cars, and of course Henry Ford's model T. Only two years later, in 1914, 99% of the vehicles manufactured in the United States were powered by a gasoline engine (Quandt, 1995).

The impetus for the second surge in commercially available electric vehicles began during the 1960s when environmental and safety concerns emerged around conventional gas vehicles (Kirsch, 2000). These concerns, combined with the energy security anxiety stemming from the oil crises of 1973-1974 propelled alternative fuel vehicles onto the national agenda, were later supported by subsequent economic development in the 1980s. In 1976 the Electric and Hybrid Vehicle Act outlined an initiative toward converting the automobile industry in the United States to mainly producing all-electric vehicles by 2000 (Anderson and Anderson, 2010). The tipping point came in 1990 when the California Air Resource Board (CARB) instituted new transportation emissions regulations. In tandem with the 1990 Clean Air Act Amendment and the 1992 Energy Policy Act, the CARB regulations pushed automakers to design and subsequently manufacture electric vehicles. The 1990s heralded the arrival of the first mass-produced electric vehicles: the Honda EV-Plus, the Ford TH!NK, the Toyota RAV4 EV, the Nissan Altra, the Chevrolet S10 Electric, the Chrysler Epic, the Ford Ranger EV and the GM EV1. The most famous of these electric vehicles was the GM EV1, whose rise and fall is chronicled in the 2006 film: *Who Killed the Electric Car?* In 1996 General Motors offered some of the first leases of the EV1 to high profile drivers including Baywatch actress Alexandra Paul and Sony Music President Jordan Harris, who took possession of their vehicles in a ritualized release event in Southern California (Kirsch, 2000). At the time vice president of marketing for Saturn opined, "I

honestly believe that when they write the history of the second century of automobiles, this [EV1] will be the starting point, the seminal event" (Dean & Reed, 1996, p.1). Despite the display of enthusiasm on the part of industry members and consumers only 1,100 EV1s were manufactured. After a few years of production manufacturers declared that electric vehicles sales represented a niche market and claimed producing them economically unviable. Even in the face of vehement and publicized protests from lessees and enthusiasts several companies recalled all their electric vehicles (Edwards, 2006).

In recent years, a variety of mass-produced PEVs comprise the burgeoning electric vehicle market in the United States. First in the market, Tesla Motors began selling the Roadster in 2008, though the company discontinued the model in 2012. The United States federal government first introduced incentives for PEVs through the American Clean Energy and Security Act of 2009, which provided a tax credit of up to $7,500 for a new PEV purchase. The federal tax credit allows $7,500 for BEVs and ranges between $2,500 to $7,500 for PHEVs, the amount depends on the size of the vehicles' battery. These incentives attempt to subsidize the increased cost of PEVs which is attributed to battery cost premiums which drive up the purchase price of PEVs in comparison to similar models of ICEVs. The savings from the removal of ICEV parts from the production process (e.g. combustion engines, transmissions, and pollution control equipment) only partially offsets the price premium of vehicles' batteries. For example, in 2015 in the United States automotive market, the average (base) purchase price of a new ICEV was $33,000 whereas the (base) purchase price for nearly half of PEVs sold in 2016 was over $35,000 (Sperling, 2018).

In 2010 Chevrolet released the Volt and Nissan began selling the LEAF. In the same year, Tesla Motors received a 465-million-dollar loan from the United States Department of

Energy (DOE) to fund the design and production of a specialized EV and the building of a manufacturing facility. The Tesla Model S became available in the Spring of 2012. In the six years since the introduction of the Nissan LEAF and the Chevy Volt the number of models of mass-marketed PEVs increased from 2 to 26. As of fall, 2016 14 PHEV and 12 EV models, excluding discontinued models and sub models (e.g., BMW i3 and i3REX, Roadster), comprised this expanding market (Cobb, 2016). The United States represents approximately 20% or one-fifth of world-wide PEV sales. Overall, though, in 2016, EVs accounted for only 1% of total new vehicle sales globally (Sperling, 2018). In 2017, new vehicle sales reached 194,000, rising to 1.1% of new light-duty vehicle sales. Between 2011 and 2017 the PEV sales in California alone amounted to 1.5% of the stock of on-road light-duty vehicles (Cobb, 2018).

By mid-2013 in California about 45,000 PEVs sold across approximately two and a half years—this number includes more than 20 different models but Nissan LEAFs, Chevrolet Volts, Plug-in Priuses and Teslas make up the bulk (Tal & Nicholas, 2013, p. 1). As of August 2016, nearly 230,000 total ZEVs and PHEVs have been registered in California, alongside the 62,000 registered in the nine states that have adopted California's ZEV regulations. These contribute towards the more than half a million ZEVs and PHEVs in the United States. Over 17,000 Level 2 and 2,100 direct current fast chargers (DC fast charger) connectors have been deployed across California and the nine states. In California, several PHEVs and BEVs were available for purchase as a new vehicle, at the time of data collection. The available BEVs include: The Fiat 500e, Ford Focus BEV, BMW i3, Chevy Spark BEV, Honda Fit BEV, Kia Soul BEV, Mercedes B-Class Electric, Mitsubishi i-MiEV, Nissan LEAF, Smart Electric Drive, Tesla Roadster and Model S, Toyota Rav4 BEV, and Volkswagen E-Golf. The available PHEVs include: Cadillac ELR, Chevy Volt, Ford C-Max Energi and Fusion Energi, Honda Accord Plug-in Hybrid,

Mercedes-Benz S550e Plug-in Hybrid, and the Toyota Prius Plug-in Hybrid. As of June 2015, 49% of the ZEVs sold or leased in California were BEVs and 51% were PHEVs, compared with the national average of 47% BEVs and 53% PHEVs sold or leased (Kurani et al., 2016a).

California ZEV buyers are eligible for the ZEV tax credit as well as a variety of other incentives with a wide range of eligibility requirements. The following list represents several of California's incentives applicable to or mentioned by participants across the three research projects: (1) State HOV Lane and High Occupancy Toll Fees Exemption; (2) Rebates for the purchase or lease of qualified vehicles via The Clean Vehicle Rebate Project ($2,500 for light duty BEVs and PHEVs and $5,000 for FCEVs that the California Air Resources Board has approved or certified); (3) A rebate of up to $3000 for the purchase or lease of PEVs via the Drive Clean! Rebate Program administered by The San Joaquin Valley Air Pollution Control District; (4) Alternative and Renewable Fuel Vehicle Technology Program incentives for businesses, vehicle and technology manufacturers, workforce training partners, fleet owners, consumers and academic institutions; (5) Insurance Discount from Farmers Insurance; (6) PEV Charging Rate Reductions through The Sacramento Municipal Utility District, Southern California Edison, Pacific Gas & Electric, Los Angeles Department of Water and Power, and San Diego Gas & Electric; (7) EVSE rebates; (8) Initially free, now discounted, parking for PEVs in designated downtown Sacramento parking garages and surface lots certified by the city's Office of Small Business Development; (9) Free Parking in San Jose, Hermosa Beach, and Santa Monica for BEVs displaying a Clean Air decal; (10) The California Department of General Services and California Department of Transportation (DOT) must provide 50 or more parking spaces and park-and-ride lots owned and operated by the DOT (Kurani et al., 2016a).

By November of 2015 California boasted the largest state network of public PEV chargers with a total of 8,303 outlets at 2,755 locations. California, Oregon, and Washington are all part of the West Coast Green Highway project which aims to place DC fast charging stations along I-5, installing a station every 35-50 miles between the Canadian and the Mexican border. In California, several other major thoroughfares have charging stations within half a mile of the road, allowing drivers to visit local businesses while they recharge their vehicles. In October of 2009, with a $99.8 million-dollar grant from the U.S. Department of Energy, ECOtality launched the EV project in California. ECOtality, in collaboration with Chevrolet and Nissan, offered qualified consumers free Blink wall mount residential chargers, and provided up to $400 dollars toward installation costs in return for access to vehicle and charging data from participants. The EV Project was "the largest deployment of electric vehicles and charge infrastructure in history" and met their goal for residential charging units in March 2013. Significantly, with charging infrastructure deployed in Los Angeles, San Diego, and the San Francisco Bay Area, California represented a large part of the EV Project. By June of 2010, the DOE supplied the EV Project with a further $15 million, which alongside partner matches brought the total project funding to approximately $230 million (Kurani et al., 2016a).

At the time of data collection, Oregon had several PHEVs and BEVs for sale as new vehicles. The available BEVs include: The Fiat 500e, Chevy Spark BEV, Kia Soul BEV, BMW i3, Ford Focus Electric, Mercedes B-Class Electric, Nissan LEAF, Smart Electric Drive, Tesla Model S, and the Volkswagen E-Golf. PHEVs include: the Cadillac ELR, Chevy Volt, Ford C-Max Energi and Fusion Energi, Honda Accord Plug-in Hybrid, Porsche Cayenne S E-Hybrid and Panamera S E-Hybrid, and the Toyota Prius Plug-in Hybrid. In August 2014 the rate of PEV adoption in Oregon was higher than the national average and in June 2015, of those consumers

who had purchased or leased PEVs in Oregon, more purchased or leased BEVs (60%) than PHEVs (40%) in contrast to the national average of 47% BEVs and 53% PHEVs, (Kurani et al., 2916b). The Alternative Fuels Data Center counted 399 electric stations and 944 charging outlets in the state and like California, in Oregon other popular roadways have charging stations within a half-mile of the highway.

Oregon state ZEV drivers qualify for the federal tax incentive appropriate for their vehicle. Additional state incentives include: (1) A 25% tax credit for residential AFV infrastructure (up to $750); (2) A tax credit for business AFV infrastructure; (3) An exemption from pollution control equipment for manufactured ZEV vehicles (as opposed to DIY builds on ICEVs) (Kurani et al, 2016b).

At the time of data collection, Washington had fewer models of PEVs available than Oregon and California, likely because it has not adopted the ZEV mandate. At the time of data collection Washington's BEV market included: the BMW i3, Ford Focus Electric, Mitsubishi i-MiEV, Nissan LEAF, Mercedes Smart for Two Electric Drive, and Tesla Model S. Its PHEV market included: the BMW i3 with range extender; BMW i8, Cadillac ELR, Chevrolet Volt, Ford Fusion Energi and C-Max Energi, Honda Accord Plug-in and Toyota Prius Plug-in. The end of 2014 saw 12,351 total PEVs registered in Washington, a significant jump from the 7,896 registered at the end of 2013. Over half of the state's PEVs are registered in King County, which includes the city of Seattle. At the time of data collection, the DOE reported 483 PEV charging stations in Washington, most of which were located in the city of Vancouver, Washington, in the greater Puget Sound area, and along the I-5 corridor. Initially free to use the cost of Washington's West Coast Electric Highway PEV chargers increased in April 2014. The cost of a

charge went up to $7.50 with the alternative of a $20 monthly subscription fee for unlimited use. Despite the rise in charging costs the use of these chargers remained high (Kurani et al., 2016c).

Research Methods

Methodological Overview

The data for this dissertation is a result of five years of research across three different research projects. In this section I first provide an overview of the general methodological approaches used during research period followed by a more detailed account of what each individual project entailed. These methods include: large scale surveys, in-depth interviews, focus groups, and an interactive workshop method developed by the research team and undertaken in the second project. The analysis of this data necessarily took a modified approach to emergent methods as the length of the collection process, and the relationship between the projects made it impossible and even detrimental to adhere to a strict program of grounded theory. However, within each research project, and as subsequent projects built upon one another, the research team worked to follow an approach to collection and analysis that adhered to grounded theory's principles of data interpretation, allowing our collection methods to develop in an ongoing dialogue with our data (Charmaz, 2009). As such the early projects and initial interviews in each project remained rather unstructured, to allow the data to speak for itself, with as minimal influence from preconceived theoretical assumptions as possible. At the same time, across the projects, researcher-specified coding systems identified major themes and significant processes which then guided more focused design of data collection instruments and the topical orientation of the research.

The interdisciplinary team I worked with during this research process employed a wide range of data collection instruments. Due to the variety of disciplinary backgrounds of the research team, with different ontological and epistemological stances, the design process included much negotiation. The argument presented in this dissertation is the result of my individual analysis of the data and is informed by my perspective as a sociologist and my location within a sociology department. That being said, my analysis cannot help but be influenced by the dialectic between data collection and data analysis that occurred during the 5-year research process. Working with a research team undoubtedly led me to a richer, more nuanced understanding of PEV consumers as I was exposed to different concepts, knowledges, perspectives, and interpretations by my fellow researchers (Driedger et al, 2006; Garland et al., 2006). Lofland and colleagues (2006) suggest that team research provides several benefits to qualitative data collection and analysis including: "increased access to different voices, multiple perspectives, various relevant situations, and encounters, thereby helping to guard against biases associated with a single role and set of role relationships, the personal characteristics of the researcher and his or her preferred interpretive point of view" (p. 93) allowing researchers to discern "a greater variety in behavior" (p. 93), and preventing precipitate analytic conclusions (Ilgen, 1999). Practically, working with a research team offered several other benefits as well. Having more than one researcher at the interviews, focus groups, and workshops allowed part of the team to document the setting, take notes that the recording may miss, and manage unforeseen logistical problems, so that the other researchers could devote all of their focus to engaging with respondents. Working with a team to conduct interviews also helped to address any potential issues with interviewer safety, as the majority of the interviews for this research occurred at the interviewee's residence.

The goal of qualitative methods is to speak with people with a variety of experiences pertinent to the research, not to replicate population measures (Lofland et al, 2006). As such, a small sample is appropriate for in-depth qualitative research designed to collect information rich, quality data. For the in-depth interviews, the focus groups, and the workshops, sampling occurred through a process of purposive sampling, as is appropriate for qualitative work, rather than random or probability based sampling. Erlandson and colleagues (1993) write, "purposive sampling increases the range of data exposed and maximizes the researcher's ability to identify emerging themes that take adequate account of contextual conditions and cultural norms" (p. 82). Focusing in-depth on a small number of deliberately selected participants allowed for access to a range of needs, interests, and behaviors. Indeed, as Lamont and Swidler (2014) explain, interviewing in particular enables the researcher to access "emotional dimensions of social experience that are not often evident in behavior… for many people the imagined meanings of their activities, their self-concepts, their fantasies about themselves (and about others) are also significant, and we generally cannot get at those without asking, or at least without talking to people…" (p. 159). The purposive sampling process took place in three stages: criterion sampling, maximum variation sampling, and convenience sampling. The first stage of sampling followed the method of criterion sampling, the process of choosing cases that meet particular criteria, which varied depending on the project goals (Erlandson et al., 1993). The second stage followed a process of maximum variation sampling where the goal was to represent a diversity or range of households with PEVs. The final stage of sampling selection, known as convenience sampling, was based on access to a population.

Interview method. As they allow participants to express their own value frameworks, using their own terminology, McCracken (1988) suggests that qualitative research methods represent an ideal approach to conducting research on new products. The primary instrument of data collection across all three projects was the semi-structured in-depth interview, developed with a focus on allowing participants to construct their own narrative about PEVs. As Lamont and Swidler (2014) note, interviews, more than other qualitative methods enable the researcher to access the features of reality, such as imaginative qualities attributed to PEVs including fantasies, underlying what is immediately observable. The technique of probing questions uncovers more in-depth responses or facts about observable situations. Accessing these features proved particularly effective in revealing how PEVs provide imaginative value to consumers.

Our process of designing, conducting, and analyzing interviews overlaps significantly with what Dick (1990) calls the Convergent Interviewing (CI) method and the grounded theory method, two emergent methods. As emergent methods, in-depth interviewing, and grounded theory both share several elements which Charmaz and Belgrave (2014) point out, including:

> (a) conducting simultaneous data collection and analysis; (b) engaging in early data analysis of emergent ideas; (c) using comparative methods throughout the inquiry; (d) analyzing basic social processes within the data; (e) constructing tentative inductive abstract categories that explain and synthesize these processes; (f) sampling to expand, refine, and check these tentative categories. (p. 350)

Emergent methods are particularly useful when engaging with new, unstudied, and dynamic social phenomena, like emerging markets and new technologies. They aim to impose as few of the researchers' pre-conceived interpretive codes on the research design and instead allow theory to emerge from empirical data. That being said, there exists a wide range of approaches to both CI and grounded theory, including arguments for various levels of engagement with the literature of the field of study prior to and during data collection. Strauss and Corbin (1998) suggest that

the literature can act as another technique to increase theoretical sensitivity and "stimulate our thinking about properties or dimensions that we can then use to examine the data in front of us" (p. 45). Their suggestion proves particularly salient to studying sustainable consumption because, as I argue in Chapter 4, the academic and policy literature on the PEV market plays a significant role in constructing PEV market subjects and reinforcing sustainability ideology. However, Strauss and Corbin (1998) also warn against letting a literature review unduly influence the direction of data collection and recommend finding a balance between remaining open to the what the data says and understanding factors that may shape the area of study.

The CI method is an iterative, in-depth interviewing technique that allows the researchers to refine the process of data collection and the content of the interview guide after each interview. This method, Rao and Perry (2003) explain, calls for researchers to develop probing questions based on the agreements and disagreements that emerge across the interviews. Consequently, with each additional interview, commonalities and differences must be reassessed and the tools of data collection refocused with regard to new information. As an interviewing technique, this process represents a continual refinement of the interview guide and the sample composition as a means to facilitate saturation by gradually paring down researcher uncertainty about the interpretive codes emerging from the data, until the interviews offer no new information. The probe questions allow researchers to increase the structure of successive interviews as a way to focus on emerging topics of interest and understand conflicting accounts from the interviewees. CI is both an interviewing technique and an approach to qualitative research.

Grounded theory is a well-known methodological and theoretical approach in qualitative research. The "theoretical" part of grounded theory refers not to an all-encompassing

social theory but rather to the grounding of explanatory models in empirical data (Glaser & Strauss, 1967). Charmaz (2006, 2008) who adopts a more constructivist epistemological approach to grounded theory states that, "grounded theory strategies make the method explicit, and their open-ended qualities foster the development of emergent conceptual analyses. Grounded theory strategies prompt early analytic thinking and keep researchers interacting with their data and nascent analyses" (Charmaz, 2008, p. 156). The grounded theory method calls for the researcher to engage in a guided conversation even as it encourages them to allow participants' comments and interests to shape and influence this direction. In grounded theory approaches, researchers move between analysis (coding) and interviews which functions to inform and orient both the collection (obtaining additional, focused data) and the analysis (refining emerging analytic categories) process.

The research team followed the general principles of emergent methodology, using in-depth interviewing, focus groups, and observation to collect data and a grounded method approach to analyzing the data. Given the particular conditions of our research, however, we needed to modify these methodologies to fit our circumstances. Using a grounded theory method, the researcher begins data collection with minimal prior engagement with the literature and therefore, ideally fewer theoretical assumptions. The goal here is to allow theoretical insights to develop from the data collection and analysis, emerging from the participants' terms and categories rather than those of the researcher. The three research projects described here necessitated some engagement with the literature prior to beginning data collection for several reasons including: funding; access to the population of PEV drivers; required technological knowledge; and the necessity of understanding the PEV market (e.g., available models, PEV sales and ownership). Moreover, several of the team members were scholars already steeped in

HEV and PEV consumer research, bringing a significant body of knowledge and experience to the research design process. As such, our approach was more in line with CI where researchers embark on data collection with some prior knowledge of the literature (Rao & Perry, 2007) but at the same time, our initial aim was not to expand or develop an existing theory. Individually, as I later conducted a more sociologically oriented analysis of my data it was impossible not to have some foregrounding in the field after several years of study. That being said, I worked hard to keep theoretical assumptions from coloring my analysis as I re-coded and analyzed data from all three projects.

Our approach to interviewing followed an emergent method where the interview guide initially remained very loosely structured and moved to a more structured format with each set of interviews. The CI model calls for researchers to meet frequently to assess the interview guide (Rao & Perry, 2007) and as Lamont and Swidler (2014) note, interviewing allows for increased attention to the research design process. Our team met regularly to share summaries of our interviews and to identify common issues, emerging areas of interests, and places where individual interviews aligned with or diverged from the interview guide. Due to logistics, the research team only met at the end of the day after conducting a set of interviews (usually two). As such, changes to the interview guide, negotiated among the researchers, did not occur after each individual interview but rather after 3 or 4 interviews. These meetings allowed us to make agreed upon adjustments to the guide based on our observations and preliminary analysis of previous interviews. We also solicited from participants in the workshops and interviews to improve the data collection process. Following this process necessitated continued interaction with our interview notes as well as preliminary analysis of emergent themes. Depending on the project, we were also constrained by a schedule which meant that some of our interviews were

conducted over the course of a week, preventing any in-depth analysis or coding of the data. However, working on sequential projects gave us the opportunity to let the codes identified in previous research lead us in "unanticipated directions" from accessing new types of participants (e.g., ICEV new car buyers, technology enthusiasts) and gather new kinds of data (e.g., video recordings, focus group discussions, workshops activities)—a fruitful result of drawing on insights from grounded theory (Charmaz & Belgrave, 2014). The emergent method allowed us to continually reassess our interpretations, checking them with the accounts of new participants regularly. The longitudinal aspect of this research meant that we could engage with the literature in between projects to contextualize our findings, and inform the topical directions of future projects.

Though each project had different collection instruments, the interview guides used in each shared two important elements. First, was a household vehicle history, which generally began the interview. The household vehicle history included a description of past and current vehicles, driving patterns and vehicle use, and vehicle related household changes (e.g., new employment, having children). As a starting point to the interview, asking about the household vehicle history gave the interviewees a chance to get comfortable in the interview setting, control the direction of discussion, and familiarize themselves with the researchers with a generally non-sensitive topic. Second, the researchers invited a narrative of the purchase process, or how the respondent came to own (or lease) a PEV (or their most recent ICEV if they were not a PEV driver). This question was open-ended and designed to encourage the participant to give an expanded account of their experience. Eliciting this narrative generally required very little prompting from the researcher as the goal was to let the interviewee narrate their own story. The rest of the interview guide was crafted in a way that built upon the narrative, following up on

pre-determined themes but also giving the interviewer room to customize the interview based on the participants' story. This flexibility, while greatly enhancing the scope of data accessed during the interview, is what makes continuous communication among the research team and the ongoing refinement of the interview guide necessary.

A narrative is a sequence of events, held together by a "plot" which organizes them in a given manner (e.g., temporally, spatially, thematically, episodically) (Bell, 2009). The gestalt of a narrative arises from its plot, which gives a series of disordered events a unity beyond a list or chronicle (Riessman, 2014). In narrative interviewing, the interviewer actively co-constructs the interview narrative with the participants, through subtle probing questions and non-verbal behaviors. Narratives of car purchases, particularly among the PEV drivers, were usually linear and temporal, however, often the narrative of how they came to be the type of person who would buy a PEV were episodic and/or thematic. A challenge of narrative analysis is its messiness. Indeed, as Riessman (2014) points out,

> stories in research interviews are rarely so clearly bounded, and often there is negotiation between the teller and listener about placement and relevance, a process that can be analyzed with transcriptions that include paralinguistic utterances, false starts, interruptions, and other subtle features of interaction. Deciding the beginnings and endings of narrative segments can be a complex interpretive task, especially when they emerge in bits and pieces over the course of the interview. (p. 335-336)

However, having a four-person research team analyzing narratives meant that there were four critical assessments as to what constituted each participants' narrative.

When using in-depth interviewing and grounded theory methods the researcher needs to be on guard for two potential shortcomings: the quality of their data and the power dynamics in the relationship of subject and scholar. Charmaz and Belgrave (2014) suggest that one of the critiques of grounded theory is that it does not focus enough attention on data collection. The

solution, they explain, is to ensure the collection processes obtains rich data to provide a solid foundation for developing theory. We addressed this concern by tape recording the interviews and later transcribing them, and having two researchers at the interview to allow for comprehensive field notes. Both of these processes increased the accuracy of data collection. We also integrated our grounded theory work in mixed methods projects, combining in-depth interviewing with both qualitative (focus groups and workshops) and quantitative methods (surveys).

As feminist scholars have long noted, the researcher is in a position of power as they control the representation of the interviewees and must remain reflexively aware of this position of authority (Wolf, 1996). At the same time, interview participants maintain control over how much information they reveal, and the extent of their participation in the research. At times, however, it was difficult to remain reflexive about my position of power in the field. This was true for several reasons, not the least of which, that I was generally younger than most of the participants, female, and a student. In some cases, I was also less technically knowledgeable about PEVs and less experienced with driving them than the participants, evoking a sense of imposter syndrome with regard to my positionality as an "expert" in the field. In one notable example, a fellow researcher and I were interviewing a male participant, in his 50s, whose household owned both a Nissan LEAF and a Chevrolet Volt. Because of my initial rapport with the participant I was leading the interview while my colleague took field notes. At one point the interviewee asked if I had ever driven a Volt and upon finding out that I had not, he insisted that I test drive his Volt, claiming, "that's what insurance is for" in the face of my terrified protests that I would crash or otherwise damage the car. Ultimately, I acquiesced, but I was incredibly uncomfortable driving a stranger's brand new car (I refuse to even drive my family's new cars

for fear of damaging them), a feeling exacerbated when, while driving around the neighborhood he began yelling "*faster Jennifer, faster*" while encouraging me to race against other cars (to show off the acceleration speed of the Volt). However, at the same time, in the analysis, writing, and representation of the research my position of power is very clear. To manage these hierarchies, I worked hard to remain both aware of my power and unintimidated by my participants.

Focus group method. Frequently the focus group method appears in marketing research, taking a structured approach to data collection with the goal of influencing market trends. The focus group method allows for the collection of individual data, group data, and interaction data. The most obvious of these is the individual level data, which drives marketing research that tries to collect individual responses simultaneously (Lezuan, 2007; Munday, 2006). Much of the literature that purports to offer guidance in designing focus group methodology, including the format, size, and role of the moderator, comes from this perspective (Catterall & Maclaran, 2006). Consequently, despite existing examples and guides, our use of focus groups adopted a sociologically informed approach to the method. In part this meant applying a less structured format but it also meant paying attention to the larger social structures which inform participants' interactions and perspectives.

Our aim with the focus groups was to observe how PEV drivers contextualize and categorize phenomena as part of a collective (Johnson, 1996). However, this was undertaken with the understanding that focus groups are not representative of the broader population. In spite of this, they offer several benefits, including exposure to a range of experiences and perspectives about how social processes unfold in and are shaped by a particular social setting

(Morgan, 1996, p. 134). Though the focus group is a staged social setting, and the performative nature of participation is subject to critique, this is true of all social interaction, staged or otherwise (Alexander, 2011; Goffman, 1959). Consequently, the interaction we observed in the focus groups can still add to our understanding of the cultural construction of meanings through social interaction, including how actors employ connotative codes and discourses in this process (Moisander et al., 2009)

Our focus group design was oriented not toward observing individual responses but rather on how individuals "shared and compared" with one another to add to the content of the discussion as a whole (Morgan, 2014). While we were certainly interested in individual level data, our goal in convening focus groups was to triangulate our interview data with group-level data, to see how participants actively co-constructed meaning, and to understand the dynamics of the interaction among PEV drivers. According to Morgan (2014), focus groups are based on

> the idea that *the ongoing conversation serves as the context for the participants' co-construction of meaning*. Thus, the expansion of the topic through sharing and comparing provides material for consolidation through organizing and conceptualizing. Similarly, some of those "social objects" become themes, and some of those themes provide the basis for conceptual frameworks (p. 172)

With the understanding that attitudes and opinions are not necessarily pre-existing but are negotiated in a particular context we worked to create multiple contexts (e.g., interviews and focus groups) as a way to illuminate the singularities for each context but also to reinforce our analytic interpretations and establish the validity of indicators (Cyr, 2016; Lezuan, 2007). This approach extended to our other projects that combined in-depth interviews with other methods of data collection. If values are constructed, in part, through social interaction and expressed through narratives then both types of data offer insights into meaning creation process and result. As Cyr (2016) suggests, when researchers attend to interaction as the unit of analysis, the

processual nature of meaning construction, rather than the end result, becomes the focus. As such, focus groups may uncover new responses, new themes, and potentially new research questions.

Workshop method. Drawing on both focus group and experimental design methods for collecting qualitative data, we designed the workshops to capture real-life data about PEV consumers in a constructed social environment. Our goal was to observe interactions between PEV drivers and non-PEV drivers. The importance of information flow from early to potential later actors through face-to-face interaction, hypothesized by so many conceptual frameworks, contrasted with results from the previous research projects (see Axsen and Kurani, 2011, 2012 for reviews of several such frameworks within the context of PEVs). The majority of in-depth interaction amongst PEV drivers both prior to and following each driver as they transitioned from "becoming" to "being" a PEV driver, as well as their interactions with ICEV drivers during and after this transformation, occurred through consumer mediated online platforms (e.g., discussion forums, listservs, personal blogs), and represents more of a transfer of information or the construction of a knowledge base rather than an interaction. Early PEV drivers described their offline interactions with unfamiliar ICEV drivers as generally infrequent and perfunctory. Interactions between PEV drivers and their friends, family, and colleagues tended to be more engaged. One early LEAF driver explained how she carried copies of a small card she made herself, which included general answers to the questions she most often received from non-PEV drivers. Other PEV drivers, engaged in purposeful PEV evangelism to drivers of conventional vehicles. We received little information about face-to-face interactions between PEV and ICEV drivers from this earlier study despite several respondents volunteering their interest in sharing

information with non-PEV drivers. Additionally, what is said, on both sides of the conversation, during encounters between PEV drivers and potential as-yet-to-be-PEV drivers was missing from our previous research. This prompted the following questions: what does a deeper conversation between PEV and ICEV drivers sound like? And what are the effects of such conversations on ICEV drivers' evaluations of PEVs (and PEV drivers)? These questions prompted the design of workshops in which PEV and ICEV drivers were brought together to engage in several activities convened among different subsets of all the participants.

Although they are similar to focus groups, workshops include a larger number of participants, generally last for a longer period of time, and involve organized "creative" activities. We used the term "Workshop" to describe the meetings convened for this research because each workshop included approximately 20 participants, as opposed to the 10 or fewer participants involved in focus groups, followed an ordered sequence of planned activities designed to produce creative outputs, and lasted approximately 4 hours in contrast to the 2 hour length of focus groups (Catterall & Maclaran, 2006). Experimental design has been successful in the study of small group interaction by bringing together a small group of experimental subjects and assigning them tasks that allow researchers to observe how the group organizes itself and the dialogue that emerges during this interaction (Babbie, 2011).

Survey method. Survey design drew on past experience with this type of study, but required the creation of questions specific to each study. Preliminary versions of the online surveys were programmed and links provided to the PH&EV Center staff for testing and review. The research team conducted formal pilot testing of the surveys to ensure that the survey population could access the survey across a wide range of computer operating systems and

devices. In the pilot testing, respondents completed the online survey. Depending on the study, they were observed, or recorded notes on the overall questionnaire, specific questions, glitches in skip patterns, customized questions, and other problems. After the pilot testing, the survey design team, and the programmer resolved the issues ranging from comprehension of the questionnaire by respondents to programming errors or omissions. The surveys underwent a second round of testing with new testers who completed the revised questionnaire and communicated issues to the design team. Finally, the survey was sent to the PH&EV Center staff once more for review before it was deployed to the full sample of respondents. In the first two research projects my team helped design the surveys but only used them for sampling for the interviews and limited demographic information to contextualize this sample. As I discuss in greater detail below, in the third project my team not only helped to design the survey but also integrated survey data and analysis into the interview protocol and research design.

Despite some concern that an online survey presents issues in representativeness of the sample (access to the internet or a device through which to access the survey) we found that this method allowed us to reach the broadest and most diverse sample from our target population (i.e., new car buyers and lessees or PEV buyers and lessees). Some of the benefits of administering an online survey include: lower costs, time efficiency, and the potential for higher rates of participation (Hesse-Biber & Griffin, 2013). Online surveys do not require travel costs for researcher and have an advantage over telephone surveys with the ability to provide visual aids and multi-media elements to the survey. The time savings from having the survey data immediately stored in a database and accessible proved particularly important to my team as it allowed us to quickly implement the interviews and maintain a reasonable timeline for data collection. The online survey and immediate storage of data also eliminated any errors that might

have come from transcribing responses. Indeed, Chang and Krosnick (2009) compared online responses to responses from telephone interviews to illustrate the reduced measurement error in online data. The self-administration of an online survey may increase the rate of participation as respondents are able to complete the survey in stages at a time and place of their choosing (Vehover & Manfeda, 2011). Additionally, we ensured that the questionnaire was available across a wide range of platforms and devices to allow for maximum access.

Research Projects

Figure 2 provides a visual guide to the three research projects that provided the data for this dissertation. In the following section I describe the methodology used for each project including the sampling procedures.

Figure 2: Project Timelines

LEAF project. Data for this project came from interviews with owners and lessees of PEVs in San Diego County, California conducted between March and April 2012. Sales and leases of PEVs in the study area began in late 2010. In total, the research team conducted twenty-eight interviews with households that owned or leased a PEV. We conducted three pilot interviews with PEV drivers in Yolo County, CA to help focus the interview protocol before conducting interviews in San Diego. Most of these vehicles were Nissan LEAFs (a BEV) though a few were Chevrolet Volts (a PHEV). Our sample came from a state-wide survey conducted by the PH&EV Center in early 2012, of California PEV drivers who had participated in ECOtality's DOE funded EV Project. Of the 1,201 total survey respondents, 336 came from San Diego County and comprised our sample population. Consequently, the data from this project generally reflects the experiences of LEAF drivers, located within a single region in California, during the initial stages of the current PEV market and charging infrastructure development.

ECOtality's DOE funded EV Project deployed PEV recharging infrastructure in eighteen cities in the United States, and San Diego County, California was one of the regions; approximately 460 households had participated in the EV project in this region by the time of our study. The EV Project provided qualified PEV customers with a free 220/240V (Level 2) home charger which they could use in addition to or in lieu of public and other charging installations. In exchange for their vehicle and charging data, the qualifying households were offered a wall mount charger and in some cities subsidized installation up to $1,200. The requirements of participating in this project meant that the interviewee owned their own home and had suitable parking and charging for their PEV. The DC fast charging port on the vehicle was an optional upgrade on the Nissan LEAF but to qualify for the EV project households must have opted to

buy (or lease) a vehicle with the port. At the time of the study, however, no DC fast charge (Level 3) charging stations were available for use in the San Diego area.

On average, PEV owners and lessees from California in general or from San Diego specifically, reported higher income, age, and education levels than the general San Diego population. Though the parameters of the EV project necessarily biased the sample toward high-income households, previous research identified similar socio-demographic differences between samples of new-vehicle buying households and general household populations, suggesting that our sample was representative of the general PEV consumer population. These differences are similar to those between other samples of new car buyers and their corresponding general populations (Axsen and Kurani, 2009; Axsen and Kurani, 2013). The interview population was sampled with the aim of including a range of household and driver attributes. Consequently, the research team selected households for the interviews sample from the survey sample based on household income, gender of the primary PEV driver, age of the survey respondent, household employment make-up, and whether the residence had a solar photovoltaic system or not. We included the solar/no solar criterion as nearly one-third of households buying or leasing a PEV in the region of interest reported installing home solar photovoltaic systems.

The research team included four researchers and two interviewers who conducted each interview. Most interviews took place at the participant's home and included at least the primary driver of the PEV. We made an effort to include other family members, especially if they drove the PEV as well. Interviews lasted between one and two hours and were guided by a very unstructured interview composed of a list of specific topics including: the interviewee's experience purchasing (or coming to purchase) the PEV, charging, information sources including the vehicles' instrumentation, and their sense of a community forming around PEVs. The

interviewers used open-ended questions and encouraged participants to discuss what they felt was important about their experience with a PEV, to expand on topics, and to raise issues not included in the interview protocol.

All of the interviews were recorded and supplemented with field notes made during the interviews. The interview team held meetings every few days while conducting interviews to analyze emerging themes in order to determine whether additional questions should be included or highlighted in future interviews. After completing the interviews, the pair of researchers who conducted the interview reviewed the audio recording and assembled a summary of each household's responses. 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. As a group, we compared these reviews to determine common themes based on drivers' experiences, ideas, and valuations across interviews (Braun and Clarke 2006). The interviews were later transcribed by undergraduate assistants and coded using a three-step coding process of open coding, axial coding, and selective coding, common to grounded theory (Bringer et al., 2006; Mills et al., 2006).

In November 2012, the same research team conducted four focus groups in San Diego, California among buyers and lessees of commercially marketed PEVs. For the four San Diego focus groups researchers created differences between pairs of groups. Groups 1 and 2 were differentiated by gender. Group 1 consisted of eight women and Group 2, consisted of ten men. Groups 3 and 4 were differentiated by self-reported technological interest and savvy: the less technologically interested and savvy group, Group 3, included two women and four men, while the more technologically interested and savvy group, Group 4, was comprised of two women and seven men. None of the participants interviewed were among the focus group attendees. A semi-

structured protocol which included possible prompts and follow-up questions derived from our analysis of the interviews conducted the previous spring guided the composition and topics of the focus groups. All of the groups tended to cover similar topics (e.g., charging, driving practices, technological development) and similarly to the interviews began with each participants PEV narrative. Beginning with the narratives allowed the participants to familiarize themselves with one another, and find commonalities and differences in their stories. The narratives ended up stimulating the discussion to the point that very little involvement on the part of the moderator was needed. In general, the moderator only engaged the participants to ensure each person had a chance to contribute to the conversation, or to refocus the discussion when it strayed to the point of irrelevance.

All but one of the participants, who drove a Chevrolet Volt, drove a Nissan LEAF. The sampling population was the same as that of the interviews, meaning that the participants had to meet the qualifications of the EV project. All of these drivers ranged from 33-77 years old, were a mix of employed and retired, and had annual household incomes ranging from $80,000 to more than $150,000 per year. Thus, like the interviews, the distributions of age, education levels, and income skewed upward compared to the general population of San Diego.

Workshop project. The workshop project included three of the four original research team members. The fourth researcher on the research project was new to the team but already worked at the PH&EV Center. As a team, we designed and implemented a series of three, four-hour workshops with approximately 20 participants in each workshop. The workshops integrated PEV owners and lessees with participants unfamiliar with electric drive technology. The initial driving interest in observing the exchange of information between PEV drivers and ICEV drivers

came from our first project, where we heard a number of accounts from PEV drivers about their interactions with ICEV with respect to their vehicle. As researchers we are restricted in our ability to observe these spontaneous interactions, and consequently used a mix of focus group methodology and experimental design to stage an interaction between PEV and ICEV drivers. Analysis of the LEAF project interviews suggests several topics of interest including: the role of away-from-home recharging infrastructure in PEV drivers' accounts of their "life with a PEV," questions ICEV drivers might have about charging infrastructure, their response to these PEV drivers' accounts. However, as part of the emergent method approach, we allowed the participants to determine the content of the discussions at the workshops. These attendee-driven agendas included: what questions do ICEV drivers have about PEVs, what do PEV drivers want to say about PEVs, and what are the implications for interest in PEVs by ICEV drivers, and for actions by automakers and policy makers who wish to expand the PEV market to many more buyers? In general, PEV drivers, without prompting by the researchers, sought to share reasons of why they bought a PEV and explanations to ICEV drivers of why that purchase was a good idea. In doing so, the PEV drivers "account" for the benefits of PEV ownership and use compared to ICEVs.

The workshop attendees also participated in a semi-structured in-depth interview with two of the researchers prior to each workshop. The interviews served a dual purpose. First, they allowed the participants to familiarize themselves with the research team, making the workshop setting less intimidating. Second, they provided a comparative source of data to that collected during the workshops. In qualitative research the fundamental sources of data are talk and actions. There are three kinds of talk that are central to qualitative research: talk in action (in the flow of activity in the setting), informal interviewing, and intensive interviewing. Talk in action

is talk naturally occurring in a situation that is part of some ongoing system of action. The capturing of this social action requires in situ observation by researchers. Informal interviewing occurs during this observation, allowing researchers to follow up on themes and topics introduced in the natural progression of talk in action. Intensive interviewing focuses primarily on action that has occurred outside the immediate context of the interviews. Interviews offer information about events beyond those that can be immediately observed and allow respondents to construct narratives (Lofland et al., 2006). To capture these three kinds of talk, two different methods were used to collect data about consumer behavior and electric vehicle incentives. The workshops allowed researchers to observe talk in action and also conduct informal interviewing with participants. The interviews offered information that was not necessarily available in the larger group discussion and allowed researchers to get detailed information on each individual driver, their vehicle history, and the narrative of their PEV (or ICEV) purchase.

Four researchers conducted the interviews: two for each interview. Doubling up on researchers allowed for one to conduct the interview and another to take field notes in the setting. The interviews were semi-structured and loosely followed an interview protocol. PEV drivers and ICEV drivers had different protocols for their interviews. For the PEV drivers a list of topics guided the discussion: interest in and initial purchase of the PEV, changes in driving habits, and charging and charging infrastructure. For the ICEV drivers the interviews focused on their car history, purchase behaviors, and driving habits. 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 allowed drivers to convey, in their own language, their experience with their vehicle and driving behavior. Each interview lasted between one and two hours, and all were conducted in the home of the driver.

The timeline of the workshops and interviews was as follows: January (Sacramento), March (Santa Clara), and June (Fresno), 2014. All three workshops were guided by a six-step protocol: 1) introduction, 2) agenda setting, 3) small, mixed (PEV- and non-PEV owners) group discussion, 4) a summary of discussions shared with the entire group, 5) small, mixed group discussion, and 6) a split group (PEV-owner only and non-PEV owner only) concluding discussion. Given the inductive approach of our research, we worked to impose minimum structure on the interaction among participants, allowing long periods of uninterrupted dialogue between them. (to which the researchers would not have access) we kept the PEV drivers and ICEV drivers separate. In the first step of the protocol, the PEV drivers and ICEV drivers were kept separate and given a 10-minute introductory talk to prepare them for the workshop. In the second step, the research team applied the principles from the "Open Space" meeting process to the workshop protocols to allow the participants to determine the topics of discussion (Owen, 1997). In this stage of the workshop the two groups came together to create an agenda for their discussion. As this step determined most of the workshop content, I describe it in greater detail. Each participant was provided with a stack of blank note cards and a pen to write any topic or question they wanted to cover in the discussion about PEVs. As they filled in their cards we invited the participants to come to the front of the group, read aloud their question or topic, and tape it alongside the other cards. This stage of the workshop went on until participants had no further topics to suggest and no further questions to pose. The workshop moderator (the same across all workshops) then asked whether questions and topics can be formed into distinct groups or whether some duplicate others. As a group, the participants worked to aggregate individual ideas and questions into topics. However, the original author of the topic or question had the final say whether it should be aggregated, deleted, or held separately (possibly seeding another

topic). This process continued until no further suggestions were made and all original authors of questions or ideas were satisfied with the disposition of their idea.

At this point, the agenda creation deviated from Open Space which would dictate the entire set of topics be discussed. The researchers intervened to pare the topics into an agenda that could be covered in the available time. The resulting agendas included two main topical areas for all three workshops: PEV costs and charging infrastructure. PEV costs was the single largest cluster of ideas and questions created by the participants in all three workshops. Other ideas from the agenda creation exercise tended to enter the discussion in the third and fourth stages of the workshops as framing of PEV owners' accounts, e.g., why buy a PEV, life with a PEV, and the future of PEVs. After the agenda setting, the participants split into two, approximately equal, mixed groups of PEV and ICEV owners to discuss the agenda topics. The goal of this division was to allow all participants a chance to speak in the given time. At the end of an hour the two groups recombined to share what each had talked about, allowing for further questions and answers between the two groups. Next, the participants divided into three mixed groups, each led by a different researcher in a conceptual game designed to elicit attendees' thoughts and opinions about the benefits and drawbacks of driving and owning a PEV as opposed to a non-PEV. The ideas that were omitted from the workshop protocol for steps three and four were re-introduced during the fifth step, the conceptual games (e.g., PEV safety and the environmental effects of PEVs. Finally, the PEV and non-PEV groups separated for their closing discussions).

To hear about the experiences of early PEV drivers and to hear how those accounts are related to and received by ICEV drivers, we recruited samples of approximately ten PEV drivers and ten ICEV drivers in three regions of California (for a total sample of approximately 60 households). The Sacramento workshop group consisted of 9 PEV drivers and 9 ICEV drivers; 9

were male and 9 were female; they ranged in age from 23-73. The San Jose workshop group consisted of 11 PEV drivers and 11 ICEV drivers; 12 were male and 10 were female; they ranged in age from 29 to 67. The Fresno workshop group consisted of 8 PEV drivers and 9 ICEV drivers; 9 were male and 8 were female; they ranged in age from 27-66. In Sacramento 10 PEV drivers were interviewed. In San Jose 11 PEV drivers were interviewed and 11 ICEV drivers were interviewed. In Fresno, 9 PEV drivers were interviewed and 9 ICEV drivers were interviewed. The discrepancy in the number of interviewees and workshop attendees is due to participants who were unexpectedly unable to attend the workshop after participating in the interview. See Figure 1 for a visual aid. As new car buyers are much more likely to own multiple vehicles, across all workshops only a few households owned only one vehicle. The PEVs owned (or leased) by the sample included 20 BEVs and 10 PHEVs. The BEVs included the Mitsubishi i-MiEV, Fiat 500E, Ford Focus EV, Nissan LEAF, Toyota RAV4 EV, and Tesla S. These vehicles spanned the then available spectrum of price, performance, luxury, driving range, and charging power. The PHEVs included the Honda Accord Plug-In, Toyota Prius Plug-In, and Chevrolet Volt. These vehicles are more similar to each other than the BEVs; pertinent differences include their electric driving range, varying approximately from 10 to 35 miles.

The sample of PEV owners came from PH&EV Center surveys while the non-PEV drivers came from a recruitment process conducted by a market research company via telephone. The three regions represented in the study are the cities of Fresno, Sacramento, and San Jose, CA, though these labels refer to smaller parts of larger urban areas. The Fresno label refers not only to the cities of Fresno and Clovis but also to the rural areas immediately surrounding these two cities. The Sacramento region includes the city of Sacramento, Sacramento County, and nearby portions of El Dorado, Placer, Sutter, and Yolo Counties. The San Jose label represents

not only the city of San Jose but Santa Clara County more broadly. The selection of these three regions was guided by our desire to observe a range of consumer attributes related to differences in the regional uptake of PEVs and deployment of PEV charging infrastructure, differences between the socio-demographic measures of early PEV buyers and the local populations of all vehicle buyers and new vehicle buyers, and variation in the availability and likely valuation of incentives for PEV purchase and use.

We used the regional level of participation in the early PEV market as the primary sampling criterion for our selection of areas of study. The goal here was to select regions that differed as to the number of PEVs sold to date: the San Jose region represents some of the highest per capita registrations of PEVs in California; Sacramento represents a low mid-range number of per capita registrations of PEVs; and finally, Fresno has the lowest per capita registrations of PEVs. In terms of range, the per capita rate of San Jose (5.5 PEVs per 1,000 people) is eleven times more than that of Fresno (.49 PEVs per 1,000 people). The difference in per capita rates between the highest (San Jose) and lowest (Fresno) three regions of the study is more than twenty-fold. Though Los Angeles County has a higher total number of PEVs sold, the per capita rate in Santa Clara County (5.54 PEVs per 1,000 people) is significantly more than that of Los Angeles (1.89 PEVs per 1,000 people) (Center for Sustainable Energy, 2018). The regional differences in the amount of away-from-home charging reflect the per capita rates of adoption for each area. For example, Santa Clara County has nearly 30 times as many charging locations and more than 50 times as many chargers as does Fresno County. There exist a number of other differences between the three regions of study that relate to the uptake and use of PEVs including: the population size, the number and variety of destinations within driving range, levels of traffic congestion, and the extent of HOV lanes.

The purpose of the study was to explore and describe the interaction between PEV drivers and non-PEV drivers. Consequently, we used the three-step purposive sampling appropriate for qualitative fieldwork discussed above, rather than random or probability sampling. In Sacramento, we sampled for ICEV drivers who did not personally know someone who owned or leased a PEV. In San Jose and Fresno, however, this was not a selection criteria. In some regions, with the PEV drivers, we employed a process of snowball sampling, where the referral of participants is used to gain access to other participants (Babbie, 2011). In Sacramento, we asked the PEV drivers to volunteer other PEV drivers who might be willing to participate in the workshops. In Fresno, we used on-line communities to recruit PEV drivers and some of these PEV drivers we asked to refer other drivers. We sampled the PEV drivers for maximum variety based on the type of vehicle they drove, their income level, age, gender, if they had children, and whether they were retired. In Sacramento, whether they commuted downtown and whether they had a home charger represented another sampling variable. We followed this sampling process with the goal of introducing ICEV drivers to a broad range of vehicle types and driver characteristics.

We used the socio-demographic profile of PEV owners to guide our sampling of non-PEV drivers for the workshops. Our data suggests that early PEV drivers were more likely to have higher incomes, to own their homes, and to have completed a college or university degree even in comparison to new car buyers in general. Consequently, our non-PEV participants were sampled based on income, homeownership, and education. For example, to match the PEV driver sample, we sampled the ICEV drivers to fit within a specific income bracket of $100k-$200k per year gross household income.

Based on our sampling parameters, the participants in this project are not statistically representative of any meaningful population. Consequently, the data from these interviews and workshops reflect the experiences of a specific group, at a specific point in the development of the PEV market, and in three specific locales. Moreover, with the exception of a few self-identified "car people" and PEV evangelists, the majority of the participants in this study would not willingly sit down to talk about automobiles and PEVs in the course of their everyday lives. However, the workshop setting enabled us to position the PEV drivers as lay "experts" who moved non-PEV drivers from a from a "thin" to a "thick" (or at least a thicker) information environment (Geertz, 1973). That is, the workshop took ICEV drivers from the everyday reality wherein they had limited exposure to or knowledge of PEVs and placed them in an environment where they interacted with PEV drivers who represented a range of PEVs, with a variety of capabilities, and a spectrum of body styles from different manufacturers.

Despite sampling for ICEV drivers with limited exposure to PEVs, signs of PEVs were universally present in the regions of study. For example, one evening as the research team was eating dinner prior to a round of interviews, the parking garage outside the restaurant was advertising PEV parking on its scrolling marquee. At another time during data collection, while staying at a hotel, we saw the evening news (playing on several large screen televisions) announcing that Consumer Reports had named an EV its Car of the Year. Prior to the start of this project, car dealerships had been selling PEVs for three years meaning that there were both increasing numbers of PEVs on the road and public charging stations. These examples, along with a number of other similar instances, suggest that signs of the emerging PEV market are visible even if consumers are not aware of them or see them, without processing their meaning.

As the ICEV drivers sampled for our workshops confirmed, though they move through an environment that includes these signs, they had largely missed them.

Multi-state Low Emission Vehicle (LEV) project. The overall study design for this project included a survey administered in the following states: California, Oregon, Washington, Delaware, Maryland, New Jersey, New York, Massachusetts, Connecticut, Rhode Island, New Hampshire, Vermont, and Maine and follow-up interviews with a subset of survey respondents in California, Oregon, and Washington. The choice of both a survey and follow-up interviews represents a deliberate attempt to contextualize the findings from the large-scale data set and to answer two types of research questions: how many (survey) and why (interviews). By implementing a survey, we were able to provide a thorough description of the population of study at the time of our research. Following up with interviews allowed us to deepen this description of by probing into the past and prospective future of respondents. Combining in-depth interviews with a large-scale survey also permitted us to not only see whether respondents held a positive or negative view of PEVs but also to explore the (e)valuative processes that led to this value judgement. The interviewers had access to the data from each household's survey responses, which gave the researchers the opportunity to ask follow up questions and probe respondents about their initial answers. This allowed for extended conversation, reflections by respondents, and commentary in their own words, something rarely possible with a survey research design. The survey was administered to new car-buying households from mid-December 2014 to early January 2015. The same 4-person team from the Workshop Project designed and implemented the interviews, which took place from January to March 2015. The

households interviewed ranged from those holding strong positive purchase intentions for LEVs to those with zero or negative interest toward LEVs.

To recruit survey participants, we hired a sample management services company to contact potential respondents and to ensure that the sample was representative of the broader population of new car buyers. To that end, the company was provided with our sampling criteria and our target sample size; they were also asked to offer participants a $5 dollar completion incentive. The vendor recruited respondents from four existing panels: American Consumer Opinion Panel (ACOP), SSI, Exchange, and Nielsen. The respondents were contacted via email, and any eligible participants who did not complete the survey were emailed follow-up reminders. In order to participate in the survey respondents had to meet the following requirements: own or lease a new vehicle since January 2008 (i.e., within 6 years of the survey) and be at least 19 years old (for consent purposes). At the time of the survey (late 2014), the used PEV market was practically non-existent and the majority of commercial PEV drivers either owned or leased a new vehicle. Thus, we made a choice to sample for consumers who had gone through the process of shopping for and buying a new vehicle at the same time as PEV drivers and during a time when PEVs were available at car dealerships. All of the survey participants were given a link to the online questionnaire, which remained active for one month between December 2014 and January 2015, itself hosted on a UC Davis server. The questionnaire could be accessed and completed across a range of operating systems on different electronic devices—with the exception of smartphones.

As this survey directly informed the interview design and data from the survey employed as part of the interview process, I discuss this survey at greater length that those used only for sampling purposes in the previous two projects. The online questionnaire was divided into six

main sections: 1) vehicle ownership, vehicle fuel types, estimated monthly driving distances and fueling costs; 2) attributes of daily driving such as use (e.g., use of HOV lanes and toll facilities, commuting, flexibility within household to reassign who drives what vehicles, and home parking conditions including access to both parking and power; 3) awareness, knowledge, and considerations of PEVs and FCEVs; 4) a vehicle design game; 5) explanation for design game choices; 6) attitudes toward air quality, climate change, fuel flexibility, energy security, and attitudes toward new technology.

The vehicle design game, in which respondents designed a plausible next new vehicle for their households, represented a constructive, interactive method of data collection. The interviewers reviewed the results of the design game with the households that participated in the follow-up interviews. The design game used in this survey was based on the successful implementation of design games in previous studies from the PH&EV Center to measure new car buyer preferences in ICEVs, HEVs, PHEVs, and BEVs. Depending on which vehicle they designed, survey respondents completed two or three iterations of the game. Initially the design game asked participants to indicate the make and model of the vehicle that would most likely become their next new car. This selection then became the starting vehicle that respondents used as the base for their choices in the design game. During the game participants moved through a series of choices that asked them to select the following: 1) drivetrain type (ICEV, HEV, PHEV, BEV, or FCEV), and for PHEVs, BEVs, and FCEVs 2) driving range per refueling and/or recharging, 3) home vs. non-home recharging and refueling, 4) and time to recharge or refuel. The suggested retail price of each respondent's base vehicle, selected at the start of the game, provided the base purchase price during the selection stages. The survey tailored itself so that any changes in the cost of the vehicle, based on the selections of the respondent, would be based

on the price of changes to the size and body type of their original base vehicle. The results of the design games represented respondents' imagined prospective vehicles under very specific conditions created by the researchers. As such, the games were not intended to accurately measure or predict the potential adoption rates among new car buyers. Instead, the games provided a way for respondents to reflect on whether they were presently willing to have their next vehicle be a PEV or FCEV and a way to engage in a dialogue with the interviewees.

In the survey, participants ranked their motivations for designing PHEVs, BEVs, or FCEVs along a scale from 0 points = not at all important to 5 points = very important. Building on our previous research and our developing interests, we offered respondents a list of 17 possible motivations for designing a LEV. However, respondents were only able to spend a total of 30 points summed across these 17 possible motivations. Highly rated motivations to design a PEV included: savings on (fuel) costs, interest in new technology, convenient to charge a PEV at home; reducing the effects of personal travel on climate change, air pollution, oil imports, and payments to oil producers. If the respondent did not choose to design a LEV then they were similarly asked about their motivations against designing such vehicles. In this situation, respondents ranked their motivations along a scale from 0 points = not at all important to 5points = very important and once again were only allowed to spend a maximum of 30 points. Here, however, we provided respondents with 19 potential motivations against LEVs derived from prior research. The highest scoring motivations against designing PEVs included: limited initial charging and fueling networks; high initial purchase price; high operating and maintenance costs; short driving range; unfamiliarity with the new technology; worry about the effects on electricity supply; waiting for technological advancement to make PEV technology more reliable.

State sample sizes were determined largely by the sample provider's ability to provide samples from the population of new-car buying households in each state. The maximum achievable sample size was used following data cleaning (primarily for records too incomplete to be useful). The final total sample size was 5,654; the final Oregon sample size was 494; the final Washington sample size was 500; the final California sample size was 1,671. In the total sample 52% of the respondents were women and 48% of the respondents were men. The median household income range for the total sample was $75,000-$100,000 dollars. Of the total respondents, in the design game 32.3% designed their next new vehicles to be a PHEV (18.6%), a BEV (9.2%), or a FCEV (4.5%). Below I describe the demographics for the samples from the states in which we also conducted follow-up interviews: Oregon, Washington, and California respectively.

There was a substantial difference in the gender balance between Oregon and the total sample: the Oregon sample had a higher percentage of female respondents (59% compared to 52%). The median household income range for Oregon respondents was $50,000-$75,000, which is lower than the total sample median household income range. Of the Oregon respondents, in the design game 38% designed their next new vehicle to be a PHEV (23.1%), a BEV (11.1%), or FCEV (4.4%). Of the Oregonians who designed a PHEV, 40% added the DC fast charge option to their vehicle design. At the same time, most households (59%) believed they would be satisfied with a charging speed that could be supplied by existing home 110V or 220V circuits.

In the California sample, 50% of the respondents were male and 50% were female, representing a completely even division. Despite the parity of our sample, in general, previous research along with rebates and sales reports suggests that early PEV buyers tend to be male. The median income category for California respondents was $75,000 to $ 99,000. In the design game,

38% of the California sample designed a PHEV (21%), BEV (11%), or FCEV (6%) as their next new vehicle. Of the Californians who designed a PHEV, 146 of the 358 (41%) incorporated the DC fast charge option into their vehicle design. Of the Californians who designed a BEV 66% believed they would be satisfied with a charging speed that could be supplied by existing 110V or 220V circuits. Two-thirds of those who designed a BEV believed they would be satisfied with a charging speed that could be supplied by existing home 110V (36%) or 220V circuits (31%). Less than half (43.5%) incorporate quick charging capability. Compared to the total sample, the California sample had a higher percentage of respondents who designed a PEV or FCEV for their next vehicle. Despite this higher number, two thirds of the survey respondents—who as new car buyers have searched for information about cars, been on new car lots, and purchased a vehicle during this period— could not name a BEV presently for sale in the United States. Among those in California who could name a BEV presently for sale, name recognition had not spread beyond the earliest entry vehicles.

In Washington, 55% of the respondents were women and 45% were male, an increase in female respondents over the total sample. The median income range of the respondents from Washington was lower than the total sample at $50,000 to $75,000 dollars. In the design game 35.7% of the Washington respondents designed a PHEV (19.8%), a BEV (11.7%), or an FCEV (4.2). Of the Washington respondents who designed a PHEV 47% believed they would be satisfied charging at the speeds afforded by 110V or 220V home outlets. Less than half of the Washington respondents who designed a BEV opted for the DC fast charging option.

In January 2015 the Oregon interviews were conducted in the city of Portland and the area between the town of Sandy in the east, Hillsboro in the west, and Wilsonville in the south. In the Puget Sound region of Washington State, including the city of Seattle and the area

spanning from the city of Renton in the south to Cottage Lakes in the north, interviews were conducted in February 2015. Finally, the California interviews were conducted in the Sacramento, San Francisco Bay, San Diego, and Los Angeles areas during March 2015. In all the locations, interviews were conducted in respondents' homes or at local restaurants, depending on the preference of the respondent.

With the aim to access a variety of respondents, we sampled the interview households based on the following criteria: whether or not they designed a PHEV, BEV, or FCEV, and whether or not at any point during the survey design game they had selected a body style and/or size that is unlikely to be offered as a PEV (i.e., a full-size vehicle). We divided LEVs into PEVs and FCEVs for both the survey and the interviews. This dual approach shaped the interview protocol, which included an outline of desired topics (informed by both previous research and findings from the survey) and suggested questions. At the same time the interviewees were given the freedom to guide the direction of the conversation where they wished, as is typical of semi-structure interviews. As with the previous two projects, the interview team met after each set of interviews to review summaries of the interviews, refine the interview protocol, and engage in preliminary analysis. As the sample for the interviews was so large, these meetings occurred after the set of interviews in a particular area concluded (i.e., Seattle, Portland, Sacramento, San Francisco, Los Angeles, and San Diego).

In general, the interviews suggested that their participation in the survey represented the first time that these new car buyers were (e)valuating LEVs, despite their recent participation as buyers in the automobile market. Thus, the follow-up interviews were even more relevant for uncovering types of data that the survey instrument cannot access. Our goal in conducting follow up interviews was to improve our understanding of the decision-making process of respondents,

their perceptions of PEVs, their household narratives, and how they fit (or did not fit) PEVs into this narrative. Though the interviews are not representative of all the survey participants, the narratives of interviewees shed light on how and why consumers do (or do not) positively value LEVs. Interviews can also uncover the variety of responses to questions too complex to be adequately addressed in an online survey (e.g., the processual aspects of how participants engage with the design game rather than just the results). Additionally, in-depth interviews offered the opportunity for households to frame questions, elaborate on answers, and address issues in their own words. In doing so, they revealed their (e)valuative practices and provided us with the language for creating interpretive categories through the analysis of interview data.

Data Analysis

The extended research period, as I noted above, meant that it was impossible to delay the literature review completely. As is often the case, our research projects necessitated rather involved engagement with the transportation literature in order to submit proposals and reports to funding organizations, ethics boards, supervisors, and stakeholders. However, my goal with this dissertation was to bring a more sociologically informed approach to consumers on the PEV market. To that end, I returned to the original transcripts of all of the projects to apply a more grounded theory approach, coding all of the data myself. While I had some awareness of the sociological literature on markets, the sociology of consumption and the sociology of valuation are both comparatively new fields, and as such, I had not engaged in-depth with that literature. Ultimately, I believe I was able to maintain a balance between understanding potential influencing factors on the PEV market, from a sociological standpoint, and still remain open to my data.

Since the amount of data I was analyzing came from all three projects, it represented a significant amount of text. To manage all of this information, I opted to use the qualitative data analysis program MAXQDA. Designed specifically to manage electronic qualitative data, I used MAXQDA to pursue a grounded theory approach to analysis, despite the fairly large amount of data that had to be sorted. The main sources of data were transcripts taken from the interviews, focus groups, and workshops. Each transcript was saved as an individual document in a MAXQDA dataset. Additionally, I also used non-textual data such as seating charts and photographs of the workshop game designs which were then linked to the appropriate documents. Furthermore, I was able to group all of my participant information with my document sets, permitting me to easily identify the demographic information pertaining to each transcript and the survey responses corresponding to the interviews from the final project.

The comparative element of grounded theory not only applies to the relationship between data collection methods and data analysis, as during the data analysis process, researchers apply a comparative method that moves between narrow, concrete codes to broader, analytic conceptualizations of the data. MAXQDA allowed me to construct codes using the language of participants, which were then compared with other codes and refined into more conceptual, inclusive codes. In the grounded theory approach, coding includes at least two steps. I used the first step, open or initial coding to identify a range of codes including, common themes, statements, and topics. I attempted to make this coding process as broad as possible to avoid any previous analysis of the data to color the second step of coding, theoretical coding, which is more selective and focused coding. Throughout this process, I used what Mills and colleagues (2006) call constant comparative coding, referring to the continuous comparative element that guides both stages of coding.

When developing theoretical frameworks, continued comparison is especially important as it ensures that the theory fits with the empirical evidence (Charmaz & Belgrave, 2014). It was at this stage in the coding that I began to engage more fully with the literature, particularly theories of valuation. As Strauss and Corbin (1998) suggest, careful incorporation of the literature into the analysis process can "stimulate our thinking about properties or dimensions that we can then use to examine the data in from of us" (p. 45). I continued to move back and forth from ideas and data, writing conceptual and theoretical memos, and linking codes, memos, and documents which ultimately formed the starting based of this dissertation.

As I moved into the more focused coding I was able to search all of my documents based on my secondary codes and collate them into a new document. Not only did this save time, but since I had previously coded the documents using an open coding approach, I could see if and where any of my initial codes unexpectedly or repeatedly overlapped with my secondary, more abstract codes, thus refining the conceptual categories that were beginning to emerge from my data. Since participants do not always use the same vocabulary when speaking about the same concept, I searched the text using synonyms for the variety of words that represented my secondary code. In part, because I transcribed some of the data, and because I had been interacting with my data for an extended period of time, frequently I could recall and locate instances of a concept that I may have skipped over earlier in the coding process, before identifying my core conceptual categories.

Chapter Summary

In this chapter I described the make-up of the PEV market in the United States, and in more detail the states of Oregon, Washington, and California. I provided an overview of the different data collection methods employed across the three projects, and outlined the trajectory

of the research that provided the data for the analysis in this dissertation. Finally, I explained my grounded theoretical approach to data analysis and how this informed the development of my theoretical framework. Using a mixed methods approach to studying PEV consumers mobilizes a variety of analytical tools which serve to facilitate the development of robust theories. However, to fully understand how consumers attribute value to PEVs, and to pursue deeper theoretical questions about valuation processes, I needed to go beyond the interviews to explore the broader frameworks of meanings available to PEV consumers. Indeed, Lamont and Swidler (2014, p. 167) remind us, as ethnographic researchers, gaining an understanding of people's motivations and the context of their immediate situation does not necessarily translate to an understanding of the broader cultural codes and institutional forces that shape them. At the explanatory level, understanding the political and cultural context in which the PEV market is embedded links the specific activities of my participants to the larger historical, cultural, and political context. In chapter 5 I use the empirical data collected during the three research projects to explain how consumers construct value in the PEV market. Before this, however, in chapter 4, I explore the broader frameworks of meanings available to PEV consumers that shape these processes of (e)valuation.

CHAPTER 3: LITERATURE REVIEW: MARKETS, CONSUMPTION, AND THEORIES OF VALUE

In Chapter 1 I asked the question: where do we look to understand the basis for consumer decision making as value construction in market contexts? In this chapter, I provide an answer by drawing on selected insights from three bodies of literature: economic sociology (specifically the sociology of markets), consumer and consumption research (in the social sciences and humanities), and valuation studies. All three scholarly fields share a focus on understanding market activity and judicious application of insights from each body of work can offset the theoretical, methodological, and topical shortcomings of the others when it comes to analyzing PEV consumption. In the first section I examine the sociology of markets as a way of understanding how sociologists explain the social, cultural, and political embeddedness of markets and market construction. In the second section I explore the development of current sociologically informed perspectives on consumption by tracing the relationship between consumption and the social sciences. In the final section I work from a valuation approach to bring together economic sociology, cultural sociology, the study of consumption and consumers, and the calculative and coordinative processes of markets. Here I lay the theoretical groundwork for my account of the relationship between consumers and PEV market construction

Introducing the Consumer

Three archetypes of the consumer emerge from the history of social science literature on consumption. The first, which continues to dominate economics and is reimagined with only slight variations across other disciplines, is the consumer as an active and rational agent. Here the consumer is a calculating figure who strategically allocates resources to maximize the utility

obtained through the purchase of goods and services. The second model of the consumer, influenced by critical work on mass consumption, is the consumer who "is largely 'constrained' to consume in the way that they do" (Campbell, 2005, p. 24). The second archetype developed, in part, from early sociological accounts of consumption as the upshot of production rather than as an autonomous social phenomenon. Early analyses of consumption draw from classical sociology's focus on industrialization and the shift to modern society, wherein scholars posited economic production and the accumulation of (economic) capital as the determining factors of social order. Though scholars have largely moved away from unilateral critiques of consumption, the conceptualization of the passive, constrained consumer continues to manifest in varying forms and to varying degrees. Indeed, even more recent sociological analyses of consumption, including Bourdieu's seminal work on taste, have been critiqued for positioning consumers as uncritical subjects governed by social structures and processes (Boltanski, 2011; Warde, 2017).

Dissatisfaction with these first two archetypes of the consumer, which sociologist Don Slater (1997, p. 33) refers to as 'the hero' and 'the dupe', led social scientists and humanities scholars to push back against these characterizations. Challenges to rational choice and critical theories of consumption came out of the broader cultural turn in the social sciences, cultural studies and the sociology of culture, consumer culture theory (CCT), and postmodern philosophy. Taken as a whole, developments in the study of consumption that move beyond the dichotomous "hero" and "dupe" offer significant insight into understanding consumers as co-constructers of market value. Of particular relevance are (a) new economic sociology's study of markets and culture and (b) the interdisciplinary study of consumption in its own right, as a central principle of social order and a realm for individual agency and choice.

Beginning in the 1970s the cultural turn in sociology brought to the fore of inquiry the central insight that culture matters. As economic sociologists embraced the ethos of the cultural turn, analyses of markets put increasing emphasis on culture, institutions, and social structure. As a response to economists, sociologists looked toward social relations to explain economic exchange, moving past an individualistic rational choice understanding of economic activity to "document the myriad ways in which social relations leave their imprint on business relations, shaping economic outcomes in ways that run counter to the expectations of economic theory" (Krippner & Alvarez, 2007, p. 232). Though a structural network approach initially dominated analyses of markets (Granovetter, 1985; White, 1981), over time sociologists refined theories of market order to increasingly view culture as a determining force of market outcomes (Fourcade, 2007). This body of research includes inquiry into the culture of markets as well as analyses of culture as constitutive of markets (Levin, 2008). Indeed, the most successfully nuanced and enlightening empirical case studies of markets explore how culture affects both constitutive activity and the functioning or operation of the market (e.g., Almeling, 2011; Healy, 2006; Zelizer, 1979, 1994).

In recent decades, scholars of consumption across disciplinary divides have pointed to the ways in which consumption moves beyond instrumental rationality or exploitation to the social uses of products. The third consumer archetype, arising from this work, "represents the consumer as neither a rational actor, nor as a helpless dupe, but rather as a self-conscious manipulator of the symbolic meanings that are attached to products, someone who selects goods with the specific intention of using them to create or maintain a given impression, identity, or lifestyle" (Campbell, 2005, p. 24). The third archetype of the consumer has roots in postmodern social theory and cultural studies where scholars look to the ways consumers use mass-market products

to defy and resist dominant ideologies. In the 1980s the sociology of consumption broadened the study of consumers beyond conceptualizing consumption as resistance, connecting the theoretical traditions of cultural studies with postmodernism (Campbell, 2005; Featherstone, 1991; Grossberg, 1986).

As the study of consumption came into its own, scholars from sociology, anthropology, and marketing pursued research on consumer culture and globalization, aestheticization, and commodification to explain how people use the consumption of cultural symbols to make sense of their lives and to form ideals and values—not simply to signal to others. In the years since the early 1980s until about the mid-2000s analyses of consumption embraced the interpretive consumer model and it is only recently that an increasing number of critics are challenging what they perceive as the narrow symbolic focus of consumption studies. As Warde (2017) explains:

> Recent scholarship is reinforcing the criticism as the cultural turn wanes. The role of material factors and forces, the imperatives of practical action, and the presence of symbolically inert phenomena leave a space for reaction against the imperialism of cultural theory. As a consequence, axioms about the role of self and self-identity, associated with expansive consumer choice in markets, are reassessed. In particular, theories of practice have begun to penetrate the vacuum caused by the entropy of the scholarly platform based on individual choice and cultural expressivist. (p. 6)

Indeed, most sociological approaches to purchase and use see consumption as an activity carried out for its social value (e.g., status reproduction and symbolic boundary work, self-expression, and lifestyle construction) rather to the neglect of material or affective value of products. A turn toward practice theory represents a recent attempt by sociologists, particularly those working in the field of sustainability, to bring back attention to materiality of consumption. An historically informed study of consumption necessitates an analysis that blends material, structural, and symbolic theories of economic activity—to answer questions about consumers and market

construction. An emerging sociology of valuation provides a theoretical framework that explains all three (symbolic value, functional value, and affective value) in market processes.

Sociology of Markets

Since the late 1970s economic sociology, in large part, has focused on the ways in which economic exchange is socially, politically, and culturally embedded. Mark Granovetter (1985) introduced the concept of embeddedness as it is used in market sociology to explain how concrete social networks and personal relationships carry market exchange. In contrast to the dominant image of markets at the time, as composed of fleeting and "arms-length" interactions, Granovetter argued that in fact economic exchange usually involves recurring transactions, which take place within pre-existing social relationships. In introducing the concept of embeddedness, Granovetter's pioneering work paved the way for sociological approaches to the study of markets as scholars revised, expanded, reviewed, and critiqued the theory of embeddedness (Fligstein & Dauter 2007; Fourcade, 2007; Krippner et al. 2004; Krippner & Alvarez 2007). Unsurprisingly then, the sub-discipline of economic sociology initially coalesced around a structural embeddedness approach to markets which reflected Granovetter's focus on networks as explanatory mechanisms (Beckert, 2009). Now, however, three approaches to studying the development and dynamics of markets dominate the sociology of markets: the structural network approach, the institutionalist or field analysis approach, and the performativity approach, all three of which emphasize the social construction of markets. The basis for these three categories are the explanatory mechanisms scholars employ as well as the types of questions they are trying to answer. Though a large portion of the sociological research on markets falls into one of these groups, these approaches are by no means exhaustive, nor are they

mutually exclusive. Which is to say, actual research at times incorporates more than one approach with the assumption that they cannot individually explain markets.

The first approach encompasses work that perpetuates market sociology's original orientation toward network structures as the primary social mechanisms that explain market stability. Economic sociologists who use this approach argue that the quality of social ties, the structure of social networks, and the types of network positions represent the materiality of social structure (Burt, 1992, 2004; Granovetter, 1985; Podolny, 2005; Uzzi, 1997). As a consequence, scholars who take this approach study how concrete social relations enable the circulation of information, the enforcement of norms, innovation, and successful economic performance, which in turn yield particular market outcomes. Labeled as either institutionalists (Fligstein & Dauter, 2007) or field analysts (Fourcade, 2007) scholars who take the second approach to studying markets examine the cultural foundations—rules, power, norms— of the market as a field or defined social space. Moving beyond the individualistic parsimony of economics, these scholars look to field level phenomena to identify institutional forms and practices that explain market emergence and (in)stability. Fligstein (2001b) defines a field as "a population of actors that constitute a social arena by orienting their actions toward each other" (p. 108). Bourdieusian field analysts look to the power dynamics inherent in relations between objective positions in the field as the explanatory mechanism for market order while institutionalists examine how rules and intersubjectively shared meanings (institutions), created via social interaction, stabilize markets (Bourdieu, 2005; Fligstein, 2001a, 2001b; DiMaggio & Powell, 1991). Finally, the third approach to markets, performativity, explains how market order arises from calculative technologies and artifacts. Scholars using the performative approach explain how actors actualize economic theories through these technologies and artifacts, and in doing so, influence markets to

the extent that markets themselves gradually shift to fit with the theoretical models (Beunza & Stark, 2004; Callon, 1998; Callon & Muniesa, 2005; MacKenzie, 2006; MacKenzie & Millo, 2003; MacKenzie, Muniesa, & Siu, 2008).

Critique of Market Sociology

Recent scholarship on the development and functioning of markets identifies three shortcomings of the sociology of markets, all of which point to the underdevelopment of market theories, in particular with respect to culture and consumption. The first critique problematizes the way market sociologists conceptualize embeddedness. The second critique questions not the conceptual validity of embeddedness per se, but rather the embeddedness of markets as an entry point to, rather than focal point of market analyses (Beckert, 2007). The third critique points to the limitations of a production oriented economic sociology.

Nearly twenty years ago, in calling for a reassessment of what he called "Parsons Pact", i.e. that economists study value and markets while economic sociologists study values and the social relations in which the market is embedded, David Stark (2000) lay the foundation for the critique of Granovetter's (and thusly much of economic sociology's) conceptualization of embeddedness:

> Basically, Parsons made a pact: in my gloss – you, economists, study value; we, the sociologists, will study values. You will have claim on the economy; we will stake our claim on the social relations in which economies are embedded. What have been the effects of Parsons' Pact? First, by limiting its range, this jurisdictional division of the social sciences placed constraints on sociology. But those constraints were enabling constraints: by delimiting a legitimate object of study – society, though not the economy – it ensured that the discipline would flourish in the great postwar expansion of the social sciences. Parsons' Pact also had another effect, for it specifically established the conditions for economic sociology. Recall the terms: economists study value, economic sociologists study values; they claim the economy, we claim the social relations in which economies are embedded. In fact, Parsons' Pact is

> still operative today because the terms of the treaty continue to structure much of the field of economic sociology. Although the treaty has been fruitful, it is now time to reconsider its terms. We did not sign it, and we should no longer be bound by its terms. To realize the actual potential of economic sociology will require that we do our work under new terms. (p. 1)

Shortly thereafter, Krippner (2002) introduced the argument that market sociology's foundational theory of market embeddedness led scholars to reify the concept of a market without elaborating the concept of the market as a theoretical object in its own right. In her opinion the consequence of this reification is an intellectual split between market behavior and social life. Indeed, early structural embeddedness theories largely ignore the content of social ties. The first critique of market sociology manifests as a push for a reconceptualization of market embeddedness that moves away from the Parsonian foundations which presuppose the separation of economy from broader realms of social life (Fourcade & Healy, 2007; Krippner, 2002; Krippner et al., 2004; Zelizer, 2005). In an attempt to overcome these limitations of the concept of embeddedness, economic sociologists work toward what Block refers to as a 'thicker' concept of embeddedness (Krippner et al., 2004, p. 117). For example, even before Stark and Krippner articulated their critiques, Zukin and DiMaggio (1990) introduced three types of embeddedness (cultural, political, and cognitive) that pushed beyond structural embeddedness. More recently, Somers and Block (2005) introduce the concept of ideational embeddedness, which includes "the ideas, public narratives, and explanatory systems by which states, societies, and political cultures construct, transform, explain, and normalize market processes" (p. 264). In a similar tone, Fourcade and Healy (2007) suggest that markets are sites of moral conflicts between social actors committed to different justificatory principles and the locus of political struggles between various interests. Building on these theoretical insights, In Chapter 4, I explain how the deeply moral ideological discourse of sustainability saturates the PEV market.

Other researchers challenge the analytical split between economic activity and social life by framing markets as sets of transactions that occur in an everyday social reality where people successfully negotiate combinations of economic activity and social relations. Zelizer (2005) demonstrates that people live "connected lives," where they incorporate economic activity into everyday practices that create and sustain social relations. She claims that people combine social relations (shared understandings, practices, obligations, and rights), transactions, and media (accounting systems and their tokens) in order to manage the inevitable mix of economic activity and relations that exists in intimate settings. This critique points to the importance of the Polanyian insight that markets are fully social institutions that reflect a complex of politics, culture, and ideology (Polanyi, 2001/1944). The orientations of market actors, including consumers, toward existing cultural frameworks and social ties determine the medium of exchange. Moreover, the cultural meanings behind commodities and exchange relations co-exist in a mutually determining relationship.

It is the expansion and critique of the concept of embeddedness that continues to encourage increasing numbers of cultural approaches to markets (Levin, 2008; see also Wherry, 2012). Significantly, scholars working to address the inadequacy of embeddedness incorporate cultural approaches into their analyses of markets in insightful and revealing ways. Levin (2008) argues that market sociologists incorporate culture into their analyses in two distinct and usually separate ways. The first he calls the "markets are culture" (MAC) approach, the second more widely used approach he labels the "markets have culture" (MHC) approach. Economic sociologists, Levin (2008) explains, distinguish between two different types of markets, and apply the "appropriate" approach depending on what kind of market is the object of investigation:

> For some markets, it is the market itself that is cultural—markets where the commodity is highly charged or contested, including blood and body parts, environmental pollution, as well as more properly understood "cultural goods" such as art and fashion. In these kinds of markets, the central question asked is how to manage the cultural valence of the commodity being bought and sold. The problem to be solved in these markets is one of stabilizing categories, information, and conventions around the markets themselves. Other kinds of markets are treated differently. Studies of financial markets, and more highly institutionalized markets for labor, services, and goods, take for granted that these commodities can be and are bought and sold by actors who have the interest and inclination to do so. Culture here manifests as a part of the exchange process. That is, financial markets have a culture, while art markets are culture. (p. 116)

In explaining how culture shapes market actors, objects, and practices the scholars working within the "markets are culture" group take a constitutive approach. Working from the assumption that markets do not come preformatted, MAC sociologists explore the cultural work that goes into creating cognitively, structurally, and legally stable market elements. Levin suggests that MAC scholars apply cultural analyses to understand how actors resolve two problems of market order: (a) commensuration and categorization; and (b) legal, cultural, and cognitive conventions. As Levin (2008) notes, this group generally studies "markets where definitions of the commodities are new and remain potentially flexible, where there is categorical incoherence or a lack of public knowledge about the commodity, or where there is contestation over the cultural meaning of the objects, actors, or activities involved in exchange" (p. 121). Though the cultural theories emerging from this approach prove relevant to understanding the PEV market as an emerging market, much of this research focuses on market producers or intermediaries and overlooks individual consumers. Some of the work in economic sociology that takes a MAC approach to studying markets fits under the broader umbrella of valuation studies, which I discuss more fully later in this chapter.

A significant proportion of economic sociologists take the MHC approach to understanding markets as cultural phenomena. This approach arises, in part, out of the same general motivations that drove early market sociologists to challenge existing atomistic, calculative economic models of markets. Incorporating analyses of culture into the study of markets is itself a goal, part of the effort of economic sociologists to position themselves against neoclassical economic theory. MHC scholars study market culture and look to how markets are culturally embedded, examining culture as an independent variable that determines market outcomes. Echoing the broader critique of the concept of embeddedness, Levin claims that the MHC approach imagines markets as pre-defined and stable, but influenced by cultural variability and consequently, does not account for cultural as a constitutive force in ostensibly stabilized markets. According to Levin, MHC approaches take for granted the stable definitions of elements of markets exchange as such. Instead of trying to understand how culture constitutes markets, like MAC scholars, MHC inquiry focuses on how culture affects the conventional outcomes (efficiency, prices, firm success) of markets.

To explain how and why consumers value PEVs, a cultural analysis of the PEV market must bridge the analytical disjuncture between culture acting as a constitutive force during market building and culture as a determining force of market operation. As Levin suggests, a more helpful approach to understanding markets looks at both the constitution and the operation of markets simultaneously. As the PEV market is an emerging market, applying a MAC approach to understanding its development makes sense. Applying a MHC approach to the PEV market, however, represents a challenge as the market is still, for the most part, unsettled. Nonetheless it remains possible to explore the cultural context of PEVs as a commodity. The PEV market exists within the larger automobile market and as such, a comprehensive account of

the PEV market will take into account how culture acts as a determining variable in the ongoing automobile market, which in turn impacts both how the PEV market is constituted and its outcomes. Consequently, my approach to analyzing the PEV market encompasses the cultural construction of consumers (responsibilization), the cultural construction of PEVs (valuation), and how the PEV market is culturally and ideationally embedded. This provides a more inclusive view of culture and markets rather than the dichotomy that Levin argues characterizes most of existing cultural analysis of markets.

Beckert (2007) offers the second critique of embeddedness, questioning the effectiveness of using embeddedness as a heuristic entry point into the study of markets even while he acknowledges that markets are indeed embedded. He explains, "that 'embeddedness' characterizes a general answer to specific problems without identifying the underlying problems themselves" (Beckert, 2007, p. 10). Beckert suggests that market actors must resolve uncertainty before markets can function as such. Stable markets are the result of social structuring as actors solve problems of competition, production, and exchange. This means that, in a sense market actors do the work of "embedding" markets as they actively create social structures to mediate market problems as those problems emerge. Consequently, embeddedness approaches to explaining market operation are generally unhelpful in identifying the underlying problems of market order. Instead, Beckert claims, economic sociology should use what he identifies as the three problems of coordination (value, competition, and co-operation) as analytical starting points. Using the value problem as a point of entry to studying the PEV market calls for a focus on consumers, social processes, and social structures. As Beckert (2009) argues, "value attachments, however, are also created in the life-worlds of consumers, and producers must react to new and often unpredictable trends that emerge. This implies that market sociology must put

much more emphasis on the demand side of markets" (p. 256-257). This last observation aligns with the third critique of economic sociology.

The third critique of economic sociology suggests that the vast majority of sociological analyses of markets focus on supply or production with little regard to consumers as active co-constructors of and participants in markets (Burr, 2004, 2014; Fligstein & Dauter, 2007; Zelizer, 2005). The actions and interactions of both producers and consumers in markets are important to understanding economic activity. Indeed, Marx (1973/1939) wrote in the introduction to the Grundrisse:

> Production is thus at the same time consumption, and consumption is at the same time production. Each is simultaneously its opposite. But an intermediary movement takes place between the two at the same time. Production leads to consumption, for which it provides the material; consumption without production would have no object. But consumption also leads to production by providing for its products the subject for whom they are products. The product only attains its final consummation in consumption… Because a product becomes a real product only through consumption. For example, a dress becomes really a dress only by being worn, a house which is uninhabited is indeed not really a house; in other words a product as distinct from a simple natural object manifests itself as a product, becomes a product, only in consumption. It is only consumption which, by destroying the product, gives it the finishing touch, for the product is a product, not because it is materialised activity, but only in so far as it is an object for the active subject. (p. 91)

Marx's words suggest that it is only through analyses of both production and consumption that we can fully understand markets. However, as I noted in Chapter 1, when economic sociologists take consumption into account they often treat consumers as passive receivers of goods, targets for producers' efforts, or as one constituency of organizations among many. Analyses of the consumption side of markets tend to focus on the networks of social relationships among consumers, cultural institutions, and media influence. These studies examine the constitution of demand through social networks or within a brand community, as accidents of history, or the manipulation of producers and marketers (Wherry, 2012). Of these three approaches to

consumption only the networks and community approach incorporates the actions of individuals by exploring the relationship between consumption and group membership as consumers generate meaningful communities around commercial goods. Accidents of history look to contemporaneous external social factors to explain the development of demand and the manipulation approach positions consumers as more or less passive in the face of product framing. Though this research provides important work supporting the insight that consumption follows cultural and social logics, it neglects the cognitive and emotional processes of individual consumers (even in social settings) and misses important aspects of consumption. As such the majority of economic sociology's analyses of consumption falls short of explaining the role of consumers in solving the value problem of market co-ordination.

Consumers and Consumption: A Scholarly Trajectory

After WWII, the production and consumption of goods and services in the Western world grew dramatically. During this post-war period, people increasingly consumed clothes, food, and durable goods in greater amounts, they lived in bigger homes, and more of them purchased automobiles. As a result of these visible social changes, larger numbers of academics strove to explain a society characterized by mass production and mass consumption and a culture driven by a logic of consumerism. Sociological analyses of mass consumption and consumer culture originate with Critical Theory coming out of the Frankfurt School between WWI and WWII. This work represents the beginning of a progression of consumption research driven, in part through interactions with previous and concurrent theoretical traditions. These approaches to consumption (and consumers) are not independent, rather each successive one builds upon earlier ones by incorporating both insights and contradictions through expansion and critique.

Critical Theorists take a fairly dystopian view of consumption, arguing that mass produced commodities conceal class relations of production and obscure capitalist ideology through the illusion of mass individuality and the narcotizing effect of mass culture (Horkheimer & Adorno, 1944/1993; Marcuse, 1964/2013). Cultural Studies challenges this critique suggesting that although certain codes of meaning dominate cultural forms, consumption is an arena for ideological struggle and as such, offers consumers opportunities for resistance to dominant representations of reality–how life is lived and experienced. Postmodern social theorists argue that the diversity and individuality of mass-produced commodities undermine old class identities by forming the basis for fragmented identities or lifestyles as part of a fragmented, liberated society of 'difference' that follows the collapse of modernity. Consumer Culture Theory (CCT) draws on elements from both cultural studies and postmodern social theory to develop the ideal typical interpretive consumer, examine the complexity of consumption, and to account for a diversity of lifestyles and identities. A similar direction of research simultaneously emerged out of the cultural turn in sociology and anthropology departments, wherein scholars focus on consumption of goods and services as the symbolic construction of lifestyles (Giddens, 1991). Zukin and Maguire (2004) note that, "most sociological studies of consumption are bracketed, on the one hand, by structural changes in economy, infrastructure, and society that create a system of *mass consumption* and, on the other hand, by individual changes in values, attitudes, and behavior that result in a *consumer culture* (p. 175). Recently, critiques of consumption as self-expression emerge in the form of a theory of practice, particularly among sociologists studying sustainability, which emphasizes the routinized day-to-day practices and material aspects of consumption.

Consumption as Repression

The Frankfurt school produced the most influential of the consumer critiques, in particular the critique of mass culture put forth by Horkheimer and Adorno. In their classic article, "The Culture Industry: Enlightenment as Mass Deception", Horkheimer and Adorno (1944/1993) argue that the products of mass culture function not as means to satisfy lower-class status striving but as means to compensate workers for the inhuman conditions of mass production. They write that the products of mass amusement are "sought after as an escape from the mechanized work process, and to recruit strength in order to be able to cope with it again" (Horkheimer & Adorno, 1944/1993, p. 137). Mass consumption renders people intellectually inactive and politically passive, as they consume mass produced goods they also consume mass produced ideologies and values which infiltrate their consciousness. Critical Theorists argue that this process represents a missing link in Marx's theory of capitalist domination and serves to explain why the proletariat revolution never fully materialized. Capitalist production creates capitalist culture [consumer culture] and a passive citizenry, in which consumption perpetuates an exploitative economic system.

According to Horkheimer and Adorno, the false division of low and high art in mass culture increases cultural unity—an inevitable unification in the objects and meanings produced by mass culture. These objects and meanings fall within the codes, ideas, and interests of the ruling class by discouraging resistance and true individuality and emphasizing the illusory rewards of conformity to an omnipresent society and the pseudo individuality that obscures fundamental sameness of mass-produced commodities. Since the entirety of mass culture is the total and flawless imitation of style, there exists no room for genius to emerge in the discrepancy between final product and style. This process serves to reproduce class distinctions and the ideology of domination, leaving no room for resistance. Adorno (Adorno & Bergstein, 1991)

argues, rather bleakly, that "the masses draw the correct conclusion from their complete social powerlessness over [and] against the monopoly which represents their misery today" (p. 80). Marcuse (1964/2013) takes this framework and applies it to consumer goods and the emerging logic of consumption at the time, arguing that consumerism functions in much the same way. His argument goes beyond the culture industry to the entire "productive apparatus" broadly encompassing goods and services, which he believes impose capitalism onto consumers.

> The means of mass transportation and communication, the commodities of lodging, food, and clothing, the irresistible output of the entertainment and information industry carry with them prescribed attitudes and habits, certain intellectual and emotional reactions which bind the consumers more or less pleasantly to the producers and, through the latter, to the whole (Marcuse 2013: p. 11-12).

In Marcuse's account commodities are the mechanism for the construction of false consciousness as they indoctrinate and manipulate consumers.

Critical Theorists expose the constraining aspect of mass culture but in doing so many treat consumers as passive recipients of culture, recipients who lack the ability to critically analyze culture and create alternative and subversive meanings. In their accounts, mass production, mass consumption, and consumer culture prevail as society fully and irrevocably integrates the working class. In contrast, however, Benjamin (2001) introduces the possibility for resistance with his analysis of the film industry in the 1930s. Benjamin argues that there is nothing essentially political or capitalist in the technology of film. In fact, what is inherent in cinema is the irrepressible possibility for disrupting the logic of capitalism and critique of the dominant group. While Hollywood attempts to minimize this, they cannot flawlessly reproduce hegemonic ideology. Despite Benjamin's account, the dominant approach to understanding consumption among Critical Theorists does not account for the complexity and multiplicity of

consumption. It disregards questions of agency and the possibility of opposition, resistance, and alternatives to the hegemony of capitalist ideology that guide cultural studies.

One group of scholars who studied mass consumption in the second half of the 20th century suggest that post-war a changing structure of capitalism represented the transition to post-modern society. They associate the (pre-war) modern period with monopoly capitalism, perceiving the post-war era to be one of multinational, late capitalism or mass society, which they identify as an epoch of post-modernity (Haraway, 1987). The culture industry and corporate production of culture, characterized by interconnectedness through systems of production; transportation and communication, represent a distinct break from previous forms of production and consumption. Frederic Jameson (2001) claims that forms of postmodernism originate in reaction and opposition to the established forms of modernism. Therefore, there exist "as many different forms of postmodernism as there were high modernism in place…" (Jameson 2001, p. 1961). Jameson (2001) explains the term postmodern as a "concept whose function is to correlate the emergence of new formal features in culture with the emergence of a new type of social life and a new economic order…" (p. 1962).

Theorists of postmodernity such as Jean Baudrillard, Zygmunt Bauman, and Frederic Jameson suggest that in postmodern society the mass-consumer market encompasses a massive welter of commodity signs. Structured by semiotic organization and codes of signification, postmodern consumption is the act of appropriating a signifier (the idea and meaning) of a commodity and the physical act of purchasing the object is secondary. Commodities only take on meaning through their position in a structure of relationships between all sign-objects (Baudrillard, 1968/1996). The breadth of meaning and signs indicates that the relationship between social categories and consumption is no longer straightforward. Consumption,

according to postmodernists, is therefore an active process wherein the "postmodern" consumer adopts and discards roles, rather than striving for conventional upward status mobility. The post-modern consumer is a playful and adventurous individual, self-reflexive and aware of their own constructive character. According to Jameson (2001), the continued fragmentation of individual styles and increasing occurrence of pastiche reflect the "deeper and more general tendencies in social life as a whole" (p. 1963). Culture in postmodern society supports the new kind of consumption, characteristic of late capitalism, which includes rapid changes in style and fashion, universal standardization, and multinational networks.

For critical postmodernists, mass production openly conducts the business of selling culture, stifling the subversive and progressive possibilities of cultural production. It promises the fulfillment of needs and desires as well as the diversion and rejuvenation necessary to return to the drudgery of work. However, ultimately, consumption is empty and unfulfilling, it is the construction of desire rather than the fulfillment of needs, and as such is self-propelling. As Bauman (2001) explains, "the 'need' which sets the members of consumer society in motion is, on the contrary, the need to keep the tension alive and, if anything, stronger with every step. Our ancestors could recommend 'delay of gratification'. Consumer society proclaims the *impossibility* of gratification and measures its progress by ever-rising demand" (p. 13). Consumer culture predetermines, controls, and manipulates needs, convincing consumers of unending needs while never actually realizing promises.

C**onsumption as Resistance**

The emergence of cultural studies, coming out of the Birmingham Centre for Contemporary Cultural Studies (CCCS), heralded a challenge to the image of the cultural dupe,

the passive manipulated consumer of Critical Theory (Santoro, 2011). Scholars within cultural studies contested both economistic explanations of consumer behavior and fatalistic critiques of consumer culture, recognizing non-rational elements, emotions, and desires and arguing that consumption also represented a realm for individual agency and choice. This theoretical shift is evident in early cultural studies scholar Raymond William's (2005) redefinition of the narrow theoretical understanding of the Marxist concepts of base and superstructure. William's (2005) work challenges Critical Theory, problematizing its use of Marxist concept of superstructure as "a unitary area within which all cultural and ideological activities [can] be placed" (p. 32). Instead, Williams argues, superstructure should conceptualize a wide range of cultural practices, and not a set of cultural and ideological activities that reflect, reproduce or are specifically dependent upon the economic base. He does, however, acknowledge that there is "mediation" between the base and superstructure, in other words the superstructure is "more than a simple reflection or reproduction" (Williams 2005, p. 33) of economic activities. Subsequently, Williams (1980) suggests, while there may be no direct connection between the base and superstructure "there is an essential homology or correspondence of structures, which can be discovered by analysis" (p. 33).

Through work on youth subcultures, cultural studies scholars revealed the ways in which consumers employed mass-market products to challenge and defy dominant ideology (Hall, 1980; Hall & Jefferson 2011; Hebdige, 1979). By positioning itself against the consumer critics of the 20th Century, the CCCS opened the way for future research on consumption to position consumers as motivated, discerning, even demanding, in their relationship to the producers of cultural texts, products, and advertising (e.g., de Certeau 1984; Jenkins 1992; Fiske 1989; Davis 1995). The foundation for current culture studies, emerged in dialogue with critical theory,

particularly under the guidance of Stuart Hall, CCCS director from 1972-1979, acknowledging an underlying dominant ideology inherent in mass culture.

With its origins in literary criticism, cultural studies conceives of ideology in terms of the concepts and languages of practical thought which, in a Gramscian sense, stabilize and perpetuate the ideas of a given dominant group by reconciling subordinate groups to their place in the current hierarchy. Lawrence Grossberg (1985) neatly articulates the perception of ideology in cultural studies:

> Ideology is the naturalization of a particular historical cultural articulation. What is natural can be taken for granted; it defined common sense, yokes together particular social practices and relations with particular structures of meaning, thus anchoring them in a structure in which their relations to social identity, political interests, etc., have already been defined and seem inevitable. By ideology I mean the mental framework the languages, the concepts, categories, imagery of thought, and the systems of representation which different classes and social groups deploy in order to make sense of, define, figure out and render intelligible the way society works. The problem of ideology, therefore, concerns the ways in which ideas of different kinds grip the minds of masses, and thereby become a material force. (p. 67)

Here, however, cultural studies scholars differ from critics of mass culture, reconceptualizing the role of ideology in mass culture, and in doing so, allow for the possibility of resistance and the development of alternative and oppositional culture.

In the cultural studies tradition, consumption is an (admittedly unequal) combination of opportunity for containment and control but also opportunity for resistance and opposition. In the multiple elements, forms, kinds, and categories of mass culture there exists the possibility for resistance to the hegemonic culture. Emergent and remnant practices develop into alternative and oppositional cultures. The objects, texts, and relations of mass society, while not inherently political, can serve as tools to reproduce the ideology of the dominant class. At the same time, they can be appropriated by consumers as they struggle to create their own culture defining it

against the mainstream. Consumers create new meanings, beliefs, practices, and values that are not originally within the limits of the dominant ideology. Mass consumption offers social utility beyond subjugation of the working class, instead it is ripe with subversive and progressive opportunities because, as Hebdige (1979) observes "commodities can be symbolically repossessed in everyday life, and endowed with implicitly oppositional meanings…" (p. 16). The objects of mass culture "can be magically appropriated; 'stolen' by subordinate groups and made to carry 'secret' meanings: meanings which express, in code, a form of resistance to the order…" (p. 16).

Alongside cultural studies the growing school of postmodern thought theorized a new epoch of postmodernity, characterized by fragmentation, cultural multiplicity (a proliferation of cultural meanings) and new methods of representation. Postmodern theory influenced cultural studies scholars, who incorporated post-modern problematics into their analyses (Hall et al., 1996). Through dialogue between the two, cultural studies became a sort of middle area between scholars who emphasize the determining force of social structures and processes, and those who, emphasize the freedom and creativity of human activity. In postmodern society, cultural studies scholars argue, the impermanence of the content of dominant culture allows for cultural opposition, deconstruction, resistance, and critical analysis that challenge the dominant groups and the prevailing ideology. Because of the post-modern struggle between different discourses and the multiplicity of cognitive codes, meanings and categories, the contest for the possession of definition is manifest even in the products of mass culture (Hebdige, 1979).

Consumer Culture Theory (CCT)

Coalescing around the dynamics of consumption and the cultural complexity of markets, a program of Consumer Culture Theory (CCT) research emerged in the mid-1980s, carried out

by scholars working mostly in marketing departments and business schools (Warde, 2017). In their programmatic article on CCT, Arnould and Thompson (2005) define consumer culture as it is understood by the scholars who work within the ongoing program of research:

> Consumer culture denotes a social arrangement in which the relations between lived culture and social resources, and between meaningful ways of life and the symbolic and material resources on which they depend, are mediated through markets. The consumption of market-made commodities and desire-inducing marketing symbols is central to consumer culture, and yet the perpetuation and reproduction of this system is largely dependent upon the exercise of free personal choice in the private sphere of everyday life. The term "consumer culture" also conceptualizes an interconnected system of commercially produced images, texts, and objects that groups use—through the construction of overlapping and even conflicting practices, identities, and meanings—to make collective sense of their environments and to orient their members' experiences and lives. These meanings are embodied and negotiated by consumers in particular social situations, roles, and relationships. Further, consumer culture describes a densely woven network of global connections and extensions through which local cultures are increasingly interpenetrated by the forces of transnational capital and the global mediascape. (p. 86)

According to Arnould and Thompson (2005), CCT researchers represent a loosely configured group with a "plurality of distinct theoretical approaches and research goals," (p. 868) who share a conceptualization of the consumer as an interpretive agent and a concentration on symbolic meanings and everyday lived experiences of consumption. This work focuses on consumption and possession practices, including individual and group identity construction, the emergence and embodiment of market cultures, and the constitution and reproduction of consumer culture. Their location in marketing departments, in part, led CCT scholars to focus on individual consumers. As Dholakia (2009) explains, "legitimation in marketing requires the rhetoric of consumer centricity. The consumer, therefore, has been placed in the centre of marketing theory and practice" (p. 828).

CCT research offers two contributions to the study of consumption that I draw from to analyze the construction of value in the PEV market: 1) the centrality of consumer interpretation,

reflexivity, and agency in market inquiry, coupled with the use of qualitative methodology to access consumer meaning-making processes and connect them to broader patterns of consumption; and 2) a theory of market mythologies as the transformation of symbolism to meaning through social narratives, which I extend to include Barthes' (1957/2012) understanding of myth as the means by which existing social systems are sustained through the reproduction of dominant ideology. I draw on these two contributions to theorize the relationship between consumers and consumer culture and the PEV market.

A Qualitative Methodological Approach to the Individual Consumer. In part the origins of the CCT program were context driven, as sociologists and anthropologists initially worked to position themselves in opposition to the methodological and theoretical approaches (e.g., microeconomic theory, cognitive and experimental psychology, positivist research models, quantitative methodological approaches, and economic modeling) that dominate marketing and business research (though increasing numbers of consumer behavior researchers are adopting elements of CCT). To distinguish themselves from this environment, CCT scholars initially emphasized the experiential and phenomenological aspects of consumption, orienting their inquiry toward the interpretive lived experience, taken as an expression of reality (Belk, 1991; Hirschman and Holbrook, 1982; Holbrook & Hirschman, 1982; Thompson et al., 1989). In the beginning, CCT scholars used the term experiential consumption to describe consumer activity and to validate CCT's early existential approach to research (Holbrook and Hirschman, 1982; Belk, 1988). The experiential consumer traverses the cosmos of market-made images, texts, and objects, engaging in conscious and critical consumption.

CCT has its historical roots in calls for consumer researchers to broaden their focus to investigate the neglected experiential, social, and cultural dimensions of consumption to explain how consumer products communicate normative meanings and how consumers critically engage with these meanings. In answering this call ongoing CCT research emphasizes the productive aspect consumption and the active consumer. As Arnould and Thompson (2005) explain, "consumer culture theory explores how consumers actively rework and transform symbolic meanings encoded in advertisements, brands, retail settings, or material goods to manifest their particular personal and social circumstances and further their identity and lifestyle goals" (p. 871). In a manner reflective of cultural studies approaches, CCT conceives of consumption as offering the possibility of resistance, sharing the common critiques leveled at critical accounts of consumer culture: that they "were overly totalized; that they failed to give the consumer sufficient credit for acting intentionally and with consequence; that they portrayed too unitary a consumer marketplace" (Schor, 2007: p.249). CCT posits consumption as array of interpretive, meaning-making activity, where consumers range from tacit acceptance of the dominant representations of products to the re-appropriation of products in ways that that consciously deviate dominant ideology.

Despite what Thompson et al., (2013, p.159) call its "humanistic/experientialist" genesis, CCT research has long engaged with structuring forces (e.g., social stratification, power dynamics, ideology). As it developed, the broader field of CCT research drew from a diverse range of academic traditions, taking cues from the broader culture turn in sociology, critical theory, cultural studies, and postmodern social philosophy (Arnould & Thompson, 2005; Thompson et al., 2013; Warde, 2017). Moreover, these scholars also incorporated the influence of social categories (e.g., class, age, ethnicity, and gender) on consumption. As the dialogic

space within the CCT studies developed to incorporate critiques of and improvements to individualist assumptions, researchers increasingly drew on aspects of structuralist and post structuralist theoretical frameworks that decentered the individual to validate their interpretivist accounts. With this in mind, currently CCT scholars support interpretive claims by and large, according to Thompson and his colleagues, "by systematically explicating layers of cultural meaning, elucidating socio-historically grounded connections between emic articulations and cultural and ideological frames, and demonstrating novel theoretical insights through comparisons to more orthodox or established theoretical frameworks" (Thompson et al., 2013, p. 157). As it stands, CCT scholars engage with ideology, focusing on how systems of meaning direct consumer behavior toward sustaining dominant groups in society. Indeed, the questions guiding much of this research reflect similar inquiry in critical and cultural theory outside of CCT.

CCT research relies heavily on qualitative data methods, including both collection and analyses techniques to access the experiential and socio-cultural aspects of consumption not easily observed through more traditional quantitative marketing techniques. In the pursuit of understanding consumer identities, qualitative methods allow researchers to get close to consumers' self-actualizing experiences (characterized by ideals of authenticity, deep meaning, and enriching aesthetic experiences), their emotional responses, and their agency (as meaning makers). Qualitative data enables researchers to analyze the contextual nuances of consumption meanings and experiences including product symbolism, ritual practices, and symbolic boundary construction. The research on consumer behavior in the PEV market, much like the vast body of transportation research employs a logical empiricist method applying quantifiable measures and statistical validation to large random samples and survey data. The CCT program offers

consumer research methodologies designed to provide insight into consumer experiences and meaning making processes.

Mythologies & Myth. In the literature on consumer research, myths have been studied extensively to understand the experiential, moral, and ideological dimensions of consumption. Early in the cultural turn of consumer research Levy (1981) drew a connection to myth: "if we take the idea that myths are ways of organizing perceptions of realities, of indirectly expressing paradoxical human concerns, they have consumer relevance because these realities and concerns affect people's daily lives" (p. 52). More recently, a number of CCT researchers posit that cultural myths exert a significant influence on consumer meaning-making processes. Foremost among these scholars is Craig Thompson, who explores the ideological inscription of market goods, arguing for the strong role of marketplace mythologies in shaping the meaning systems ascribed to products (Thompson, 2004).

In his work on alternative medicine consumers Thompson (2004) argues that the incorporation of mythic construction into distinctive marketplaces, with specific competitive conditions, creates a particular marketplace mythology. According to Thompson (2004), a "marketplace mythology and its constituent metaphors serve multiple ideological agendas that exist" (p. 171) in that market. Alongside Thompson, several other scholars have incorporated marketplace mythologies into their analyses including the commercial mythology of the American South (Thompson and Tian, 2008) and demythologizing practices (Arsel & Thompson, 2011). In their work on the morality of car consumption and Hummer drivers, Luedicke, Thompson, and Giesler (2010) highlight the interplay of ideology and mythology. Holt and Thompson (2004) show how consumers use market place mythologies as dramatic

resources for processes of identity construction. Giesler (2012), similarly to Thompson, explores how opposing groups of consumers and producers employ mythologies in their struggle to define products. This work offers nuanced accounts of how market agents (through brands and products) and consumers (through consumption narratives and identity construction) construct mythic narratives and meanings.

Market mythologies are frequently contradictory, as the mythological construction of the market reflects competing ideological interests. The ambiguity and plasticity of consumer myths gives them greater utility as meaning-making tools for deployment by different groups. Marketplace mythologies, though dependent on the conditions and history of the market context, have basis in broader mythic archetypes and plotlines. As scholars of mythology note, the development and success of a mythology depends on the fit between mythic archetypes and the specific historical and environmental context of the lived experiences of a particular people. As Slotkin (2006) explains, "it is in their development of traditional metaphors (and the narratives that express them) that the mythologies of particular cultures move from the archetypal paradigms to the creation of acculturated, even idiosyncratic myth-metaphors" (p. 14).

Since Sidney Levy's (1981) seminal work on consumer mythologies, CCT researchers have looked at the process of mythologizing markets and products as resources available to different, and at times competing, groups in markets. The limitations of this approach reflect the broader critique of individualist approaches to markets—that they focus on market actors consciously leveraging cultural myths in pursuit of varied interests and neglect issues of power and structural constraints. Drawing on the work of Roland Barthes (1957/2012), allows for the expansion of the conceptualization of myth to incorporate an understanding of how marketplace mythologies serve to naturalize ideology, culturally constituted systems of consumption, and

particular political and economic forms. Work from Barthes offers a foundation for the relationship between dominant ideology, myth, and consumption. He argues that ideological, politically-driven myths can distort history, as particular interpretations of reality become unquestioned universal truths through the dispersion and acceptance of cultural myths inscribed in consumer objects. Myth functions to perpetuate existing social conditions through ideology, depoliticizing speech, and obscuring power relations, effectively reducing avenues of resistance. Barthes explains how ideological tendencies of cultures manifest as myth and, as CCT scholars demonstrate, interested parties can then leverage these myths to create marketplace mythologies which provide meanings and metaphors that serve multiple ideological agendas and establish market power relations.

Consumption as Self-Expression

In the second half of the 1980s, consumption and consumer behavior became an increasing focal point for research in the social sciences. In part through the work of scholars in the CCT program as I discussed above but also among sociologists and cultural anthropologists who studied modernity, macro-processes of globalization, and the materiality of consumption. Many of these analyses of consumption dovetail with the work of CCT scholars, responding to cultural studies and post-modern theory as they attempt to understand and explain consumerism as an organizing force in society. This work includes broad theoretical explanations of life in modern society (of which consumption represents a significant part), macro-level studies including processes of globalization and homogenization, and micro-level studies of how individual consumers purchase and use commodities in their everyday life. As the perceived problems with globalization and Americanization grew in prominence in sociological analyses,

consumption scholars began to critically engage with the idea of a homogenous consumer culture with questions about social integration, stratification, and identity formation.

Using the concept of appropriation—the incorporation, adaptation, and using up of items—anthropologists applied perspectives developed from research on non-market exchange and material culture to understanding mass-market consumption (Miller, 1998). In doing so they revealed how individuals adapt mass-produced commodities, or "alienated" products by endowing them with meaning. In the process of appropriation, consumers transform goods into personal items which they then use for a range of purposes. Anthropologist Daniel Miller's (1987, 1998, 2008, 2010) extensive work on material culture suggests that people value consumer goods for more than aesthetic and communicative uses. He challenges critical views of materialism, arguing that people engage with commodities in ways that transform objects into possessions that hold affective value, facilitate social relationships, and carry memories. In contrast to critiques of consumption, Miller argues that rather than creating a "dumbing down" effect or the illusion of individuality, mass produced objects offer the potential for de-alienation, as people make consumption into a personal and social priority. Miller posits agentic consumers who use commodities creatively to engage with others, to communicate, to inscribe themselves on the world in tangible ways. The empirical analyses of consumer behavior (shopping, clothing, leisure, and household possessions) and material culture coming from these sociologists and anthropologists (e.g., Entwistle 2000, Falk & Campbell 1997, Miller, 1998; Zukin 2003) suggest that commodities undergo a process of transformation, including commitment and investment, into meaningful personal possessions.

In sociology, driven by the cultural turn, post-modern theory, and an increasingly global culture of consumption, scholars looked to make sense of how people, as consumers, used goods

and services to construct distinct lifestyles. According to Gabriel and Lang (1995), this communicative model of consumption is based on the fundamental insight that “material objects embody a system of meanings, through which we express ourselves and communicate with each other” (p. 51). They describe the image of the consumer as communicator, suggesting that “we want and buy things not because of what they can do for us, but because of what things mean to us and what they say about us. According to this view, goods tell stories and communicate meanings in different ways but every bit as effectively as words” (Gabriel and Lang, 2015, p. 51). The communicative model of consumption echoes earlier accounts of conspicuous consumption and status consumption by Veblen (1934/1992) and Simmel (Simmel et al., 1997).

Anthropologists and sociologists have long argued that material goods demarcate social position, rendering visible social groups and hierarchies. In large part, sociology studied consumption under the guise of poverty, which requires estimation of needs, wants, and their satisfaction. Daloz (2007) points out that, Veblen, Weber, and Simmel all examined consumption tangentially as they worked to explain modern industrial society, social status, and reputation. Though these classical social theorists incorporated consumption into their analyses, they did so only as a means of illustrating and promoting their central theoretical arguments. Consequently, all three only provide partial analyses of consumption. Veblen (1934/1992) focuses on the ‘conspicuous consumption’ of goods as an index of wealth, while Weber (1958) points out that a group’s style of life, including consumption, defined that group. Simmel shows how fashions constantly change in modern societies in a long-running game of status-seeking (Simmel et al., 1997). More recently, Juliet Schor (1999) has convincingly revitalized classical arguments of conspicuous consumption, suggesting that modern consumers consciously look to higher socio-economic status groups as "reference groups," for conspicuous consumption.

Foremost among sociologists who study the capacity of consumption to determine, reflect, and reproduce social divisions is Pierre Bourdieu (for a review of Bourdieu's influence in the U.S. see Sallaz & Zavisca, 2007). Bourdieu, like many who follow him, looks to power and domination with respect to the realm of taste, deconstructing consumer choice as a reflection of social position. Bourdieu (1984) examines how class groups express themselves through consumption patterns and styles. He uses the concept of "habitus" to explain 'the way society becomes deposited in persons in the form of lasting dispositions, or trained capacities and structured propensities to think, feel and act in determinant ways," (Wacquant 2006, p. 316) that reflect social order. These dispositions predispose individuals to particular tastes which manifest in lifestyle choices, including consumption choices, and are the expression of the symbolic dimensions of class relations. Bourdieu believes that social structure influences the interaction of individuals even independently of their consciousness. His argument, that the ultimate result of culture is the legitimatation and maintainence of the class system of capitalist society, brings to mind the Frankfurt School's theory of consumption. In contrast, however, Bourdieu is critical of the distinction between elite and popular culture, arguing that so-called aesthetics and the "great art" produced in high culture are a fallacy, existing only to serve the interest of the ruling elites by reproducing and legitimating class and status distinctions. Social groups acquire specific cultural tastes through a process of socialization within social institutions. Although perceived as an inherent quality, taste is reproduced within the same social group, with little variation. In this manner, the elite class reproduces itself under the guise of taste and contains the dominated masses by controlling them through the medium of culture (Bourdieu 1984).

Other scholars expand upon and critique Bourdieu's work, looking at consumption in the United States and producing more nuanced accounts of social reproduction (Gartman 2002;

Lamont, 2009, 2012a; Peterson & Kern, 1996). Peterson and Kern (1996) use the concept of cultural omnivorousness to explore how dominant status groups gentrify elements of popular culture and incorporate them into the dominant status group culture in ways that fit the interests of the dominant group and remove the threat of subordinate subcultures. Gans (1999) develops the concept of taste cultures, clusters of cultural forms which embody similar values and aesthetic standards, and align with taste publics. Some of this research, in particular boundary work, suggests that what counts as cultural capital changes depending on the different values held by different groups (Lamont 1992). Crane (2000) illustrates the role played by fashion as a means of symbolic consumption along both gender and class divisions.

Applying Bourdieu's concept of habitus to American consumers Holt (1998) suggests that cultural capital is expressed through embodied tastes that shape consumption practices, rather than the consumption of particular goods. In other words, *how* consumers consume, not necessarily *what* they consume displays their level of cultural capital and in doing so, symbolically reproduces social distinction. Similarly to Bourdieu, Holt argues that the cultural capital that shapes consumption practices arises from the shared habitus of the members of a collective. As such, depending on the sociological factors that determine their intellectual, social, and aesthetic dispositions, people possess varying levels of cultural capital which in his view still emanates from the "social milieu of cultural elites" (Holt 1998, p. 3).

Several sociologists use the concept of lifestyles choices to frame consumption as the actualization of self-identity through consumption choices—and in this perspective, commodities represent the principle mechanisms for communicating self-identity (Beck, 1992; Beck et al., 1994; Giddens, 1991). These scholars posit that people in the modern era find themselves increasingly free of traditional determinants of identity (i.e. status groups or class) and instead

compose a self-narrative by negotiating a multitude of behaviors and shared meanings into an internally coherent 'lifestyle'. Moreover, lifestyles are not all encompassing but should be thought of as 'slices' or sets of internally coherent scripts that allow for maneuvering or selection depending on the context. The implication is that individuals have more than one 'lifestyle' and draw on different strategies of action across a variety of settings (Giddens, 1991). Constructing a lifestyle is a self-reflexive activity whereby people delineate social difference through meaningful consumption choices. This conceptualization of consumption presupposes that people rely on a heightened aesthetic sensibility and enhanced attention to taste in their everyday life.

For these scholars, consumption driven lifestyles do not originate from people's social position, but represent a carefully considered outcome of selective consumer choices. Instead of coming from an internalized disposition, the motivation to engage in creative acts of self-expression arises from the organization of social life no longer dependent on "historically prescribed social forms and commitments" (Beck, 1992, p. 128). For Beck, the burden of creating and maintaining a self-identity is the result of the form of the institutions of modern society, the extension of employment insecurity, the displacement of traditional forms of identity, and a changing cultural value system. For Bauman (2001) consumption, rather than the reflection and reproduction of class divisions, is the embodiment of the diffuse and volatile desires that characterize modern society. According to Bauman (2001) the plasticity of consumption which mirrors "the principle of instability, has become functional to a modernity that seems to conjure stability out of an entire lack of solidity" (p. 9). In this sense, using mass-produced goods and the services of consumer industries, people explore and "discover" their identity, picking up and discarding lifestyles as they move through life.

Campbell (2005) suggests the "craft consumer" as a challenge to the free-floating lifestyle conceptualization of consumption in modern society. According to him, that "consumers actively respond to commodities and services, consciously employing these as a means to achieving their own ends," (Campbell, 2005, p. 24) is not evidence that consumers are in search of identity but rather represents the expression of an identity they already possess. Campbell (2005) points to the skill, knowledge, and judgement that consumers bring to their consumption activities (craft activities), suggesting that it is a "clear and stable sense of identity" (p. 24) that produces distinctive ways of consuming. In this sense, Campbell's conceptualization of consumption shares elements with Bourdieu's concept of habitus, embodied in taste and expressed through consumption. However, unlike Bourdieu, Campbell does not elaborate on how consumption, through the display of this skill and knowledge, might symbolically reproduce social distinctions

These lifestyle approaches to consumption put forth a predominantly voluntaristic conceptualization of consumption which, according to critics, fails to account for the social and material determinants of consumer behavior (Lodziak, 2002; Shove & Warde, 2002; Soron, 2010; Warde, 2014). This critique is similarly leveled, by others, at CCT scholars—that they emphasize the symbolic to the neglect of the structural constraints and the environmental dimensions of consumption. With lifestyle theories, however, critics also argue that the exaggeration of the freedom of consumption in the communicative model of consumption presents an image of a fluid and facile altering of lifestyle habits, which in turn offers a misleading individualistic account of a fundamentally social behavior.

Other scholars, while acknowledging that consumption is an avenue for self-creation and self-expression suggest that social inequality and status continue to influence lifestyle

construction. Hamilton and Fels (2010) point to the reflexivity present in consumption, observing that, "whatever the choices people make, the awareness of making choices about their lives also encourages them to develop some "artfulness" to their self-representation, some distinctive touch that identifies one individual from another, one group from another" (p. 567). They argue that instead of being synonymous with class, lifestyles themselves become stratified according to levels of income. Similarly, Thompson (1996) explores the relationship between class and lifestyle suggesting that the professional and domestic obligations of middle-class women combine to shape what he characterizes as a "juggling lifestyle". According to these scholars, lifestyles, as the mechanisms for self-representation and social distinction, structure consumption practices and reproduce social inequality.

Consumption as Practice

Practice theory offers an alternative approach to understanding consumption, one that moves away from individuals and identity construction. In practice theory, consumption may be thought of as "the corollary of the way the practice is organized, rather than as the outcome of personal choice, whether unconstrained or bounded." (Warde, 2005, p. 137) Reckwitz (2002), incorporates elements of theories of social practices from the work of Pierre Bourdieu, Anthony Giddens, Michel Foucault, Harold Garfinkel, Judith Butler, Bruno Latour, and Theodore Schatzki to elaborate an ideal type of practice theory, which he believes offers a conceptual alternative to other forms of social and cultural theories of action. According to Reckwitz (2002) cultural theories explain and understand actions by reconstructing the symbolic structures of knowledge which enable and constrain agents to interpret the world according to certain forms and to behave in corresponding ways. Social order is produced and reproduced through

collective cognitive and symbolic structures, and as shared knowledge enables a socially shared way of ascribing meaning to the world.

Practice theory as a cultural theory places the social in practices, and locates the analysis of mental activities of understanding and knowing within a complex of doing things - that is, mental activities are part of a practice. According to Reckwitz (2002), "a practice is a routinized type of behavior which consists of several elements, interconnected to one another: forms of bodily activities, forms of mental activities, things and their use, background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge" (p. 249). Building on Reckwitz's definition, Shove, Pantzar and Watson (2012) explain that practices should be understood as an entity (practice-as-entity) and a performance (practice-as-performance). Practices exist as "a recognizable conjunction of *elements*… which can be spoken about and more importantly drawn upon as a set of resources" (p. 8). At the same time, practices exist as successive moments of enactment of single actions. It is only through these successive moments of performance that the interdependencies between elements, which constitute the practice-as-entity, are sustained over time. Practices as entities, are internally differentiated, meaning that though general or common practices exist, different groups enact them differently. What the practice is "depends upon who does it, where, when, and with what consequence for the positioning and subsequent trajectory of the activity as a whole" (Shove and Pantzar, 2005, p. 59).

Shove and Walker (2010) offer a concise breakdown of the constituent elements of practices: materials (complexes of technology), repertoires of meanings, and competencies. Their approach facilitates the identification and analysis of the ingredients of a specific practice and how these elements combine within individual enactments and the practice as an entity. The

historically and culturally situated elements of a social practice are non-subjective, belonging to the practice rather than the individuals, as bodily and mental agents, who act as carriers of a practice. It is the routinization of social practices, carried out by individual actors across space and time that constitute social structure. The individual represents a unique point at which these elements are combined in ways that destabilize *and* sustain social structure. Practices exist within a reference structure of other established, culturally specific meanings and practices (Shove & Walker 2010; Shove et al., 2012). New practices consist of new configurations of existing elements or of new elements in conjunction with those that already exist. The application of practice theory to Nordic Walking by Pantzar and Shove (2005) suggests that changes in practices and social structure are not only a consequence of exogenous factors (such as innovations, new images, or skills) but involve a process of bricolage that draws on existing elements.

Practice theory proposes that it is the engagement in practices that explain the nature of consumption rather than individual desires. If we think of acts of consumption as part of a larger practice, one that often includes a variety of consumer needs, the elements of practice present in vehicle purchase and use become increasingly important in analyses of the PEV market. While PEV acquisition and ownership are undoubtedly important in signaling status and constructing identities, it is also clear that PEVs are directly implicated in the conduct and reproduction of daily life. Drivers are actively and creatively reproducing the practice itself and associated images and ideologies that feed back into the PEV market.

Valuation Studies

The literature reviewed above indicates how, across the disciplines of sociology and anthropology, scholars of consumption emphasize the symbolic functions of goods, and their ability to carry and communicate meaning. This emphasis helped me develop two broad questions about consumption as I studied consumer practices in the PEV market: What does it mean to say a good has value? How do consumers (e)valuate goods? In sociology, answers to these questions have a long history of connecting consumption to social stratification, calling attention to the relationship between social status and cultural taste, and the reproduction of social groups and boundaries. Yet, as growing interest in valuation practices reveals, until recently there existed a rather limited amount of empirical knowledge of the process of value construction (Kjellberg et al., 2013). Of late, however, an emerging field of valuation studies represents the consolidation of increasing numbers of systematic studies of valuation. Indeed, 2013 saw the launch of the journal *Valuation Studies*, with the goal of fostering discourse in the transdisciplinary field of valuation (Muniesa and Helgesson 2013; Vatin 2013). This work builds on previous research and encompasses current value-orientated sociology of markets, (e.g., Aspers 2011; Aspers and Beckert 2011; Beckert and Musselin 2013; Fourcade and Healy 2007; Karpik 2010; Zelizer 1979) economics of conventions approaches coming out of France, (e.g., Storper and Salais 1997; Boltanski and Thévenot, 2006; Diaz-Bone and Salais 2012) and work in the sociology of science, classification, and evaluation. (e.g., Espeland and Stevens 1998; Lamont 2012b; Diaz-Bone and Didier 2016; Zerubavel, 1993, 1996)

A large portion of valuation studies address the market as the locus of value construction (e.g., Antal et al. 2015; Aspers & Beckert, 2011; Beckert and Musselin 2013; Moor and Lury, 2011). Among these, most focus on producers or intermediaries and their involvement in

processes that establish value— e.g. how niches corresponding to firm identities make firms different in the eyes of consumers and how firms adapt while establishing niche value through differentiation (e.g., Aspers 2010; Hendricks, 2016) and how firms are involved in the construction of worth in a new industry (Khaire, 2014). Using cases from the United States and France, Fourcade's (2011) comparative analysis of the compensation for economical disasters suggests that national context produces different symbolic associations between money and nature, which in turn lead to different evaluations of worth. These examples illustrate the importance of empirical studies of valuation practices for establishing and reinforcing a process perspective on valuation. However, much of this work highlights how supply-side or intermediaries' actions lead to the attribution or assessment of value rather than those of consumers.

A common thread connecting sociologically informed studies of value in markets is the understanding that value is socially constructed (e.g., Beckert & Aspers, 2011; Fourcade, 2011; Stark, 2011; Zelizer, 1979, 1994, 2005). That is, the perceived value of a good or service is a consequence not of some intrinsic property, but rather a complex of relational, cognitive, and affective processes informed by shared symbolic meanings and evaluative schema (Dittmar, 1992; Muniesa, 2011). This insight not only draws attention to the fact that value is external to goods but also that it is dynamic, contested, and context dependent. In a manner similar to the interpretivist accounts of consumption from CCT scholars, those who study valuation support the idea that value arises in part from the relationship between the object and the person who considers it valuable. This approach shifts analysis away from a static concept of value towards a fluid concept of valuation. Using the concept of valuation enables me to combine MAC and

MHC approaches to markets and culture to look not only at how PEVs are culturally constituted as products on the market but also the culture of this market.

Dimensions of Value: What does it mean to say goods have value?

In identifying what he calls "the value problem," Beckert (2009) asserts that for a market to exist, market actors must resolve issues of value, referring to both the valorization (valuation) of products and the evaluation of goods in relation to one another, a combined process Lamont (2012b) calls (e)valuation. According to Beckert (2009), the valuation process resolves market coordination problems not by "all actors assigning the same value to a good, but rather by individual actors being sufficiently convinced by their own valuations to want to acquire the corresponding commodities as buyers in the marketplace" (p. 257). This means assigned product valuations may be multivalent and stand in opposition to one another. Though it is the individual buyer who chooses to purchase a good or service, the (e)valuation process is socially informed by standards, status positions and social networks, social norms, and shared meanings; all of which reduce uncertainty and stabilize expectations. As a result, "the assignments of value are subject to a dynamic process of change" (Beckert, 2009, p. 257) as the structuring elements themselves change.

But what does it mean to say that a good provides value for an actor? To answer this question, we can think of value as the expected performance of a good. Beckert (2011) states, "for a good to have value, its purchaser must have a positive view of what [they] expect the good to perform: the good "makes a difference" for the owner through its (potential) performance" (p. 108). In this sense, consumers perceive that a given quality (or qualities) of a good affects a particular performance, which becomes, if viewed as desirable, a source of value. The quality of a good refers to "the explicit and implicit, visible and invisible aspects of a good, service, or

person being valued" (Beckert & Musselin, 2013, p. 1) Goods do not have inherent qualities but instead through social processes of product qualification, "goods become seen as possessing certain traits and occupying a specific position in relation to other products in the product space." As such, product "qualities create incentives or disincentives for purchasing decisions on markets" (Beckert & Musselin, 2013, p. 1).

A good holds physical value if the quality of the good alters the state of the world. That is, physical value derives from the physical effect of the good. Extending beyond the physical effects, symbolic value arises from the meaning(s) a good or service holds for a consumer individually and within their social environment. As McCracken (1986) noted early on in the study of consumer culture, "consumer goods have a significance that goes beyond their utilitarian character and commercial value. This significance rests largely in their ability to carry and communicate cultural meaning" (p. 71); and empirical evidence suggests that consumers value goods and services for symbolic reasons as well as functional ones. The perceived value of goods comes not only from their material characteristics but also from the ascription of symbolic qualities. Beckert's (2011) approach to analyzing symbolic value offers a useful distinction between positional and imaginative value. In his view, symbolic value comes from the non-material qualities ascribed to a good which the consumer perceives as positively affecting their social position or imaginative lifeworld. The positional value of an object is relational and comes from the ability of the object to position consumers in differentiated social space. This conceptualization leaves room for theories of status consumption, self-expression, and relational work. Imaginative value, though based on socially constructed moral, values, and meanings, exists within the consciousness of individual consumers as they symbolically connect ideals to the purchase and use of a good.

Valuation then, according to Beckert, is based on fictional expectations regarding future outcomes, derived from the socially constructed qualities of goods and services. Following this line of thinking, the consumption of consumer goods and services depends on whether or not consumers believe acquiring the product will meet the expected future performance. CCT research also highlights how many consumers construct their lives around multiple realities, using consumption to create experiences linked to fantasies, desires, aesthetics, emotions, and identity play. Though Beckert does not discuss affective value, a critique frequently leveled at sociological approaches, I argue that the concept of physical value allows for the incorporation of emotions into an analysis of valuation. Scholars working within the sub-discipline of the sociology of emotions argue that, "emotions are felt in and through the body," suggesting a physical effect (Sheller, 2004, p. 226). Importantly, as these sociologists argue, "there are social patterns to feeling itself" as "relational settings and affective cultures; shared public and collective cultural conventions and dispositions" shape emotions (Hochschild in Sheller, 2004, p. 226). The gasoline car has long been associated with physical qualities that evoke an emotional performance. As Sheller (2004) neatly articulates:

> The car is deeply entrenched in the ways in which we inhabit the physical world. It not only appeals to an apparently 'instinctual' aesthetic and kinesthetic sense, but it transforms the way we sense the world and the capacities of human bodies to interact with that world through the visual, aural, olfactory, interoceptive and proprioceptive senses. We not only feel the car, but we feel through the car and with the car. A key overlooked aspect of car cultures is the emotional investments people have in the relationships between the car, the self, family and friends, creating affective contexts that are also deeply materialized in particular types of vehicles, homes, neighbourhoods and cities. (p. 228)

Aspers and Beckert's (2011) conceptualization of market value offers a heuristic device for looking at the dimensions of value within the PEV market and how consumers come to assign economic value to PEVs. They identify several dimensions of economic value: use value,

investment value, individualistic value, relational value, functional value, and symbolic value that represent several of the ways in which goods can become economically valuable to consumers. In social life, market actors assess value according to different scales, and negotiate translations across these scales. Economic value arises as consumers, influenced by the production side of the market, translate other forms of value into economic value. Economic value refers to the amount (usually money) an individual market participant is willing to exchange for a good or service. The economic value of a good takes shape from the combination of different expected performances. The selection and prioritization of these sources of value depend on the individual actor. Through processes of translation, conflicts emerge and actors construct rationalizations and explanations to reconcile disjuncture across value scales.

Empirical research that looks at how value construction in the PEV market derives from socially constructed expectations, contributes to a broader understanding of valuation. A nuanced understanding of consumer behavior in the PEV market calls for the deconstruction of economic valuation by identifying the ideal types of physical and symbolic qualities from which consumers derive value. In chapter 6, I discuss the ways in which the qualities consumers attribute to PEVs provides symbolic and functional value for consumers. In this chapter, Beckert's (2011) conceptualization of physical, positional, and imaginative performance and corresponding dimensions of value is applied to the PEV market to analyze how PEVs become economically valuable to consumers.

The (E)valuation of Goods: Valorization and Evaluation

Understanding how goods provide value for consumers, however, does not resolve the question of their (e)valuation. Moreover, differences in the perceived value of a good can stem

from the different meanings the qualities of the object hold for different actors. The question now becomes: how do consumers come to these value judgements, i.e. how do they (e)valuate goods? Taken together, Fourcade and Healy's (2007) insight that markets are fundamentally moral, the sociological postulate that the attribution of worth is socially and culturally patterned, as well as the work coming out of the economics of conventions (Boltanksi & Thevenot, 2006), all suggest that the valorization of products comes from a broader moral order, or an orientation toward the realization of shared values. Consequently, it is not enough to explain what it means to say that a good holds value. A thorough account of value construction also needs to explain why consumers find given qualities of goods valuable or desirable, which depends on the cultural, political, and social context of the market. As Beckert (2009) explains, "the normative and cognitive framing of markets, anchored in social belief systems, is a constitutive element of their emergence because it shapes the assessment of the desirability and the suitability of the products offered and thus reduces uncertainty in markets" (p. 255-256).

Several valuation scholars argue for an analytical distinction between valuing, (alternatively referred to as valorizing) or the process of giving worth, and evaluating, or the process of assessing (Kjellberg et al., 2013; Lamont, 2012b; Vatin, 2013). This approach draws on the pragmatist theory of Dewey (1939) who posited valuation as a process comprising both valuing (e.g., prizing, esteeming,) and evaluating (e.g., appraising, estimating) through practical value judgements. Together these valuation practices produce and reproduce value by doing valuation either in terms of attributing or in terms of assessing value. According to Dewey, the former represents the affective aspect of valuation as a positive or negative valence toward something and the latter represents the assessment of what or whether to value. By redefining

and expanding on this conceptualization, valuation theories increasingly explain part of market problem-solving and decision-making through the action of market actors.

Analytically distinguishing between valuation/valorization (the process of adding value to something) and evaluation (producing a judgement by assessing the value of something) is useful for examining the value of goods, the criteria for valuation, and the mechanisms of evaluation in the context of a given market. This terminology derives from the French verbs *valoriser*, which is to ascribe or give value to something and *évaluer*, which means to assess value or to evaluate (Vatin, 2013). While Vatin (2013) suggests that valuation studies must address both *valorization* and *evaluation*, he associates evaluation with exchange and valorizing with the production process. Other work challenges this view, demonstrating how valorization and evaluation are relevant processes from production to consumption (Heuts & Mol, 2013; Lamont, 2012b). Here I argue that both activities take place during exchange as market actors, in this case consumers, simultaneously add value to and assess the value of PEVs. By differentiating between the two, however, theories of value provide fruitful guides for exploring how and why goods, via the qualities attributed to them, have positive or negative value (i.e., good/bad, right/wrong, sacred/profane) as well as the mechanisms through which consumers assess this value. Scholars examine both immaterial (Boltanksi & Thévenot, 2006) and material structures (Callon et al, 2002; Karpik, 2010) to theorize how a broad range of devices and institutional regimes facilitate the assessment of goods and services (Karpik, 2010).

Though we may attempt to analytically distinguish valuing (valorizing) as a process of worth attribution from evaluating which comprises a value judgement, i.e., the measuring of this value along a scale, with an objective "to-be-achieved", or against the value of another product, empirically, in social processes, the two activities are often impossible to separate (Aspers &

Beckert, 2011; Chiapello, 2015; Muniesa 2011; Vatin 2013). Indeed, as Lamont (2012b) explains, “evaluators often valorize the entity they are to assess as they justify to others their assessment. For instance, art critics attribute value to an artwork (‘this is path-breaking,’ ‘this is crap’) simultaneously attempting to convince their peers to agree on their evaluation of a particular work” (p. 205). In total, (e)valuation is a process of both worth attribution (valuation) and assessment (evaluation) “that involves various operations: identifying and selecting which objects should be paid attention (and thus what escapes attention), qualifying what is valuable, i.e., the viewpoint from which objects are praised, estimating their ‘‘worth’’ within the chosen framework” (Chiapello, 2015, p. 16).

Studies of (e)valuation suggest that evaluative practices represent patterns of social behavior, organized in terms of broadly shared, internally coherent, sets of moral conventions. Here moral represents “understandings of good and bad, right and wrong, worthy and unworthy that vary between persons and between social groups (Hitlin & Vasey, 2013, p. 55). The economics of conventions approach also works from the assumption that a moral order represents a fundamental foundation for social coordination. These “orders of worth” (Boltanksi & Thévenot, 2006; Stark, 2000) represent historical and contextual logics of value that determine the justification of something (in this case a PEV or the qualities of a PEV) as “worthy” or having a positive value. The concept of orders of worth suggests that distinct value systems represent a resource for people to draw upon to justify the demarcation of certain things, practices and persons as having worth. Hence that which is valued in markets reflects broader social values, and goods may come to represent the secular values of a community.

The Qualification of Goods: How do Consumers Assess the Value of Goods?

Shared cultural frameworks, rooted in a broader moral order, shape the desire for a good or service, which must prevail over the cost of the product for an exchange to occur. The literature discussed above establishes that economic value comes not from the intrinsic properties of the object but rather from a process of (e)valuation, specific to the social context of the market. Looking at the dimensions of value in a market reveals which qualities consumers value; but how do they know whether and to what degree a product has these qualities? And how do they themselves participate in the qualification of goods? For consumers, choosing among goods with similar qualities depends on value judgements—that is, judgements about what is better or more desirable (Aspers & Beckert, 2011). Determining quality differences between goods across and within shared product categories is crucial for the attribution of value and value judgements. Consequently, questions about the (e)valuation of PEVs need to address the processes of qualification that form the basis for these value judgements, and uncovering the processes of qualification and classification is fundamental to understanding how market actors assess the economic value of PEVs.

The classification of goods has a long history of investigation in sociology, (e.g., Bowker & Star, 1999; Durkheim & Mauss,1963; Lounsbury & Rao, 2004; Zerubavel, 1996; Zuckerman, 1999) and represents an integral part of the co-ordination of markets by allowing for market actors to make value judgements between products. To classify goods means to put them into market categories that establish distinction and at the same time allow for commensurability among the goods. Espeland and Stevens (1998) propose that commensurability among goods enables the functioning of markets by simplifying disparate information. Espeland and Stevens' (1998) description suggests that the phenomenon of commensurability supports the underlying assumption of valuation studies; that value is not intrinsic.

> Embedded in this logic [of commensurability] is another assumption: that all value is relative and that the value of something can be expressed only in terms of its relation to something else. This form of valuing denies the possibility of intrinsic value, pricelessness, or any absolute category of value. Commensuration presupposes that widely disparate or even idiosyncratic values can be expressed in standardized ways and that these expressions do not alter meanings relevant to decisions. (p. 324)

Commensuration transforms qualities into quantities and differences between goods into magnitudes along a shared scale. As such, commensuration allows for rapid comprehension and comparison of different goods through standardization and proxies (often price) for a range of different qualities. However, the classification of goods determines the worth of goods not only in terms of price but also the worth of goods in terms of other dimensions of value (Aspers &, 2011; Beckert and Musselin, 2013). Market classifications then, represent part of the answer to the question of what is valued and how quality is constructed.

The classification of goods and the assessment of their qualities—involving the formation of categories, the sorting of goods into these categories, and the construction of quality differences across and within these categories— represent a central coordination problem in markets (Beckert and Musselin, 2013). Market sociologists who study valuation, as Diaz-Bone (2017) explains, conceive of "categories and classifications - as organized architectures of categories - cognitive infrastructures for producers, employers, employees and consumers which they apply to understand market order, product niches and the qualities of labor and of products in markets" (p. 238). Product categories are socially shaped, established through formal and informal processes that construct and assess the qualities of products as compared to other products, even as existing categories shape these processes. Processes of qualification can take various forms and arise from a range of measurement systems and quantified criteria, expert assessment, or social networks.

Scholars suggest posing an analytical distinction between standard and status markets, which arguably allows researchers to determine how market actors measure quality. In standard markets, the qualities of a commodity are evaluated in relation to other products in the market. In status markets the quality of a good is measured by the social structural position of buyers and sellers. Different (e)valuations of the identities of objects and market actors impact consumer choices in markets (Zuckerman, 1999). In practice, however, markets for a given good or service employ both standards and status measurements to determine the quality of products. Therefore, as Aspers and Beckert (2011) suggest, in all types of markets, similar social devices represent the processes through which things become economically valuable to consumers, that is, how standards are constructed and status is measured. Valuation studies call attention to the role of a broad array of variously named market devices (e.g., arrangements/ metrics/ socio-technical mechanisms/ infrastructures) in facilitating value judgements (Kjellberg et al., 2013, p. 22). Market devices, including categories, status, networks, standards and certifications, rankings, and accounting schemes, among others, represent the mechanisms of product (e)valuation. These devices share the common function of segmenting markets by applying classifications to ascribe and evaluate both product qualities and market identities (product, producer, and consumer). Moreover, these devices measure quality within product groups. The perceived quality differences between products within the same product category arise from comparison with other goods along a defined scale.

Though sociological approaches to studying markets, and scholars working within valuation studies, increasingly look to the role of intermediaries in qualifying (and quantifying) goods, including how these intermediaries shape the value systems that order (e)valuation, (Bessy & Chauvin 2013) my work orients toward consumers. Of particular interest to my

research is Karpik's (2010, p. 95) conceptualization of judgement devices, which he argues represent the central mechanism of qualification. According to Karpik (2010), judgement devices encompass a wide range of instruments, created by actors in the market, which reduce the ambiguity and risk in a market by increasing the understanding and experience of market actors, particularly consumers. Judgement devices represent information gathered from multiple sources, an aspect which in and of itself functions to reduce consumer uncertainty regarding the quality of the goods and provide market actors with a common frame of reference for (e)valuating products (Callon et al., 2002; Karpik, 2010). Karpik (2010) illustrates how judgement devices work to solve the problem of value in markets, specifically in the case of unique products, which he argues are otherwise incommensurable and therefore not easily (e)valuated. These devices do so in two significant ways: One, they classify and qualify products, thereby producing oriented knowledge about the qualities of goods (Callon et al., 2002; Karpik, 2010). Two, they represent credible sources to those who use them, thereby increasing trust among market actors. The significance consumers attribute to the qualifications produced by a particular judgement device is determined by its social position. That judgement devices function as trust devices among market actors supports the underlying sociological insight that trust represents a fundamental necessity for the emergence and functioning of markets.

Though (e)valuation, as I show above, is a socially patterned phenomenon, informed by the social position of the evaluator, it is most often individual consumers who employ judgement devices to make purchase decisions in markets. As Karpik notes, individuals use and interpret judgement devices in myriad ways, consequently, the perceived worthiness of a product may vary from person to person. Moreover, on an individual level, there exists a multidimensionality of the criteria of (e)valuation, and multiple judgement devices can act in both complementary

and conflicting ways, providing consistent (in the case of the former) and contradictory (in the case of the latter) sets of information to consumers. Consumers therefore, must negotiate and resolve tensions between the product qualifications offered by different judgement devices for a value judgement (and subsequent exchange) to occur.

Karpik (2010, p. 45-46) describes in detail a typology of judgement devices which includes the following: cicerones (experts, critics, and guidebooks), confluences (techniques used by firms to channel buyers), rankings, confluences, appellations (signals of quality scrutinized by independent third parties), and networks. Cicerones, as critics and guides, designates the people and materials (including digital materials) that provide specific evaluations of products. Rankings represent either experts' or buyers' hierarchical arrangements of products based on varying criteria. Confluences are the numerous mechanisms sellers use to maneuver buyers toward purchases—which can be implemented in a physical space or on the internet. Appellations refer to the names that symbolically represent the qualities attributed to a product (or group of products) including brands, certifications and quality labels, designations of origin, and professional titles. Finally, networks, which Karpik refers to as "hardy and effective social structures" encompass personal, practitioner, and trade networks. Personal networks, made up of interpersonal relationships, include connections among family members, friends, colleagues, and other contacts. Karpik (2010) explains that the personal network provides members with credible information, affording actors with the "possibility of accessing any point of the social relationship to avail themselves—via one or several persons—of personal experience and capitalized knowledge while on the whole remaining protected from the dangers of opportunism" (p. 45). The practitioner network, made up of professionals, allows for the spread of information

regarding non-observable aspects of products. The trade network includes both sellers and buyers (or their representatives).

The possibility of standardization and commensuration and the quantification of qualities through judgement devices lends itself to the idea of a neutral valuation regime (Espeland and Stevens 1998). However, the broad range of judgement devices and the collective, fluid, and constructed nature of the devices themselves suggests that the categories and qualities of goods and services remain open to contestation. As such, it is important to note that even when a product has seemingly natural properties, the identification, definition, and measurement of these qualities are socially informed. As a social process, the qualification of goods and services raises questions about the power and inequality inherent in creating, accessing, and employing judgement devices. Callon, Méadel, and Rabeharisoa offer a brief example that illustrates the constructedness of qualification procedures and the demarcation of what constitutes a "quality":

> These properties [qualities] are not observed; they are 'revealed' through tests or trials which involve interactions between agents (teams) and the goods to be qualified. The fact that a wine is syrupy, that it matures with age, that it has a high or low alcohol content, that it comes from the Médoc region or Touraineare are all properties that will be used to characterize it but which, to be identified and objectified, require the implementation of certified tests and the realization of codified measurements. (p. 198)

Qualification processes necessarily erase certain quality differences, placing qualities along hierarchical scales, and producing quality assessments (with regard to conformity and deviance) as market actors with the ability to do so attribute and assess product qualities. As Callon and colleagues reveal, the categories and measurement instruments of product qualities are socially constituted, shaped as those with the power to do so shape them, selecting certain characteristics and representations over others. In highlighting the constructedness of quality characteristics Callon, Méadel, and Rabeharisoa present a model of product qualification that pushes against

what they—and Karpik—see as the mis-understanding of product qualities, put forth in economic theories, as intrinsic properties.

Conclusion

I began this chapter by showing that new economic sociology with its focus on embeddedness explains how macro-structures (social, cultural, political) structure markets. By broadening and critiquing the concept of embeddedness, cultural analyses of markets not only shed light on the ways in which culture (as an underlying or exogenous structure) affects how markets work but also reveal the cultural work that goes into creating market objects (e.g., commodities, consumers). Studies of consumers and consumption offer a complementary approach to the sociology of markets. In accounting for consumer agency, expressive and interpretive action, and symbolic meaning in consumer markets, consumer oriented research provides an analytical foil for the productivist focus of economic sociology. Scholars from this group focus on the demand side (broadly defined) of markets, providing rich and detailed qualitative inquiry and theories of consumer meaning-making. This work explores consumption as a means of communicating, specifically signaling status and self-identity, with others. Largely comprised of micro-level studies, accounts of consumers and consumption demonstrate the meaningfulness of consumption, its role in identity formation, aesthetic expression in everyday life, and the experience of being a consumer confronted with a profusion of commodities. By emphasizing communication, agency, and engagement, exponents of the cultural turn demonstrate how and why people make consumption into personal and social priorities. However, as Thompson and his colleagues note, "matters of agency, and emic meaning are not likely to be understood through a romanticizing interpretive lens that excises the role of culture

and social structure" (Thompson et al., 2013, p. 158-159). Consequently, I draw on economic sociology's emphasis on social macro-structures as well as consumer meaning-making to understand how institutions, ideology, and the socio-historical context shape value creation as much as the interpretive activities of consumers.

The understanding that the value of goods and services arises from an observable social process of (e)valuation, rather than a miraculous emergence of agreed upon value from unconnected market actors, calls for the investigation of the complexity of elements that constitute (e)valuation processes. Valuation studies represent a synthesis of cross disciplinary approaches to markets that acknowledge the active role of consumers in the dynamics of market construction, through networks and cognitive frames traditionally studied by sociology, without neglecting problems of coordination, calculation, and information, which are more often the purview of economists. Valuation studies regularly incorporate the work of cultural sociologists who have long advanced the centrality of symbolic consumption to advanced capitalist societies. Drawing on the insight provided by the sociology of valuation, broadly defined, allows me to emphasize that cultural meanings and social structures affect consumer behavior rather than the rational calculation that dominates PEV research.

CHAPTER 4: CONTEXTUALIZING THE PEV MARKET

The historical and socio-political context of the PEV market, the materiality and symbolism of automobility, all play a part in shaping consumers' expectations and experiences of PEVs. Since PEVs are as much a product of their context as an agent of change, an understanding of their social milieu is vital to an analysis of how and why consumers value PEVs. The goal of this chapter is to characterize and provide background information about the social context of the emerging PEV market. To that end I turn first toward research on automobiles and automobility to show how automobiles and major cultural discourses about mobility exist in a mutually sustaining relationship, fueling potent symbolic representations in culture and configuring distinct ways of moving, inhabiting, and socializing. The appositeness of the broader phenomenon of automobility becomes clear when we realize that rather than shaping conceptions of motorized mobility, electric vehicles must compete with the provisionally stabilized materials, competencies, and meanings of mobility based on ICEVs. Knowledge of automobility as an organizing system is fundamental to understanding the emergence and functioning of a PEV market—including consumer processes of valuation—as consumers and producers are deeply embedded in the material and symbolic elements of a car based mobility paradigm. Analyses of the cultural and social entailments of PEVs illuminate localized meanings within the market, but a 'mobilities' understanding of the automobile in American culture connects PEV market processes to the larger system of automobility.

The (e)valuations of PEVs, are not only connected to the actual lived experiences of drivers and the system of automobility in which they are embedded, but are also shaped by a broader context of powerful economic and ideological interests. Roland Barthes (1957/2012) suggests that myths represent the cultural manifestations of ideology. He argues that myth is a

type of speech which functions, as a mode of signification, to portray reality in compliance with a given ideology. Drawing from this argument, I understand myth as a way of "saying something", of signification, that naturalizes ideology, obscuring its historical context and internal tensions to make it seem commonsense, timeless, indisputable, and natural rather than a social product. According to Barthes, anything, not just oral speech, but writing, representations, and even objects are mythical speech, if they mean something. Consequently, any cultural product can be "de-mythologized" to reveal the underlying conceptual structure that maps everyday experience.

Following Barthes, Hebdige (1979) dismisses the idea of a universal and commonsensical understanding of the world, and in its place, hypothesizes a privileged paradigm of comprehension that ensures a "classifiable, intelligible and meaningful" way of organizing everyday life. Hebdige is building on Stuart Hall's argument that people understand the everyday world in a way that they believe is natural and instinctual but in fact follows a determined "connotative code" that "cut[s] across a range of potential meanings, making certain meanings available" (Hebdige, 1979, p.14) while dismissing others. This connotative code is nothing more than ideology, the particular cognitive map of the dominant group. As Mudge (2008) observes, "in politics, the most influential kind of power is definitional: those with the ability to define political problems and the range of possible solutions exert a unique influence" (p. 707). Consequently, there is a connection between the groups who control socio-political discourse and the trajectories that the dominant connotative code of meaning follow. The interests of this dominant group are reflected, albeit in an often nonlinear and ambiguous way, in the continually reproduced dominant discourses and dominant ideologies expressed through myth.

Ellul (1973) suggests that, in order to mobilize people, ideology must express itself through myth, connecting contemporary socio-economic and political interests with the everyday lived experience. As Barthes notes, myth functions to transform a cultural[8] and historical object into the sign of a particular ethos, ideology, or set of values. Indeed, Barthes' contemporary, Lefebvre (1971) argues that the automobile is consumed, in addition to its function as transport, as a sign. Through myth an object comes to represent (signify) ideology as objective and a 'true' reflection of reality. Mythic speech, then, is not fixed but variable, and myths, informed by specific power structures, are always political even as they de-politicize, and are contingent on historical and cultural context even as they de-historicize. More recently, Wernick suggests that cars have long been "vehicles for myth" and representing not only current dominant ideology, but also the "technical and organizational transformation that made them possible" connecting modernity and industrial development with broader ideologies (1994, p. 71).

I draw on the work of Mudge (2008) and Somers and Block (2005) to explore sustainability as an ideological force and how the ideology of sustainability, expressed in an explicitly moral manner, in turn exerts political and economic influence. There exist two important contradictions inherent in sustainability ideology. First, to achieve sustainable development, practical applications must reconcile, in capitalist market systems, two historically opposed phenomena—economic growth and the preservation of the environment. Sustainability advocates employ narratives of sustainable development to project this reconciliation while sidestepping any fundamental changes to the market system and model of economic development that helped bring about a crisis of sustainability in the first place (Escobar 1996, p. 328*).* Conceptually, sustainability calls for individuals to consume less, or at least more

[8] Here Barthes is referring to culture as the entirety of everyday life, rather than a narrow definition of culture as the arts.

efficiently, as a means to lower the amount of natural resources wasted in the production-consumption process. At the same time, the language of individualism itself motivates and sustains market fundamentalism (Fourcade and Healy, 2007; Mudge, 2008), even in the face of calling for reduced or efficient consumption. Yet, in spite of the tensions, sustainability continues to represent a dominant environmental ideational regime in the United States. I argue below, that it is the myths of individual responsibility and technological progress that serve to conceal these contradictions, lending to the continued dominance of sustainability ideology.

In the following chapter I provide depth and background on the myths of the responsible consumer and technological utopianism that undergird sustainability as an ideology, as a set of policy conventions, and a configuration of symbolic meaning or connotative codes (Mudge, 2008). The ideas of individual responsibilization and technological utopianism are not only pertinent for understanding the driving forces behind current transportation policy and research approaches, but are also reflected in the personal accounts of consumers I heard in interviews. Rather than offering a comprehensive account of the roots and instantiations of each narrative, my aim in this chapter is to provide a general overview to better understand how individually and synergistically these myths shape consumer (e)valuation of PEVs.

By the end of the chapter the reader will be in a better place to understand the dominant trends in analyses of consumers and the PEV market in relation to sustainability discourse, which ultimately informs the valuation of PEVs. Much of the literature I document at the end of this chapter is oriented toward policy-making or industry development, and as such, is useful to situate an overview of this body of work in relation to the ideological and political manifestation of sustainability. At the same time, an account of existing research on PEV consumers relates to my earlier explanation of the development of consumer behavior studies, steeped in the

methodological and theoretical traditions of psychology and economics, and serves to illustrate how my sociologically informed approach represents a unique take on studying PEV consumers.

Automobiles in Context

There exists limited academic analysis on the development and implications of the automobile and its related socio-technical matrix as objects that structure social action (Dant, 2004; Miller 2001; Sheller & Urry 2000). As Dant (2004) notes, in the social sciences and humanities, the car and related infrastructure "are used as a taken-for-granted analogy to explain other social actions such as those of pedestrian traffic" (p. 61) rather than examined in their own right. Miller (2001) argues that the non-technical literature on the automobile predominately features linear histories of car production and design, which hinge on significant figures and events; or offer statistical representations and universalizing explications of the consequence of mass car consumption and use. Analyses of the car within these two categories come from one of two perspectives. They either approach the history of the automobile as a story of production, where the car exemplifies the development of production in industrial capitalism. Or they frame the automobile as a story of destruction, representative of the waste and physical dangers of car use (e.g., pollution, accidents). There are, beyond the dominant literature, social histories of the car, which look at the changing patterns of work and leisure and the demarcation of social boundaries. These social histories offer a broader understanding of the social significance of the automobile than the dominant narrow analyses of the car, but do not address all of the social implications of the automobile.

Three more contemporary trends in academic literature offer a better resource for understanding not only the social and cultural factors of ICEVs, but also the circumstances

surrounding the (re)introduction of PEVs. First—despite a significant dearth of research when compared to other cultural artifacts—with the rise of consumption focused inquiry, one can increasingly find analyses of the car, including the cultural and social entailments of the car, and accounts of car consumption (e.g., Miller, 2001). These cultural analyses complement the second trend, composed of a growing body of sociological research concerning mobility, which focuses on the automobile as the embodiment and focal point of a dominant system or regime of automobility. A system of automobility refers to the patterned and structured ways in which a range of social developments mutually reinforce on another, making possible and at times necessitating the widespread use of automobiles (Böhm et al. 2006).

Mobility scholars understand automobility as one of the principal socio-technical institutions; a hybrid assemblage of humans, machines, spaces, forms of governance, and infrastructure, which organizes modern society (Edensor, 2004; Sheller & Urry, 2000; Urry, 2004). The system of automobility is both an ideological formation and a material complex—legitimated through popular, policy, and academic discourses—encompassing a set of political institutions and practices, with a phenomenological aspect, or a subjectivity that shapes how individuals experience the world. As such, sociological research on mobility focuses on the social, cultural, material, and affective impacts of automobility, examining what configures the social processes related to automobiles and expanding the scope of scholarly analysis of the car (Urry, 2007).

To understand the context of the emergence and functioning of a PEV market—including consumer processes of (e)valuation— I explain three significant aspects of automobility in the United States: the symbolism of automobility, the socio-technical complex of automobility, and the phenomenology of automobility. The symbolism of automobility refers to the sign values of

automobiles and the meanings associated with car related practices and infrastructure. The socio-technical complex of automobility refers to the material artifacts, the related infrastructure, and the political and institutional matrix that comprises the system of mobility built around the car. The phenomenology of automobility refers to the ways in which automobility shapes the subjective position from which people experience social reality. Although I am separating these concepts to allow for analysis, they are closely entwined and often difficult to separate out in everyday life. The point in this section is to provide a general contextual understanding of the cultural meanings, materials, and environment associated with travel and automobiles in the United States, so as to better explain the sources of value and systems of valuation from which PEV consumers draw for their own (e)valuations of PEVs. As such, given the focus of this dissertation I will not be addressing all the facets of automobility, even within these three aspects.

The first two trends in academic literature on the automobile complement one another and indeed there is some overlap between the two. The third trend, also reflected in policy discourse, is a body of work that focuses on the presence of externalities, augmenting analyses of automobiles to include an account of the social and environmental costs associated with car use, and as such acknowledges the political context of car. This work fits within a broader research and policy program concerned with the social and ecological costs of energy consumption, as automobiles represent a significant source of energy use, one that is only growing over time as car ownership and mileage has increased. As previous qualitative research on car use shows, critical automobility discourses are so fundamental and "disseminated so widely in the media, they become in turn the backdrop to the reflexivity of the drivers themselves" (Maxwell, 2001, p. 203).

Automobility

A combination of autonomy and mobility, the term *automobility*, refers to autonomous, self-directed movement. This comprehensive definition of automobility encompasses not just a car-based automobility but a variety of ways in which the connection between autonomy and mobility, through material and symbolic combinations, might occur. Featherstone (2004) offers a succinct explanation of the connection between the early automobile and the development of the term automobility:

> The auto in the term automobile initially referred to a self-propelled vehicle (a carriage without a horse). The autonomy was not just through the motor, but the capacity for independent motorized self-steering movement freed from the confines of a rail track. The promise here is for self-steering autonomy and capacity to search out the open road or off-road, encapsulated in vehicles which afford not only speed and mobility, but act as comforting protected and enclosed private spaces, increasingly a platform for communications media, that can be enjoyed alone or in the company of significant others. (p. 1)

By 1968 Lefebvre (1971, p. 100) had labeled the car the 'Leading-Object' in terms of its centrality within the culture of modern societies. In the United States, the dominant system of automobility centers around the car, subordinating other automobilities or different modes of autonomous, independent mobility—such as walking, cycling, etc. The car constitutes the predominant material and symbolic artifact of mobility, as the production and consumption of automobility is embodied in the car, which is consequently constitutive of and produced by modern society. It is Marcuse (1964/2013) who asserts how, often seemingly utopian technological innovation, rather than representing a liberating technology, "imposes its economic and political requirements for defense and expansion on labor time and free time, on the material and intellectual culture" (p. 406). This is indeed true for the ICEV, as automobility sustains the flexibility, speed, and connectivity demanded by current society—demands created in part by

automobility— and narratives of drivers position the car as a tool for managing time pressures and the speed of modern life, (Miele, 2008; Miller, 2001; Urry, 2007; Wacjman, 2008) despite the contradictions inherent in car-based automobility.

Historically, a growing socio-technical system of automobility offered hope, while the open road represented new possibilities of work, of adventure, even of romance, and the car stood as the key to accessing these possibilities. The car based system of automobility sustains "major discourses of what constitutes the good life, what is necessary for an appropriate citizenship of mobility and that provides potent literary and artistic images and symbols" (Urry, 2004, p. 26). More than half a century ago cars captured the attention of French intellectuals, who sought to understand the relationship between the automobile and social and cultural conditions (Inglis, 2004). Lefebvre (1971) declared that in additional its practical use, the car is something magical, a denizen from the lands of make-believe, echoing Barthes' famous comparison of the car to gothic cathedrals. Barthes (1957/2012) identified the car as a "Magical Object", a fetishized commodity that combined the detachment of the mechanical with everyday intimacy to offer both visual and affective pleasures. He wrote, "I believe that the automobile is, today, the almost the exact equivalent of the great Gothic cathedrals: I mean a great creation of the period, passionately conceived by unknown artists, consumed in its image, if not in use, by an entire populace which appropriates in it an entirely magical object" (Barthes 1957/2012, p. 169). What drew the attention of these scholars still holds relevance for our current car culture, where diverse qualities associated with cars and a range of car-related meanings and practices permeate culture, embodying symbols of desire and sensuality, mobility, status, family-life, freedom and independence, adventure, individualism, and rebellion. These symbolic

representations manifest across sundry cultural texts from films and literature to songs and advertisements, even as systems of automobility infuse the material aspects of everyday life.

The automobile continues to be one of the most aspired to cultural goods in the United States and a significant commodity for individual consumption (Gossling 2017a, 2017b; Sheller, 2004; Urry 2004; 2006). The car is a polyvalent cultural artifact associated with a wide range of sign values and symbols including the car as: a partner, a protective shell or cocoon and/or a private personal space, a means of empowerment, an affective object evoking and projecting emotions, as freedom, maleness, dominance, desire and sexuality, and a means of escape (Haustein et al., 2009; Presdee, 2003; Sheller, 2004; Sheller & Urry, 2000) There exists a fascination with the car from early childhood that only increases as one grows up, due in part to the way popular media glamorizes the car. Undeniably the car plays a central role in a number of 'coming-of-age' rituals which originated, according to Sheller and Urry (2000, p. 747), with "the discovery of bench-seats and 'lover's lanes'". Part of the allure of the car manifests as a sexualized extension of the driver's desirability and fantasy world—where the driver is competent, powerful, and capable. For example, working-class youth rejected homogenized American sedans and sought difference and individuality by modifying stock cars, touching off the hot-rod and custom-car subcultures (Moorhouse, 1991).

The ICEV is a commodity already so firmly entrenched in symbolic, material, and habitual ways, that, "American culture is inconceivable without the culture of the car and its sounds" (Urry, 2006, p. 27). In the United States car ownership seemingly became 'democratized' first, through Fordist assembly line production which served to make automobiles available to wider swathes of the American public—as Graves-Brown (1997) points out, "even the dispossessed of the Great Depression travelled by car" (p. 68)— and second, with

the massive undertaking of widespread road building, starting with the funding allocation of $25 million toward building an interstate highway system and the passing of the Federal Aid Highway Act in 1956 (Weingroff, 1996). In the United States, from early on in its history the automobile dominated as the symbolic and tangible manifestation of autonomous mobility (Brown, 2013; Gartman, 2004; Moeckli and Lee, 2007; Weber, 2004; Wollen and Kerr, 2002; Wright and Curtis, 2005). The symbolism of automobility supports neoliberal ideology, linking automobility with citizenship and freedom, in particular the freedom to exercise choice in everyday life, and framing the perceived unlimited mobility (associated with car ownership and use) as a fundamental right and condition of modern liberal society (Freudendal-Pedersen, 2012; Rajan, 2006). Freedom and individualism are two interconnected dominant myths associated with the car, which in turn influence how PEV consumers perceive automobility.

Gartman (2004, p. 171) explains how automobiles, early on, came to be an indispensable fixture of the upper class, used for leisure activities including: touring, racing, and parading along the fashionable boulevards. Consequently, the automobile rapidly became representative, in American culture at least, of the freedom and leisure associated with the wealthy. Increasing numbers of people strove to obtain an automobile as a way to transport themselves beyond the quotidian struggles of the working class to the life of leisure the car represented as a symbol of wealth. Indeed, as Schudsen (1991) notes, the growing used car market indicated a higher rate of turnover as people purchased "better" models when possible. Indeed, by 1927 the number of new car sales amounted to less than that of used cars. This behavior, Schudsen argues served to reinforce the automobile as a symbol of class and status distinction. However, as ever growing numbers of consumers chose the automobile to signify their prosperity, automakers began to produce less-expensive models for the new car market. Consequently, mere ownership of a car

became rather a less distinctive status symbol and increasingly it was the type of car one owned that testified to the wealth, leisure, and freedom of the driver. Gartman (2004) explains how,

> the contradictions of the Fordist age of mass individuality manifest not only consumer aesthetics but also spilled over into use. When all Americans sought to express individual freedom and escape from mass production by taking to the roads, they created unintended collective effects that undermined these pleasures of automobility. Crowded roads increased breakdowns, accidents, noise and pollution, and generally despoiled the pristine countryside to which motorists sought to escape (p. 183)

This led some scholars to suggest that, like other mass-produced cultural objects, automobiles offered consumers only inauthentic fulfillment of the needs and desires created by an alienating production process (Adorno & Bernstein, 1991).

Automobility shapes how people experience and sense the world. Not only are the physical, embodied experiences of car travel described through narratives of freedom and independence they also evoke sensations including feelings of joy and excitement which have subsequently come to be automatically connected with the automobile, even if/when the original affective element of automobility is not present. As sociologists, we accept that relational settings and affective cultures shape emotions. Though people experience emotions in and through the individual body, sociological analyses demonstrate how emotions are "shared, public and collective cultural conventions and dispositions" (Sheller, 2004, p. 226). Automobility then, is viscerally experienced but in a patterned and structured way; that is, the emotions associated with cars are not naturally occurring but rather prompted and governed by a range of rules, expectations, and patterns. As Redshaw (2008) suggests, "the emotional and passionate attachment to the car… is a function of social and cultural factors through which individuals develop and cars are articulated or inscribed with meaning and made part of daily practice" (p.

5). Sheller (2004) argues that indeed the affective elements of cars play an equally important role in sustaining a car-based automobility as socio-economic and technological factors.

The dominant discourse of automobility positions the car as the vehicle through which humans can access the wild parts of nature, as it endows them with the capacity to go anywhere. In addition, in the United States pop culture expressions of automobility speak to a cultural ethos of individualism, evoking dreams of adventure and freedom and drawing on fantasies of limited governance and self-direction, the ability to move and live without needing permission (Bell, 1976; Cohan and Hark, 1997; Eyerman and Löfgren, 1995). Freedom, speed, and power even shape the form of the automobile through car design (Wright & Curtis, 2005). They are embodied in the outward form of the car, reinforcing these mythological associations with an intentional, material, expression of meaning. Humanity's domination of nature through technological development, and imagery of the "American West", both of which often emerge alongside the multiple manifestations of the cultural ethos of individualism throughout the history of the United States, come into play here as well. The myths of the responsibilized consumer and technological utopianism, through which sustainability ideology is expressed and reproduced, fit with the cultural ethos of individualism and technological progress that were already connected to automobiles and automobility in the United States prior to the emergence of the current PEV market. It is not such a great leap then for sustainability discourse to connect these narratives with PEVs.

Although this symbolism still exists, an anemoia accompanies today's cultural incarnations of cars and the road itself from road movies and pop songs to classic car collecting and vintage car rallies, evoking a time when the car embodied freedom and opportunity (Sheller, 2004). There is, according to post-modern theorist Jameson, (2001) in postmodern society, only

the opportunity for what he calls the "nostalgia mode", or the imitation of previous styles, not the creation of new ones. For the automobile, this manifests as nostalgia for the remembered freedom and prosperity—whether real or imagined—of the golden age of the automobile. The lyrics from Lonestar's 1999 hit country song: "What About Now?" provide a quintessential example of this nostalgia, linking the older, larger (and cheaper) 'Detroit dinosaur" with imagery of a something better, just down the road:

> The sign in the window said for sale or trade; On the last remaining dinosaur Detroit made; Seven hundred dollars was a heck of a deal; For a four-hundred-horsepower jukebox on wheels; And that road rolls out like a welcome mat; I don't know where it goes, but it beats where we're at… Let's take that spin that never ends; That we've been talking about; What about now? Why should we wait?; We can chase these dreams down the interstate… (Harbin et al., 1999)

The Lonestar song echoes a pervasive anemoia arising from the growing awareness of the major contradictions and tensions inherent in the system of automobility.

Automobility is a system of meaning and conceptualizing that is naturalized and deeply woven into the fabric of reality to the point that it is difficult for people to recognize or understand its contradictions. For example, in the face of growing congestion, car ownership and use is still perpetually increasing, even as the pursuit of individual mobility intensifies collective immobility. I saw this theme repeatedly in the accounts of urban PEV drivers, particularly those in San Diego and the Bay Area, who cited HOV lane access as a primary motivator for purchasing their vehicle. As one PEV driver from Silicon Valley explained, "*my biggest motivation was the HOV sticker. That's what got me in the showroom. For us, it was like, wow we get this HOV sticker, and that means we'd get 30 minutes or an hour of our life back every day.*" Equally contradictory is the juxtaposition of the car as a time-saving device with the reality of individuals piecing fragments of time together in daily life to fit into the rhythms of roads and

the expectation of far ranging mobility. Contributing to the awareness of the tensions of automobility is a growing transportation discourse that positions the car as environmentally destructive and as Doughty and Murray (2016) note, though the "championing of the individualism of automobility" remains strong, there is "an emerging moral landscape of transport [that sees] car travel constructed as immoral" (p. 314). It was clear from the responses of many PEV drivers that they were aware of the tension between the environmental hazards presented by ICEVs and the need or desire for independent, individual automobility. These consumers frequently saw the PEV as a means of resolving this contradiction and their purchase narrative frequently included comments like: "*wonderful for the environment*", "*doing my part*", "*give back to the planet*", and "*reduce my global footprint*."

Social life has become locked into an automobility it generates and presupposes, in part because automobility itself suffuses the structure and organization of the physical world. By the 1980s, though public transportation existed, it was a denigrated form of travel, for those who were unable to afford cars, and travel by car was the predominant mode of transportation. By this time, car ownership was a necessity rather than a choice, as policy and planning based on *autologic* ordered everyday life (Reese 2016). Automobile principles or *autologic* (Flink, 1990; Miller, 2001) has become reified through what Urry (2004) describes as

> an extraordinarily powerful *complex* constituted through technical and social interlinkages with other industries, car parts and accessories; petrol refining and distribution; road building and maintenance; hotels, roadside service areas, and motels; car sales and repair workshops; suburban house building; retailing and leisure complexes; advertising and marketing; urban design and planning; and various oil-rich nations. (p. 26)

For Urry and other mobility scholars, the automobility complex locates cars and car drivers in an expanding network containing infrastructure (e.g., roads, parking arrangements, maintenance), industrial organizations (e.g., petroleum suppliers, automakers), social and political institutions

(e.g., transportation rules and regulations, healthcare, environmental protections), and technology, all of which are connected, particularly through economic linkages, in an expanding network. The socio-technical complex of automobility represents the external conditions that make individual and mass automobile use possible and even necessary.

Significantly, individuals construct their lives around the symbolic and physical aspects of a regime of mobility that, over time, increasingly centered on the potentials and characteristics of the car, to the point that the automobile has helped configure the modern (Western) subject. As a consequence, it remains difficult for people to move beyond the dominant culture of automobility because it has become constitutive of the primary social context from which individuals engage with society. The automobile has become part of our 'second nature' (Edensor, 2004). Automobility is part of everyday life, even for those unable or unwilling to use a car. Numerous studies indicate that the car and its rituals serve to perform group belonging and provide outlets for self-expression (e.g., Collin-Lange 2013; Gartman 2004; Lumsden 2013; Miller 2001). The car not only offers an aesthetic and kinesthetic experience, it represents a conduit through which human bodies interact with the physical world as people sense and feel through and with the car. Regardless of whether people drive regularly or not, automobility as an emotional, embodied experience influences how they experience the world. As Paul Gilroy (2001) notes, "cars are integral to the privatization, individualization and emotionalization of consumer society as a whole', in part due to the 'popular pleasures of auto-freedom – mobility, power, speed'; cars in many ways 'have redefined movement and extended sensory experience" (p. 89).

A unique blend of symbolic and material elements, car-based automobility is a system that requires the coordinated action of many different components—cultural, political, economic,

and phenomenological. “The car’s significance is that it reconfigures civil society involving distinct ways of dwelling, travelling and socialising in, and through, an automobilised time-space” (Urry, 2000, p. 59). Consequently, rather than representing a completely new technology on the market, PEVs enter into a system with provisionally stabilized materials, competencies, and meanings of mobility based on ICEVs. As such, the PEV market represents an opportunity to examine what directs, shapes, or dictates the social processes that successfully or unsuccessfully establish/displace or stabilize/destabilize a technological artifact.

Sustainability

As Maxwell (2001, p. 203) noted nearly twenty years ago, in his interviews with drivers about their personal car use, discourses of sustainability are so vital and disseminated so widely, they emerge in the narratives of car drivers. This observation still holds true today, particularly among car buyers on the PEV market. In general, deep public concerns for the social and environmental consequences of car use, and resource consumption more broadly, suffuse the meanings associated with car-based automobility in everyday life. Consumers draw on narratives of sustainability as a moral guide and to explain (justify) their actions. At the same time, ideas of sustainability play a not inconsequential role in shaping the socio-political context of the PEV market. Consequently, reflecting on sustainability as an ideological system is essential to explaining how consumers come to value PEVs.

But what is sustainability and how can it be understood as an ideological system? A comprehensive answer to this question lies beyond the scope of this dissertation. Here, however, I provide an overview of sustainability in order to illustrate why and how the ideas of sustainability play a significant role in the (e)valuative practice of PEV consumers. In a broad

sense sustainability is an anthropocentric environmentalism that puts people at the center of nature and frames the earth and its resources as existing to sustain human life. Anthropocentricism combines a desire to preserve the environment for descendants, practical utilitarian values, and an aesthetic appreciation of nature. Historically, the idea of sustainability, arising from global political processes and the varied interests that constitute these processes, represented the prioritization of the relationship between nature and socio-economic development. Current sustainability discourse positions the environment as a public problem intricately entwined with economic development and social justice, and proposes changes to governance structures and every day practices as a means of mitigating human caused environmental damages while enabling continued socio-economic growth (Burns, 2013; Ricketts, 2010).

Using Mudge's (2008) analysis of neoliberalism as an analytic guide, I discuss sustainability as an ideological system with a political, intellectual, and bureaucratic face. Mudge conceives of neoliberalism as "an intellectual-professional project, a repertoire of policies, and a form of politics" (p. 704). Similarly to neoliberalism, sustainability has distinctive, if overlapping modes and expression. For the purposes of this dissertation I focus on the modes and expressions of sustainability ideology as they relate to the arenas most relevant to the PEV market and consumers: transportation and sustainable consumption. The different interpretations of PEVs in policy undoubtedly represent particular, powerful interests especially as the dominant framing of PEVs will have consequences for the future of automobility. This being said, I am sidestepping any in-depth analysis of the driving interests behind sustainable policy discourse for two related reasons. First, though I am looking at sustainability discourse as it relates to energy and transportation, my focus on consumer valuation processes precludes a thorough analysis of the

undoubtedly intricate power dynamics behind the definition and governance of sustainable development. Second, a cursory analysis may not add in any significant way to an understanding of how sustainable policy narratives play out in consumer valuation processes without more rigorous inquiry.

Sustainability politics, which share an orientation toward defining and solving an environmental and social crisis of development, represent sustainability's political face. Sustainability politics include struggles to define what constitutes sustainable development, and how best to achieve economic, social, and environmental sustainability with a continued rate of industrial development. Policy practices, oriented toward changing behavior and promoting technological innovation and development, represent sustainability's bureaucratic face. Interdisciplinary research on the economic, social, and environmental crisis and solutions to that crisis represent sustainability's intellectual-professional face. PEV research represents a particularly interesting case as it addresses both technological innovation and individual behavior change as solutions to the sustainability crisis. Underpinning all of these expressions are four ideational elements that form the core of sustainability. First, that there exists concurrent and connected economic, social, and environmental crises, resulting from the current (and historical) state of industrial production and consumption, referred to, in total, as a sustainability crisis. The environmental aspect of this crisis is often defined in terms of climate change and the depletion of natural sources of energy. Second, that simultaneous economic growth, social equity, and ecological preservation is possible—even in the face of the existing crisis. Third, that individual behavior, particularly consumption (and consumption of energy), has a causal impact on economic, social, and environmental processes. Fourth, that technological development can successfully aid in solving this tripartite crisis, particularly energy efficient technologies.

Aside from the astuteness of her theoretical argument, there are two strong reasons for choosing Mudge's work as a guide. First her work is topically relevant as the narratives and myths that sustain and legitimate neoliberalism overlap closely with those of sustainability. Several scholars have documented the recent rise and staying power of neoliberal ideology (Bourdieu and Wacquant, 1999; Fourcade-Gourinchas & Babb, 2002; Krippner, 2011; Mirowski and Plehwe 2009; Mudge 2008; Peck 2008; Prasad 2006). Significantly, across the expressions of sustainability, neoliberalism reinforces (and is reinforced by) sustainability discourse, suggesting an elective affinity between these two sets of ideas. Of particular interest to my work, is the market-centric concept of the empowered consumer, whose freedom of choice represents a vehicle for political authority and social change. Willis and Schor (2012) explain the extension of the idea of the empowered individual into a model for affecting change:

> It is also a kind of "folk model" that one can find in public discussions of change. It retains a commonsense plausibility in a world where consumer actions are ideologically constructed as voluntary, consequential, and sovereign. We term this the *naïve aggregationist* model, because it fails to take into account concentrations of power, structural factors, or other obstacles, instead seeing consumer action like a tsunami that can roll over whatever is in its path. (p.165)

The consequence of these models of social change, they argue, is that when people take up the idea of the empowered consumer it "displaces collective political action and leads people to see the marketplace as the primary arena for change" (Willis & Schor, 2012, p. 165). Though the idea of the empowered consumer is similar to the agentic consumer found in CCT approaches, in sustainability discourse, this conceptualization of the consumer goes much further, drawing heavily on the language of individualism to present a consumer-oriented focus on market-based solutions to the sustainability crisis, and often ignores external social factors.

Second, like neoliberalism, sustainability is rooted in a moral project. And like neoliberal approaches to improving capitalism, which Amable (2011) argues accept "the political and moral confines of capitalism" (p. 12) sustainability similarly fails to propose any fundamental change to the economic system. In the post-war United States, the environment came to represent a source of social anxiety, sustained by a moralizing environmentalism which critiqued processes of production and consumption. In the early 1960s the United States saw a shift in the way people viewed the relationship between nature and humanity from a moderate conservationist approach to a broader, modern environmentalism rooted in discourses of risk and a post-industrial world-view. The new environmentalism subsumed conservationist goals of preservation of wildlife and aesthetic environments for public enjoyment as well as the conservation and efficient use of resources into more comprehensive environmental protection goals (Mertig and Dunlap, 2001). This transformation corresponded with the development of what Beck (1992) calls a post WWII risk society characterized by reflexivity, in the form of critiques of modern industrial practices and, due to the cumulative outcome of complex production of risks as a systemic side effect of production, the organized irresponsibility of risk producers. Though perhaps not the dramatic redefining of social stratification theorized by Beck as a stage of late modernity, shifting environmental concerns most certainly reflected a growing shared fear of collective and catastrophic ecological disasters, the most pressing arising from manufactured or man-made hazards. Over time, environmental anxiety became institutionalized, reflected in the emergence of environmental NGOs, government agencies and departments, and policy reform—all intended to manage environmental risks.

Closely related to the institutionalization of environmental anxiety was the emergence of sustainability discourse. In the early 1980s a growing perception of the deterioration of natural

resources led representatives from several nations to convene a U.N. World Commission on Environment and Development (the Brundtland Commission). The resulting Brundtland Commission's report *Our Common Future* (World Commission on Environment and Development (WCED), 1987) introduced to a wide audience the term "sustainable development" defined in the report as, "…development that meets the needs of the present without compromising the ability of future generations to meet their own needs…" (p. 43). The Brundtland Commission referred to the state of technology and social organization as barriers to present and future environmental sustainability, hinting at the focus on technological development and social re-organization that characterizes current iterations of sustainability discourse. The report goes on to elaborate how, for economic and social development to be sustainable, it must ensure the ability of the environment to meet the needs of future generations as well as those of the present, in particular the needs of the economically disadvantaged, on a global level.

> [Sustainable] development involves a progressive transformation of economy and society. A development path that is sustainable in a physical sense could theoretically be pursued even in a rigid social and political setting. But physical sustainability cannot be secured unless development policies pay attention to such considerations as changes in access to resources and in the distribution of costs and benefits. Even the narrow notion of physical sustainability implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation (WCED, 1987, p. 43).

In the Brundtland Report's definition of sustainable lay the foundation for a moralizing rhetoric that links economic growth with social equality and environmental preservation. It also positions nature as subordinate to human control. Only ten years later this connection was explicitly laid out in the definition of sustainability put forth in the United Nations' Agenda for Development (1997) which reads,

> [Sustainable] development is a multidimensional undertaking to achieve a higher quality of life for all people. Economic development, social development and environmental protection are interdependent and mutually reinforcing components of sustainable development. (p. 1)

The historical trajectory of sustainability illustrates how it is rooted in a moral project—concerned with what constitutes an appropriate rate of economic growth and the fair distribution of natural resources among the current population but also cross generationally (Opschoor & van der Straaten, 1993, p.2).

Now, 30 years later policymakers, global stakeholders, academics, researchers, and others continue to draw on ideas of sustainability to address what they believe is a concurrent and connected environmental crisis, developmental crisis, and energy crisis. Recently, however, as Fuchs (2017) notes, "there has been a shift from a focus on ecological issues towards the inclusion of broader societal issues" (p. 449) including increased focus on poverty and inequality. The conceptual and value orientation of diverse social actors shape the definition and implementation of sustainability differently across sectors of society, though this is not an undisputed project. Burns (2013) suggests that "sustainable development has been a contentious and contested concept, not only with respect to controversies between advocates of capitalism and those of socialism, between industrialized and developed countries, or between modernization advocates and their diverse opponents" (p. 12). Sustainability must be understood as a moral project as well, concerned with defining social values and the rights of other human and non-human lives. This moral framework subsequently structures consumption as it is expressed in policy and through discourse. In discourse, the morality of sustainability aligns with a larger "jeremiad against consumerism" (Cross, 2000; Luedicke et al., 2010), which includes elements of critiques of mass culture along with "charges of wastefulness, personal irresponsibility, and selfish disregard for the collective good (Luedicke et al., 2010, p. 1016). The

ramifications of this may be seen among consumers as they internalize a moral order sacralizing certain ways of consuming and proscribing others, negotiating sustainability values with other value systems in their everyday lives.

Høyer (2008) points out that concerns related to the energy consumption of personal motorized transportation did not initially appear in sustainability discourse. At first, transportation concerns manifested, when mentioned, as issues of density—air pollution in local areas and traffic congestion. Ultimately, however, the calls for reduced CO_2 emissions to combat climate change led sustainability advocates to reframe and locate transportation concerns within the broader understanding of a connected sustainability crisis. The link between transportation, global pollution, and unsustainable energy consumption, Høyer argues, led to the development of two concepts: sustainable mobility (as broadly defined movement) and sustainable transportation (as systems of transportation including infrastructure), both of which began to increasingly appear in academic and policy discourse. Significantly, as Høyer notes, and I explain below, PEVs have been framed as integral to achieving global sustainability.

This explains, in part, how sustainability ideology relates to consumers on the PEV market. To answer this question more fully, I turn to Somers and Block's (2005) comparative analysis of the rise of market fundamentalism in England in the early years of the industrial revolution, and in the United States during the second half of the 21st Century. Expanding on the idea of market embeddedness, espoused by economic sociologists, they introduce the concept of "ideational embeddedness", arguing that markets are always embedded in "ideas, public narratives, and explanatory systems" (p. 264) which shape and legitimate market order. Their argument uses two distinct cases to illustrate how ideas (i.e., market fundamentalism) have the

power to shape and structure markets (i.e., low wage labor markets) by affecting radical shifts in social and economic policy.

The concept of ideational embeddedness allows me to answer the question of how the PEV market is ideationally embedded, but it is Somers and Block's (2005) theory of epistemic privilege that answers the question of why sustainability is the dominant embedding ideational regime. They use the concept of epistemic privilege to explain how free market ideas gained traction in two very different historical time periods. According to Somers and Block, ideas have the causal power to change the ideational regime that embeds a market. However, as they argue, not all ideas have this power, indeed the degree to which they do is an empirical question. To describe the advantage some ideas have over others, Somers and Block use the term epistemic privilege. In their analysis, they ask and answer the question: what gives ideas epistemic privilege? In part, epistemic privilege comes from a "goodness of fit" or the elective affinity between ideas and other ideas, and/or between ideas and particular groups of people. But, as Somers and Block suggest, it is not only a goodness of fit between ideas, local context, and social groups that give ideational regimes dominance. They argue that internal claims to veracity, or a means of making themselves as "true" is what give ideas the power to establish themselves as a dominant regime, overturning the existing ideational regime in the process. Somers and Block (2005) explain the process through which a new ideational regime can overturn an existing one:

> To convert one ideational regime to another, the challenger must meet three difficult requirements. The new theory must, by means of its own logic, be able to demonstrate why the currently dominant ideas can only fail to solve society's problems. It must be able to explain how intelligent people could have been so misled. And it must be able to provide an alternative view of social reality by means of a more compelling public narrative. (p. 271)

In their analysis, market fundamentalism comes equipped with three factors that give it the epistemic privilege or "epistemological bootstraps" to meet the challenges of toppling an existing regime.

Though I cannot offer a comprehensive analysis of the rise of sustainability in this dissertation, some understanding of the factors that allow sustainability to exist, as the embedding ideational regime of the PEV market, is important for two reasons. First, these factors help to explain the power of sustainability ideology to create a material change as it is taken up by consumers when they engage in (e)valuative practices. Second, understanding these factors illuminates how ideas of sustainability influence the PEV market through environmental, social, and economic policies, and also through academic and policy research, which itself is instrumental in supporting this ideational regime and shaping the PEV market.

I argue that there are several factors which support the epistemic privilege of sustainability. For ideas of sustainability to take hold, people must be convinced that environmental resources are finite, and that their continued consumption is necessary for maintaining the current standard of living characteristic of late industrial society. They must also be convinced of the existence of a global ecological and socio-economic crisis resulting from the historical trajectory of socio-economic development. That political contestations increasingly emerge over how to balance ecological preservation and socio-economic development suggests the success of sustainability in setting the parameters of an existing crisis. The existence of this sustainability crisis is further sustained by academic and policy research, which offers scientific empirical proof of ecological resource depletion and anthropogenic climate change alongside "empirically tested" models of paths toward sustainable development.

Sustainability must offer a convincing solution to the sustainability crisis, which it does by employing the concept of sustainable development. Sustainable development is not just the idea that simultaneous economic growth, social justice, and ecological preservation are both possible and desirable, but also represents a programmatic statement addressing the problems created by previous or "unsustainable" paths of socio-economic development. The narrative of sustainable development incorporates two key factors: individual behavior change and technological innovation, which represent the mechanisms through which sustainable development becomes an achievable state. These two mechanisms build on the myth of the responsible consumer and the ideals of technological utopianism respectively.

The Responsible Consumer

Sustainability ideology supports a shift in responsibility for the production and therefore, mitigation, of environmental risks toward the individual and away from the state and corporations, connecting democratic citizenship with consumer behavior (Hobson, 2013). It is Beck (1992) who argues that concurrent processes of individualization and globalization resulted in increased awareness of a perceived relationship between individual experience and global events. This relationship is frequently understood as the causal link between aggregate individual consumer behavior and global ecological issues. Building from Beck's argument I propose that anthropocentric environmentalism and the reflexive critiques of industrial processes characteristic of risk society, in tandem with a dominant culture of individualism in the U.S. encourage a self-oriented experience of environmental risks which further sustains this connection. That people perceive and experience ecological hazards as personal risk, supported

by the neoliberal myth of the empowered consumer produced and upholds the idea of the responsible consumer.

Calling for consumers to take on the responsibility of advancing sustainability goals through consumption sustains the existing economic system, perpetuating demand, while seemingly addressing the tension between economic development and ecological risk. The concept of the responsible consumer, which incorporates the moralizing aspect of the jeremiad against consumption but also the neoliberal construct of the sovereign consumer, represents the idealized market subject of sustainability ideology (Schwartzkopf, 2011). Indeed, when discussing the moral expression of neoliberalism, Amable (2011) notes that "many contemporary comments about capitalism and moral values insist on the fact that capitalism is efficient and sound, provided individual behaviour satisfies some minimal ethical requirement" (p. 12). Neoliberal ideology subverts capitalism's destructive tendencies to represent capitalism as morally neutral, shifting the moral responsibility to individuals within the system. From this perspective, "making capitalism more moral would make no sense; what is required is an increased ethical responsibility by individuals" (Amable, 2011, p. 12). What Akenji (2013) calls consumer scapegoatism simultaneously casts the consumer as both the driver of economic growth (through consumption) and the one who must bear the burden of bringing about an institutional, structural, and cultural shift toward a sustainable system. This occurs through a moralizing process of responsibilization wherein the constraints of the capitalist system of socio-economic development are imposed on consumers as a normative order (Giesler & Veresiu, 2014).

The nuances of the definitional meanings of 'responsible' offer a useful avenue for understanding the different dimensions of the "responsible consumer". The Oxford English

Dictionary enumerates several definitions of the word responsible, but four are of particular relevance in this case: 1) "being the cause or originator of something, deserving of credit or blame for something"; 2) "capable of rational thought" and "morally accountable for ones' actions"; 3) "capable of fulfilling an obligation or duty, reliable, trustworthy, sensible"; 4) "being in charge of something [or] appointed to look after something" (Responsible, 2010). These definitions allow us to see how the responsible consumer takes on several aspects, all of which serve to cast them as the source of and solution to sustainability concerns. Although this description of the ideal of the responsible consumer is necessarily exaggerated to provide an analytical account, articulations of the responsible consumer are based on these elements to a greater or lesser degree.

Sustainability ideology positions the consumer as responsible for creating the sustainability crisis, through the collective over-consumption of resources and disregard of their moral obligation to exercise consumer "sovereignty" to manage the harmful practices of producers (who are, after all, only answering market demand) (Akenji, 2013). This element of shared responsibility draws on the fundamental core of neoliberal ideology that holds the market, in particular individual market choice, as the solution to social, financial, and environmental problems (Mudge, 2008). The second and third definitions illustrate another aspect of the responsible consumer—that they are capable of rational thought, and empowered by this capability to engage in responsible consumption, or ethical consumption practices. Finally, the last definition of responsible points to the conceptualization of the responsible consumer as the agent of change, in charge of bringing about sustainability by implementing sustainable consumption practices. This final definition of responsible begs the question: how are consumers appointed to this position of responsibility? And who does the appointing?

The responsible consumer is not a natural market phenomenon, as even sustainability advocates recognize the need for educational campaigns and policy incentives to encourage responsible consumption. Instead, the responsible consumer emerges through a four-part process of material and rhetorical strategies of intervention articulated by Giesler and Veresiu (2014) as they deconstruct what they call the "responsibilization" of consumers. Responsibilization consists of four elements: personalization, authorization, capabilization, and transformation:

> *Personalization* redefines the solution of a focal social problem in terms of the development of a particular morally enlightened agent, the responsible consumer, and contrasts this consumer's individual desires, aspirations, and choice capabilities with an immoral other: the irresponsible consumer. *Authorization* draws on available economic, psychological, and other scientific expert knowledge to render the development and adoption of the responsible consumer subjectivity both economically and morally legitimate. *Capabilization* develops a market (products and services) for ethical self-management. And finally, during *transformation*, individual consumers adopt their new moralized self-understanding" (Geisler & Veresiu, 2014, p. 841).

Policy elites, intellectuals, market actors, the media, and consumers themselves are all complicit, to varying degrees, and with different motivations, in appointing the consumer as responsible for social change. As I explore later in this chapter, sustainability policy and academic research perpetuate and sustain the subjectivity of the responsibilized individual. Indeed, several critics point to the prevalence, in sustainable consumption literature, of individualist approaches to addressing environmental problems (Maniates, 2002; Middlemiss, 2010; Shove & Warde, 2002; Soron, 2010; Southerton et al., 2004; Spaargaren, 2003).

Technological Utopianism

Technological utopianism represents "a mode of thought and activity that vaunts technology as the means of bringing about utopia" (Segal, 2005 p. 10). Here technology refers to both the creation of devices and instruments and the method of implementing them in society. In

technological utopian thought, this process of technological development and deployment, as Segal (2005) notes, takes place within a rational, scientific, and ultimately elite system of governance. Marvin (1988) highlights the reference to technology in the original utopic vision of Thomas Moore from the 1500s. On Moore's island of Utopia, the residents achieve worldly paradise not only through pious living and communal spirit, but also through technical pursuits. Other scholars point to the significance of the role of technology in Enlightenment utopian thinking. Noble (1999) links the Gnosticism of medieval monks to modern strains of technological utopianism through the quest for transcendence, attributing a religiosity to society's relationship with technology (see also Davis, 1998). As modern thinkers adapted Gnosticism they moved away from otherworldly mysticism toward the ability to create an earthly paradise through technological innovation. This modern Gnostic mythos has been linked to a range of current marketplace mythologies where it inscribes consumer products with the omnipotence of technology (Best & Kellner, 2001; Giesler, 2012; Kozinets, 2008; Thompson, 2004).

Segal (2005) argues that the history of technological utopianism in the United States can be traced back at least as far as 1883. Nye (2002) suggests that, in American culture, the nation's founding narrative of manifest destiny is one of technological utopianism, specifically the conquest of nature through technology. Multiple expressions of technological utopianism have appeared to differing degrees throughout the history of the United States. These expressions share several common elements: a sense of optimism, a focus on the relationship between society and nature, and a teleological understanding of social development as progress toward a telos of the world in its ultimate perfection. Two of these expressions are particularly relevant to understanding how consumers on the PEV market come to take up ideas of sustainability. The

first, which I discussed above, is the technological "autopianism" embodied in the automobile. The second, digital utopianism, represents an important link between high-tech products and social progress; and technological innovation with financial success (Turner, 2006; TyreeHageman, 2013). The era of digital utopianism also saw the emergence of what Kozinets (2008) calls "techspressive ideology", referring to the belief that technology also represents the mechanism for the fulfillment of pleasure. Techspressivism was mythologized through the "geek chic" which, according to Kozinets, provided "technologically enabled role models of cutting-edge fashion, entertainment, and art" (p. 870). Both technological autopianism and digital utopianism connect technology with nature, with freedom and limited governance, and importantly, with consumer products. As such, they primed consumers for sustainability's articulation of technological development—in particular as it applies to PEVs, which represent both automotive technology and digital technology—and gave sustainability advocates a language with which to express this narrative in a familiar way.

The history of technological utopianism in the United States, and indeed in much of the West, suggests that this narrative aspect of sustainability ideology represents a variation of the long-held belief that progress represents continual technological innovation, which leads to social and material improvement. Wright (2006) explains that, "our technological culture measures human progress by technology: the club is better than the fist, the arrow better than the club, the bullet better than the arrow" (p. 4). In this sense the narrative of technological utopianism retroactively casts history as a story of progress that fits with its ideals, making technologically driven sustainable development seem natural, historical, and inevitable. At its most extreme, technological utopianism is not only teleological but tautological as well—if society is understood to be inevitably progressing toward utopia via technology, then

technological change occurs in service of this progression, regardless of the consequences of any given innovation.

Though alternative narratives exist, in the official and standard texts of sustainable development—policy and academic— PEVs (and the future of PEVs) are predominantly framed as an improvement to ICEV automobility or a co-existing alternative to ICEV automobility. This fits into a broader approach to sustainable transportation that Reese (2016) labels the "accelerate" or "progress" narrative and suggests that it reflects a teleological understanding of history as "an upward trajectory of scientific research and technological development, where each passing year brings humanity closer to a better future" (p. 157). In this future PEVs represent renewable energy technology that promotes the continuation of autonomously mobile drivers through sustainable energy consumption. This is true even among texts that are critical of dominant sustainable development goals and processes. PEVs are thought to sustain rather than challenge the current, unsustainable, system of automobility. The "accelerate" narrative is reflected in the interviews with PEV drivers and ICEV drivers alike, where respondents discuss PEVs as the vehicle of the future and a developing technology representing efficiency gains.

Sustainability's Political Face: Energy Efficiency and Climate Change

Much, though not all, of sustainability discourse positions recent rapid changing of the global climate, and the subsequent ecological and social consequences as human driven. Though climate change is undeniably an ecological, if anthropogenic, phenomena, sustainability ideology, which delineates a particular way of addressing the environmental and social ramifications of global warming and resource depletion (e.g., energy sustainability) is a political one. The governance of the relationship between nature and socio-economic development

involves not only the actions and institutions of nation states, but also non-state actors (e.g. transnational groups, corporations, consumers, and social movements) and institutions (e.g., intra-governmental accords, trading schemes, certification programs, and industry conventions) (Himley, 2008, p. 435).

In the United States, conceptualizations of sustainable development often form around issues of climate change and energy consumption. It is telling that in the United States the Department of Energy (DOE) rather than the Department of Transportation oversees and funds PEV research, development, and deployment. Prior to the formation of the DOE in 1977, the 1976 Electric and Hybrid Vehicle Research, Development, and Demonstration act tasked the Energy Research and Development Administration with sponsoring EV and HEV related research and development. This responsibility shifted to the newly formed DOE in 1977, which, under this act was directed to "cooperate with industry toward the following objectives: to promote basic and applied research on electric and hybrid vehicle batteries, controls, and motors; to determine optimum electric and hybrid vehicle design; and to design vehicles that emphasize durability, length of life, ease of repair, and interchangeability of parts" (Quandt, 1995, p. 848). Currently, within the DOE it is the office of Energy Efficiency and Renewable Energy (EERE) that manages the development and deployment of all efficient and renewable energy technologies, including PEVs (Link et al., 2015).

In the United States two foci of sustainability's political face emerge as particularly relevant to the PEV market. The first is anthropogenic climate change from greenhouse gas (GHG) emissions. The Earth's climate is defined as long-term averages as well as variations in land surface temperatures, atmospheric behavior, and ocean and ice levels. Climate change is estimated to increase rapidly, depending on the continued emissions of heat trapping gasses,

raising economic, ecological, technological, and other social concerns (Aldy et al., 2001; Clark & York, 2005; Walsh et al., 2014,). Founded in 1988, just one year after the Brundtland Commission released their report, the Intergovernmental Panel on Climate Change (IPCC) is a scientific body of 2500 scientists that assesses the development and associated risks of climate change and releases regular reports on the knowledge of climate change. The IPCC contributes to a large body of scientific research that provides empirical evidence of global warming, and shows how natural phenomena cannot explain the speed and magnitude of recent climate changes.

Growing awareness of climate change is both a motivator and product of sustainability discourse, and GHG driven global warming is closely connected to sustainable transportation research and policy, as personal transportation directly contributes to GHGs through tailpipe emissions. According to the International Energy Agency (IEA), in 2014 road transport was responsible for 23% of the total worldwide CO_2 emissions from fuel combustion (as cited in Santos, 2017). Until the 1970s, when the combination of "oil shocks" and a growing awareness of air pollution initiated a closer look at the negative consequences of automobility, United States transportation policy focused mainly on facilitating the use of private automobiles. By the early 1990s, global warming had not only drawn the attention of the environmental community, but emerged as a legitimate problem in the broader political arena. That being said, the construction of anthropogenic climate change as a social problem was not without opposition. Backed by the fossil fuel industry and its allies, an environmental countermovement arose, looking to delegitimize anthropogenic global warming and limit regulatory action (McCright and Dunlap, 2011). Despite this political antagonism, by the early 2010s environmental policy and energy elites had successfully reinvigorated energy security goals of the 1970s alongside

pressing climate and air quality goals. As Urry (2010) points out, “even the Pentagon has announced that climate change will result in a global catastrophe costing millions of lives in wars and natural disasters” (p. 193).

The second focus of sustainability’s political face is sustainable energy, the definition of which extends along a broad spectrum from energy efficiency and personal consumption, to industrial production and geo-politics. Conceptions of sustainable energy goals, in the United States, range from “no oil imports”, to the use of only renewable energy sources. In his 2012 State of the Union address, President Barack Obama spoke about energy security and environmental concerns calling for, “a future where we’re in control of our own energy, and our security and prosperity aren’t so tied to unstable parts of the world. This country needs an all-out, all-of-the-above strategy that develops every available source of American energy,” and promising action; “the differences in this chamber may be too deep right now to pass a comprehensive plan to fight climate change. But there’s no reason why Congress shouldn’t at least set a clean energy standard that creates a market for innovation. So far, you haven’t acted. Well, tonight, I will. I’m directing my administration to allow the development of clean energy on enough public land to power 3 million homes” (Text of President Obama’s State of the Union address, 2012). Around the same time, the United States Department of Energy revealed its program *EV-Everywhere* with the stated goal of enabling widespread adoption of PEVs by making them as “affordable and convenient for the American family as gasoline-powered vehicles” (DOE, 2013). The growing political struggle around GHG driven global warming, energy consumption, and the sustainability of resources, places PEVs in a position of increasing significance in automotive and energy markets and policy. In 2014 then United States Secretary of Energy Ernest Moniz stated, “We are addressing our energy challenges with, first of all, I

would say three major objectives in mind. One is to support economic growth, good jobs, et cetera. Secondly is to reinforce our security. And third and perhaps, in my view, of greatest interest right now is addressing the climate challenge" (Climate One, 2014). Three years after his state of the union address, Obama continued to frame climate change as a prominent political issue. In a speech given just before Earth Day 2015 U.S. President Obama once again identified climate change as a central economic, environmental, and political concern, stating that "there's no greater threat to our planet than climate change." (Weekly address: Climate change can no longer be ignored, 2015). Climate change, in particular global warming, represents a central focal point for the political debate around achieving sustainable development and the above remarks are representative of the broader global sustainability discourse that links environmental depredation with social justice, technological innovation, and economic development.

In practice, much of the focus on sustainable energy overlaps with climate change concerns, where sustainable energy is, at least in part, defined as emission-free energy production and consumption. However, as Littlefield (2013) notes, in the United States, the concept of sustainability is often used in connection with energy security, where energy security is defined as "national security" and the movement away from foreign sources of fuel or define as finding an alternative, reliable source of energy. Narratives of sustainable energy from different and often opposing interest groups construct and employ concepts of ''security,'' ''independence,'' and ''sustainability'' in distinct ways. Some research indicates that adherents to different understandings of sustainable energy often fall along party lines, where conservatives connect sustainable energy to "no oil imports", national security, and economic benefits, while liberals see energy security in the form of a broader range of energy sources, and connect sustainable energy with environmental resource protection (Hess et al., 2016; Hess & Pride

Brown, 2017; Mayer et al., 2016). However, among my participants, their conceptualization of sustainable energy was often articulated as a combination of environmentally safe, reliable or renewable, and produced in the United States. In the opinion of LEAF driver Sven the sustainability crisis represented the political, economic, and environmental costs of oil as an energy source and was due in part, to the energy needs of individual drivers. "*I think that we have to have an alternative. Alternatives to combustion based transportation. Large vehicles can burn natural gas and oil and even coal. But a large proportion of America's energy needs is in propelling single driver vehicles down the road. So that's where people, individual actions can actually make a big difference. Well, I'm a scientist so I guess you could say I'm familiar with the global warming story and certainly aware of the costs to the United States of not being energy independent and those include overseas wars. They include being seen as the equivalent of the Star Wars evil empire by most of the rest of the world and it's just damaging. It's damaging in so many different ways, environmental ways, social ways, political ways. I think it's important that we become energy independent and I know very well that we can't do it by drilling more oil. It wouldn't be wise to do it by fracking the entire Eastern Seaboard either. All these things have a cost. Even green technology has a cost and certainly we're aware of that. Silicon cells have to be made and that costs a lot of energy and it wastes a lot of energy to do that. But I think that's more manageable. Waste control is a science that is quite well developed so we can manage that. What we can't manage is relying on these overseas suppliers. As China grows there's just going to be more and more competition for those resource*."

In the United States sustainability ideology, as it is expressed through the rhetoric of transportation policy elites, takes the form of narratives of the political volatility and threat to the United States from oil-producing parts of the world, the growing demand from industrializing

countries, unpredictable price fluctuations, and finite natural resources—all of which reinforce the long held image of a country facing a limited and unstable source of energy (Reese, 2016) Indeed, the concept of energy security is not new, in the early 1970s President Nixon launched Project Independence, with the stated goal of achieving energy independence by the 1980s. President Nixon pronounced, in his 1974 State of the Union Address, "Let it be our national goal: At the end of this decade, in the year 1980, the United States will not be dependent on any other country for the energy we need to provide our jobs, to heat our homes, and to keep our transportation moving" (Nixon, 1974). Sustainability discourse revitalizes these concerns, offering solutions that take the form of a shift to low-emission energy production, the development of zero emission vehicle technology, and accelerated scientific research. Significantly, these solutions can be offered as fixes for climate change, environmental damage, and energy security alleviating both energy security concerns and ecological concerns, and potentially spanning both sides of political debates that run along party lines.

Political elites promote energy efficiency as an effortless way to reduce carbon emissions. As 2009 US Secretary of Energy Stephen Chu explained, "the quickest and easiest way to reduce our carbon footprint is through energy efficiency. Energy efficiency is not just low-hanging fruit; it is fruit that is lying on the ground" (as cited in Shove, 2017). To many stakeholders, PEVs embody reduced carbon emissions and sustainable energy, and consequently represent a key facilitator of sustainable development. In the United States, transportation represents the largest individual source of GHG emissions, with 28% of the average resident's carbon emissions coming from personal vehicles (Shulman et al., 2012). The dominant system of automobility means that many people depend on cars to accomplish most of their day to day travel, and research shows that trips using personal cars constitute more than 80% of individual

travel (Biggar & Ardoin, 2017). Changing transportation behavior offers a convenient means for sustainability advocates to set and meet seemingly straightforward sustainable development goals. The perceived symbiotic relationship between PEVs and energy efficiency ostensibly offers further opportunities for sustainability oriented policy to make concrete transformations that represent sustainable development. For example, substituting electricity from the grid for liquid fuels, it argued, can achieve several goals including: addressing air pollution and climate change through reduced emissions of pollutants and GHGs, moving away from a dependence on foreign oil, and diversifying energy sources for transportation. Such goals have prompted governments and non-state entities to set targets and mandates (e.g., zero-emission vehicle mandates, fuel economy regulations) to encourage the production and marketing of PEVs on the one side, and to promote uptake through investment in PEV charging infrastructure, promotional efforts and subsidies for new vehicle purchases on the other (International Energy Agency, 2017). The most recent of intra-governmental accords, the Paris Agreement which sets a long-term goal of net zero emissions and the complete decarbonization of the transport sector, was ratified by several governments including the United States in November of 2016.

In the United States, these political narratives of sustainability employ energy efficient technologies and consumer behavior change—the uptake of these technologies—as self-evident solutions to the sustainability crisis. These narratives tap into technological utopianism, suggesting that the consequences of long-term increases in energy consumption can be mitigated by increasing the speed of scientific research and technological development. It follows that policy directives work toward finding and using less fuel and reducing resource consumption to meet current energy demands, but often fail to address what constitutes these energy demands. The bureaucratic face of sustainability ideology is expressed in policy approaches to energy

consumption that foreground technology oriented toward fuels and resources, ignoring other aspects of energy demand. Moreover, as Shove (2017) points out, "in trying to tease generic aspects of energy performance out of such specific configurations, programmes and policies of energy efficiency necessarily miss what matters" (p. 6) and may fail to prevent untenable increases in energy consumption.

Sustainability's Bureaucratic Face: Energy Consumption and Transportation Policy

Given the diversity of sustainability policy approaches, for purposes relevant to the analysis in this dissertation I review mainstream policy approaches as they relate to sustainable consumption—especially energy and transportation consumption in the United States. In general, mainstream sustainable transportation policy approaches position consumers as responsibilized subjects, producing regulatory mechanisms aimed at changing individual behavior through what Soneyrd and Uggla (2015, p. 914) refer to as "governing through free will". Here we see how the myth of the responsible consumer drives the design and implementation of sustainable transportation policy, which ultimately fixes on individuals as the lever of socio-economic change. Thus, even as policy builds on the concept of the "responsible consumer" it is, at the same time part of the responsibilization process, producing and legitimating this consumer subjectivity.

The argument behind promoting consumer-based initiatives is that there will only be continued production of PEVs if there is a market for them. As such, policymakers believe that consumer acceptance of electric drive technology is the key to a successful sustainable transportation sector (Ozaki & Sevastyanova, 2011). Indeed, this consumer oriented approach assumes that it is the uptake of PEVs by consumers, to meet their everyday mobility activities

that will bring about sustainable transportation and ultimately contribute to solving the sustainability crisis. To that end, even the regulation of automotive production is shaped with the promotion of private, personal vehicle use in mind. The effectiveness of a given PEV policy is measured by its success in terms of adoption rates. This focus on consumption and the responsible consumer means that sustainable energy and transportation policy are relevant to understanding PEV valuation, as policymaking influences the construction of the emerging market, particularly the construction of consumer subjectivities within this market.

Policy approaches that aim to change transportation and energy consumption behavior are rooted, for the most part, in microeconomics (e.g. rational choice models, pricing, market structure); behavioral economics (e.g. bounded rationality, framing effects, decision heuristics); technology adoption models (e.g. diffusion theories), and social and environmental psychology (e.g. self-efficacy, social communication, theory of planned behavior, pro-environmental attitudes, value-belief-norm theories). In terms of reaching consumers specifically, policymakers at the national and local level often apply measures that assume individual behavior is guided by free will and that consumers, as choosers, are susceptible to intervention strategies such as price shifts or moral arguments that make certain choices more attractive. Here, neatly articulated, is the idea of the responsible consumer, who if educated about the ecological and economic consequences of their consumption practices, will have both the power and inclination to change their market choices. This necessarily positions individuals as consuming objects who act out their lives according to individual, rational choices (Soneryd & Uggla, 2015) with limited interference from external social forces. Where policy approaches do consider the context of individual behavior it is usually to determine what factors act as barriers to or motivations for choosing sustainable behavior. Soneryd and Uggla (2015) call such policy measures

"technologies of responsibilization" which "are designed to help individuals address these responsibilities by informing, guiding, and providing products and tools facilitating individual choice" (p. 914).

Behavior oriented transportation and energy consumption policy measures fall into three categories based on whether their intervention strategy aims to facilitate behavior change through informational campaigns, foster behavior change through incentives and counter-incentives, or force behavior change through regulation and mandates. In the PEV market, policy measures that fall into the last group are generally directed toward manufacturers, such as zero-emission vehicle (ZEV) mandates, low carbon fuel policies, fleet vehicle mandates, and transportation planning requirements. However, there are several examples of policy measures that force sustainable behavior change in consumer markets in general, such as banning single use plastic shopping bags or the sale of incandescent light bulbs.

Information campaigns represent the foremost policy approaches put into practice. These approaches, in general, assume an information deficit among consumers and attempt to address this deficiency by disseminating information about unsustainable behavior and its related consequences. As I noted above, these policy measures rely on individuals to act on new information and increase their "ethical" consumption practices in order to meet sustainable directives, taking for granted a causal link between policy, attitude, and behavior. Rather than attempts at manipulation, these approaches are clearly articulated to consumers, who often support the logic behind them. This was reflected in the accounts of consumers I interviewed. When asked about policy incentives during an interview a non-PEV driver explained, "*Government incentives are very important and should be maintained but I think it's not enough. A lot of these shifts are shifts in mental paradigm. You really have to believe that the electric car*

is the right thing." Although they had not purchased a PEV, this interviewee's response suggests that they too make this conceptual link between one's attitude toward PEVs and subsequent actions, and that the appropriate method for increasing PEV purchases is not financial incentives or travel perks, but affecting a mental paradigm shift among consumers. In part, as I discuss in more detail below, the belief in the causal relationship between attitudes and behavior expressed in both policy and in consumer narratives comes from the individualist, rationalist perspectives that dominate psychology and diffuse to wider populations through academic and popular discourse (Batel et al., 2016).

Such 'information deficit' models have been widely criticized on theoretical and pragmatic grounds—for failing to take into account social, cultural, and institutional contexts that shape attitudes and behavior, for the veracity of the information presented, and for their framing of issues of sustainability (Akenji, 2013; Maniates, 2002; Owens & Driffill 2008; Shove, 2010; Spaargaren, 2011). Some critics argue that attitudes and subsequent behavior are influenced by a variety of factors aside from information provision. They suggest shifting to policy measures that move beyond or look to complement information campaigns, including directing efforts toward reducing barriers to action or accounting for other influences on behavior. Research on educational campaigns suggests that providing information may in some circumstances influence attitudes on issues like energy and the environment, but often have limited impact on behavior—otherwise known as the attitude-behavior gap. Additionally, led by sociologists, there is some criticism of the presupposed link between attitude and behavior that forms the basis of the theoretical foundations that undergird behavior-oriented policy approaches.

In part behavior-oriented approaches are popular among policy elites because they are usually inexpensive, easily implemented, and invoke a powerful discourse of individual freedom that resonates with people. They also persist not because they are successful, but rather because they are not. Marsden and colleagues (2014) draw on extensive qualitative interview data with policymakers in the United Kingdom to suggest that there is "an expectation in local and national government that measures on reducing carbon have to be consistent with policies that support economic growth" (p. 75). They argue that the connection between automobility and economic progress in our current capitalist, car-based automobility system makes policymakers reluctant to profoundly alter travel behavior. In their words, "decision-makers tacitly accept the counter-argument that the focus on choice will have limited impact on behavior;" even as they continue to promote these kinds of policy measures, because "the behaviours that decision-makers would like to promote tend towards increased travel, as this is believed to have a causal connection with economic development" (Marsden et al., 2014, p. 76). With likely a wide range of motivating factors, supporting informational policy measures is common among political elites who advocate sustainable development, though the research focus for PEV consumption literature is shifting to more incentive based methods of encouraging behavior change.

To promote energy saving behavior, policymakers also employ economic initiatives. Sustainable transportation policy initiatives offer incentives toward the purchase of PEVs (often based on the type of vehicle) and electric vehicle supply equipment (EVSE). In the United States, the federal government passed the American Clean Energy and Security Act in 2009, introducing a tax credit of up to $7,500 for new PEV purchases. Since then, a number of regional governments (state, county, and city) have enacted a variety of PEV incentives to promote consumer uptake. In California, where the majority of my respondents lived, the Clean Vehicle

Rebate Project offers up to $7,000 in electric vehicle rebates on top of the federal tax incentive. In some cases, incentives take the form of purchase rebates, tax credits, discounted purchase taxes for both the vehicle and the purchase and installation of EVSE, vehicle registration fees, high-occupancy vehicle (HOV) lane access, and city parking benefits. Additionally, governments are partnering with corporations to offer incentives such as workplace charging, and with utility companies to offer incentives such as preferential electricity rates for charging. In California, many companies, particularly high-tech companies (e.g., Google, Apple, Qualcomm, Facebook, Netflix, Sony), offer charging opportunities and PEV purchase incentives to employees.

Policy approaches that use incentives, particularly financial incentives, to promote sustainable transportation behavior in the form of PEV purchase and use are based on the understanding that consumers are rational actors seeking to maximize utility. To a great extent drivers are seen as fixed, risk averse, and unlikely to embrace significant mobility changes without intervention. Research on consumer PEV adoption frequently looks to the characteristics of consumers including their range expectations, their reluctance to try new technology, their lack of the characteristics of early adopters, and their unwillingness to pay, as immutable elements of demand (Hui, 2017). As Reese (2016) notes "they [consumers] are understood to be drivers, and American drivers at that: they like their cars big, comfortable, and fast; and they will continue to do so well into the future. This expectation sets the bounds for possible transformations of the automobile. The American driver-consumer will not change, so technology must" (p. 158). Here we see how the entrenched system of automobility shapes how policymakers and academics perceive potential PEV consumers as drivers. The belief in the transformational power of technology, though it acknowledges external constraints on individual

action, represents a form of technological utopianism, which assumes that technology alone can affect ecological preservation through innovation rather than changing patterns of mobility.

Though I believe Reese's description is necessarily exaggerated for analytic purposes, the entrenched system of automobility does include normative assumptions about mobility needs, which may or may not reflect actual mobility practices. These assumptions shape and are reproduced by policy measures and in consumers' understandings of their own mobility practices. Consequently, policy approaches are designed within a framework in which some values and needs are understood to be nonnegotiable to the consumer and must be managed through incentives and technological development (Soneryd & Uggla, 2015). Framing the transition to sustainable mobility as a problem of individual adoption and assuming driver needs and desires are static necessarily positions the PEV in comparison to the ICEV. As Hui (2017) notes,

> Imagining that consumers would purchase EVs instead of ICVs – that they are items to be chosen within a market of "cars" – paradoxically establishes a relationship wherein EVs are assumed to be comparable to and substitutable with ICVs at the same time that governments encourage and incentivize them due to their difference from ICVs. Moreover, comparisons routinely made between EVs and ICVs do not place them on even terrain. ICVs are positioned as the benchmark, against which EV performance is judged. (p. 5)

Consequently, by attempting to substitute the PEV for the ICEV this approach to promoting adoption ends up working against itself when the PEV cannot meet existing consumer needs in the same way (Mom, 2004).

While policy efforts demonstrate the prioritizing of electric vehicles, they hinge on PEV uptake, seeking to change behavior by focusing on individual choices, thereby positioning individual consumer behavior as the means of achieving sustainable transportation goals. Sustainability's focus on accelerating technological development necessitates mechanisms to

facilitate and promote diffusion of efficient technology. Reese (2016) explains, "the driver-consumer plays a pivotal role in the envisioned technological change: producing an advanced vehicle will only solve the challenges of oil consumption and climate change if a significant number of consumers buy and use that advanced vehicle" (p. 158). Consequently, policymakers believe getting answers to the question of why people are buying (or not buying) PEVs will enable them to develop strategies to encourage and increase adoption. In the following section I review more closely sustainable consumption and PEV consumption behavior studies that inform much of behavior oriented sustainable policy.

Sustainability's Intellectual-Professional Face: PEVs as sustainable products and PEV adoption as sustainable consumption

Stimulated by the growing belief in the transformational power of alternative fuel vehicles alongside funding from industry and state sources, an increasing number of researchers are examining the PEV market. Articles on PEVs and consumers generally begin by presenting some environmental or sustainability bona fides— associating PEVs with these phenomena broadly, or energy efficiency and reduced climate change more specifically. PEVs are thought to provide a number of advantages over ICEVs including, but not limited to, reduced emissions of GHGs and other pollutants (Supekar et al., 2013; Axsen et al., 2011; Samaras & Meisterling, 2008; Stephan and Sullivan, 2008; Duvall et al., 2007), increased incorporation of renewable energy sources into the electricity grid (Finn et al., 2012; Palensky & Dietrich, 2011), and better organization of local electricity allocation (Shao et al., 2012). At the same time, researchers are increasingly studying how PEVs can help achieve climate and energy goals. This research

incorporates a broad range of topics from different types of PEVs and various competitor vehicle propulsion technologies to energy supplies and infrastructure.

PEV consumer research draws on theoretical, methodological, and topical approaches from transportation literature, marketing and business school research on consumption, studies of pro-environmental behavior, and the broader body of sustainability research. PEV research, funding, and policy, frame PEVs as a sustainable product and thusly, PEV consumption as sustainable consumption. It follows that the principal theoretical and methodological approaches from sustainable consumption research influence the study of PEV consumers. Sustainability scholar Tim Jackson (2005) gives a comprehensive account of the varying approaches to studying sustainable consumption in his review, but here I discuss only those that prevail in PEV research, which focus on purchase intentions and purchase behaviors, theorizing different antecedents or predictors that motivate behavior, using quantitative methods to test these models of consumer behavior at the point of purchase (Rezvani et al., 2015). Despite a growing number of critiques, in PEV market academic and policy research, the approaches that employ the concept of the (more or less) rational actor and that draw on psychological theories of norms, attitudes, and behavior and/or econometric models, continue to be seen as the ones best suited to understanding and changing consumer behavior.

To contextualize my research within the field of PEV consumer behavior research and explain how my approach represents a unique theoretical and methodological exploration of PEV consumers, in this section I provide an overview of the academic literature on PEV consumption. Following Liao and colleagues (2016) I divide the theoretical and methodological approaches that make up the bulk of PEV consumer research into two groups: those that are primarily economics based and those that are primarily psychology based, both of which I explain in more

detail below. I also discuss the two sociologically informed theoretical frameworks that, despite their current marginality, are becoming increasingly popular in sustainability research (Spaargaran, 2011). I also briefly discuss how existing research on PEV consumption fits into the broader literature on "sustainable" consumption, or consumption of certain types of products as solutions to environmental sustainability concerns—variously referred to as green consumption in terms of environmentally conscious consumption, or as ethical consumption, critical consumerism, political consumption, or sustainable consumption in terms of social, economic, and environmentally conscious consumption (Connolly & Prothero, 2008; Peattie, 2010; Willis & Schor, 2012).

As I noted in Chapter 2, the majority of applied research on consumption, from the post-war period until very recently, came mainly from an emerging discipline of consumer behavior that built heavily on econometric and mainstream, cognitive social psychological approaches. Warde (2017) explains how, "within sociology consumption holds a morally ambivalent status and has often met with moral censure. It is thus controversial. Although omnipresent and ineradicable, consumption often seemed a rather frivolous topic for social scientific investigation. Empirical research explicitly about consumption was scarce, indeed almost nonexistent, within sociology until the end of the 1980s" (2017: p. 2). As a result, empirical studies of consumption during this post-war period became the purview of economics, psychology, and marketing rather than sociology. Moreover, although sociological insights are increasingly appearing in studies of consumer behavior, these foundational disciplines continue to dominate the ontology and epistemology of consumer behavior research, in particular among work done outside of academia, including industry and policy research on sustainable consumption and PEV consumer research.

The discipline of consumer behavior, often oriented toward commercial and policy purposes, brings together theories and methods from economics and psychology to pursue questions about marketing influence, market segmentation, and consumer purchase decisions. Economists examine consumption as the act of purchase, revealing patterns of consumer behavior based on statistical analyses of expenditure. Psychologists, on the other hand, look to the motivations that drive consumer behavior, focusing on explaining how values and attitudes translate to action. The upshot of this orientation is that much current consumer behavior research, even if it is not for commercial purposes per se, assumes freedom of choice and understands consumer behavior as negotiated at the individual level, mostly independently from social influence. As I noted above, the research community produces and maintains the ideational elements that give sustainability epistemic privilege. As such, the approaches from economics and mainstream cognitive psychology used in consumer behavior research are both theoretical and political, contributing to the production and maintenance of sustainability ideology partially as a discourse but also in part by constructing and re-presenting notions of decontextualized rational actors and consumer responsibilization (Batel et al., 2016). This is especially true of research on sustainable consumption, transportation, and consumer behavior in the PEV market which is mostly based on either statistical modeling techniques or cognitive psychological theories of behavior.

As a result of its disciplinary roots and focus on purchase choice, sustainable consumption research wrestles with the perceived "attitude-behavior gap", where environmental knowledge and environmental values seemingly fail to translate into action. However, as Shove (2010) notes, the attitude-behavior "gap is only mystifying if we suppose that values do (or should) translate into action" (p. 1276). In general, sustainable consumption researchers, coming

from the attitude-behavior approach, often attempt to identify and cultivate a category of actual or potential "sustainable" consumers based on attitudes and beliefs. Upon discovery, these consumers are thought to represent a group whose behavior can be modeled and targeted for influence, which ultimately will have a broader applicability. As such, this literature attempts to identify the barriers to and enablers of translating environmental belief into "pro-environmental behavior", of which, as Shove (2010, p.1275) points out, there are no obvious limits. From there, researchers move to searching for the combination of information and incentives that will motivate consumers to shift toward sustainable consumption by changing their attitudes and beliefs, particularly in policy oriented research. The focus on the "attitude-behavior" gap is a result of an epistemological stance coming from psychology and reproduced in sustainable consumption research, where the locus of understanding behavior rests within the individual, and the idea that social change depends on individual behavior, which is in turn driven by values and attitudes. Sustainable consumption research employs the concept of the responsible consumer who, with a high degree of conscious decision-making, can choose to change their behavior toward making sustainable consumption choices, or less frequently, the predictably irrational actor, who can be manipulated into changing their behavior (Batel et al., 2016; Shove, 2010).

This is not to say that the attitude-behavior approach goes uncontested. Scholars, particularly coming out of sociology, have challenged what Shove (2010) calls the ABC model—(A)ttitude—(B)ehavior—(C)hoice as it is applied to sustainable consumption, calling for increased focus on social context and social practices rather than individual choice as a means of addressing sustainable consumption (Akenji, 2013; Gabriel and Lang, 2006; Sahakian et al., 2013; Shove & Warde 2002; Spaargaran, 2011; Warde, 2005, 2014). Peattie (2010) also calls into question attitude-behavior based models, arguing that they "represent single snapshots

of consumers' perceptions of very specific aspects of their lives and behaviors, which may tell us very little about their lifestyles, environmental impacts, and ability to move toward significantly more sustainable forms of consumption" (p. 218) These critiques suggest that existing approaches to sustainable consumption rely on a narrow understanding of human behavior and neglect the more pressing problems concerning ecological, social, and economic sustainability and their underlying causes.

Liao and colleagues (2016) note that, "economic studies focus on estimating the taste parameters for attributes which denote their weights in the decision" (p. 254) to purchase a PEV. Research that falls into this category generally starts by looking at vehicle attributes as the barriers to drivers of PEV purchases, and assumes that consumer desires are static and can be analyzed in isolation from the larger social context. In the PEV market, where there exists a limited amount of data on consumer purchase behavior (due in part to the newness of the market), researchers often substitute stated preference (SP)—expressed willingness to adopt—for revealed preference (RP) or actual adoption behavior. Only recently have researchers been able to access large sample populations of PEV buyers for collection and analysis.

Researchers use discrete choice experiments, similar to the design game used in our survey instrument, to collect SP data from the choices respondents make based on a given set of alternatives. These choice experiments often focus on vehicle attributes as barriers to adoption, and as such, ask respondents to choose among a range of both attributes and incentives that impact their decision to purchase a PEV. To identify both the barriers and incentives to PEV purchase choice, these studies generally include financial (e.g., purchase price, operation price, fuel price), technical (e.g., driving range, recharging time, vehicle type, vehicle performance), infrastructure (e.g., public charging stations), and policy (e.g., tax rebates, HOV lane access, free

parking) attributes (see Liao et al., 2016; Rezvani et al., 2015 for reviews). For example, in a recent study Higgins et al. (2017) used a discrete choice experiment administered via survey to a large group of potential new car buyers in large cities (n = 961). The choice exercise was designed to reveal how consumer demand for PEVs might respond to a range of different advancements in electric drive technology. To measure this, the survey asked respondents to select one of four different powertrains (ICEV, HEV, PHEV, or BEV) across a variety of real and hypothetical price and technology combinations. Higgins and colleagues used multinomial logistic regression to analyze the relative impact that changes in technology and price had on the demand for each type of powertrain. Researchers commonly use discrete choice models and logit or probit regression to calculate the probability of a PEV being chosen among alternatives under the influence of consumer preferences.

Other PEV consumer researchers use Agent-based modeling (ABM), to assess market scenarios based on the hypothesized actions of consumers, automakers, policymakers, and suppliers (see Al-Alawi & Bradley, 2013 for a review). ABM is a forecasting method which creates a virtual environment to simulate a system model wherein the researcher sets the parameters and internal characteristics of actors within an analytically bounded system, such as the PEV market. These attributes are thought to determine the action and interaction of the entities and individuals within the market, revealing the potential outcomes of different sets of market conditions created in the modeling environment. Researchers using this method argue that it can help predict potential outcomes, reducing uncertainty in the design and implementation of policy measures and technological changes.

Psychology based studies, on the other hand, “focus on the motivation and process of decision-making by examining the influence of a wide range of individual-specific psychological

constructs (attitudes, emotion, values etc.) and perceptions of EV on intentions for EV adoption" (Liao et al., 2016, p. 254). As PEVs are positioned as eco-friendly products, PEV purchase and use is often understood as pro-environmental behavior. PEV consumer literature that draws on psychological theories to explain this behavior, per se, falls into two groups based on their explanatory focus. In general, research from both groups employ statistical models to identify which variables represent the motivators and barriers to PEV adoption, regardless of whether they are vehicle attributes or value systems, though there exists a minority of studies that employ qualitative data collection and analysis methods. The majority of PEV consumer studies incorporate pro-environmental and pro-social attitudinal measurements (variously defined and operationalized) as a significant, potential motivators of PEV purchase intentions or recently, purchase behavior.

The first group represents work that follows a Theory of Planned Behavior (Azjen, 1991) approach. The Theory of Planned Behavior (TBP), which is frequently used to understand consumer behavior in the context of sustainable consumption practices, links attitudes with behavior as part of a volitional process of individual action. This approach frames consumer behavior as the outcome of conscious reflection on the benefits and drawbacks of engaging in the behavior in question. TPB is a variation of rational choice theory, which asserts benefits and utility maximization as the basis of human behavior. Scholars in this group consider consumer behavior as more or less rational behavior, and measure consumer attitudes toward PEVs or toward "pro-environmental" behavior in general as a way to predict purchase intentions. TPB and its predecessor the Theory of Reasoned Action (Fishbein & Ajzen, 1975) both assume that individuals make decisions based on the rational evaluation of available information about behavior choices and the consequences of these choices. The core principle of this theory is the

proposition that behavior is directly predicted by intention, which is driven by attitudes and subjective norms. Here, attitude is defined as the sum of the perceived costs and benefits of the consequences of a behavior (i.e., buying a PEV) (Bamberg and Möser, 2007, p. 16). TPB scholars study consumers' attitudes toward PEVs in general and attempt to isolate their perceptions of elements of PEVs to better identify what aspects represent barriers to consumer adoption. In this research, attitudinal measurements generally include questions about technological, financial, and infrastructure related attributes to operationalize consumer attitude toward PEVs and suggests a number of barriers and motivators to adoption including: high purchase cost of PEVs, perception of PEV oriented policy, technical features of the vehicle, knowledge about PEVs, the feasibility of adoption, and the perception of the general and local opinions surrounding PEVs.

The TPB framework suggests that two contextual factors influence consumer purchase intentions: perceived behavioral control (PBC— the perceived feasibility and effectiveness of the behavior) and subjective social norms (the perceived expectations of a given reference group). These two variables are often incorporated into studies that measure consumer attitudes and subsequent behavior (or intent). And indeed, researchers using discrete choice models often draw on the TPB to explain how measuring consumer attitudes toward PEV attributes translates into a measurement of their intention to buy PEV. In TPB based analyses, PEV researchers also look to identify the market conditions that impact whether consumers are able to convert a pro-environmental attitude into action, including consumer access to information about the benefits of PEVs and related technology and the availability of different types of PEVs. The TPB approach reinforces the ideal of the responsible consumer, suggesting that through changing

attitudes and removing barriers to action, consumers can be responsiblized to act as "ethical" consumers.

The second group of work draws on the Value Belief Norm theory (Stern, 2000; Stern et al., 1999). The Value Belief Norm (VBN) theory, which builds from Schwartz's (1977) Norm Activation Model (NAM), proposes that consumer behavior can be explained by individual beliefs and internal norms (referred to as personal norms). In the NAM, the internal expectations of conduct that people hold for themselves are activated by beliefs, themselves influenced by personal values. Schwartz identifies four dimensions of personal values: 1) altruistic (self-transcendence), 2) self-interested (self-enhancement), 3) conservation (traditionalism), and 4) openness to change (liminality). Stern's VBN theory applies this model to pro-environmental behavior, arguing that beliefs related to the ecosystem and the environmental impacts of human activity activate personal norms in the form of moral obligations to act in environmentally friendly ways, which ultimately influence adoption behavior and/or intentions. VBN approaches have also incorporated symbolic meanings, affective attributes, and identity theories into their analyses.

Studies that draw on VBN theory to explain sustainable consumption often look to the New Environmental Paradigm (NEP) scale to measure people' pro-environmental values. The NEP represents a way of describing and measuring a set of values (a worldview) based on beliefs about the adverse consequences of environmental change (Dunlap, 2008; Dunlap et al, 2000;). Scholars working from the VBN approach suggest that the development of pro-environmental values, and subsequent personal pro-environmental norms, are central to generating sustainable consumption and support for pro-environmental policy measures. However, Stern himself, along with others, argues that consumer concern for the environment will not necessarily result in pro

environmental behavior and that there is a gap between the environmental values and behavior (Oliver and Rosen, 2010; Kollmuss and Agyeman, 2002; Stern, 2000).

Both models share the belief that behavior is driven by voluntary choice, based on conscious, reflexive assessments of the consequences of particular behavior. The difference is in how each explains what shapes consumers' positive valuation of adopting a PEV. TPB views consumers' needs and desires as static, thus consumers value PEVs when the outcome of purchasing one meets these needs and desires. Consequently, the goal for TPB scholars is to identify consumer needs and desires to ensure that PEVs can meet them. This, they believe, will allow policymakers and other stakeholders to influence intent to purchase by ensuring that the perceived outcomes of purchasing a PEV are valued positively. In VBN theory, the motivation to purchase arises from pre-existing internal values and norms, and consumers are understood to value PEVs when they fit with these values and norms. The goal then, for VBN scholars is to identify which values and norms (including self-identity and symbolic meanings) are linked to PEV adoption. Both of these approaches focus on the barriers and motivators to PEV adoption with the ultimate aim of increasing consumer uptake.

In consumer PEV adoption literature, a number of scholars assert that social status and self-identity play an influential role in determining consumer behavior and intentions (Skippon and Garwood, 2011; Graham-Rowe et al., 2012; Axsen et al., 2012; Schuitema et al., 2013; Burgess et al., 2013). The literature that looks at the symbolism of PEVs, focuses on how the purchase and use of this type of vehicle symbolically represent the desired social position and perceived self-image of consumers (Noppers et al., 2015; Schuitema et al., 2013). General research on sustainable behavior and self-identity posits a relationship between pro-environmental self-identity and pro-environmental behaviors (Van der Werff et al., 2013;

Whitmarsh and O'Neill, 2010). Research on PEV and HEV consumption makes a link between these vehicles as symbols of environmentalism and pro-environmental self-identity (Noppers et al., 2015; Sexton and Sexton, 2014). A number of studies support the symbolic connection between pro-environmental values or pro-environmental self-identity and PEVs (Axsen & Kurani, 2013; Axsen et al., 2012; Graham-Rowe et al., 2012). Many of these same studies also connect self-identity as a technological adopter or social innovator with PEV adoption.

In TBP based research, the symbolic attributes of PEVs are generally operationalized, at a very superficial level, as the perceived outcomes of PEV purchase (i.e., produces and communicates social status; reinforces and expresses self-identity). In this research, the symbolic attributes of PEVs, which like other vehicle attributes, are understood to influence consumers' attitudes toward intent to purchase the vehicle, and can be put into a model alongside other vehicle attributes. Thus, frequently the influences of symbolic attributes of PEVs on consumer uptake are measured generically, without defining the actual symbolic meanings underlying why consumers believe (or do not believe) a PEV accurately represents their social status and self-identity. In contrast, VBN informed research approaches generally identify the symbolic meanings associated with PEVs (e.g., pro-environmental, advanced technology), or the specific aspects of social status and self-identity linked to PEV adoption (e.g., environmentalist, tech enthusiast, early adopter). This research often explores the relationship between symbolic attributes and PEV adoption in two stages, first by assessing which symbolic elements consumers associate with PEVs, and second by using statistical analysis to reveal the influence of symbolic attributes on PEV purchase.

Some PEV scholars take a lifestyle approach to understanding the relationship between self-identity and consumption practices, which posits that identity manifests as, and is informed

by, engagement in lifestyles (Giddens, 1991; Spaargaren, 2003). These scholars point to consumer lifestyles as a central mechanism for understanding and affecting social change. They argue that the relationship between the symbolic meaning consumers attribute to a product and the consumer's elf-image significantly influences purchase intentions (White & Sintov, 2017). This research posits a direct, independent effect of self-identity on PEV adoption intentions and behavior as individuals work to maintain their self-identity through consumption practices (Axsen, et al, 2012; Barbarossa et al., 2015).

Lifestyle theory argues that consumers express their identity by constructing a lifestyle, or an internally coherent set of activities. This construction process is the fluid and reflexive as individuals manage their consumption practices and behaviors and negotiate the tensions, inconsistencies and conflicting values that arise across different aspects of their lives (Evans and Jackson, 2007; Giddens, 1991; Spaargaren, 2003). Giddens (1991) suggests that no single "lifestyle" fully represents the identity of a consumer; instead, any given "lifestyle" represents one of many sets of practices that reflect and inform different aspects of their self-identity. As Axsen, TyreeHageman, and Lentz (2012) suggest, pro-environmental consumption practices are thought to represent an independent lifestyle sector and "engaging in novel pro-environmental practices can stimulate an individual's consideration of a sustainability-oriented lifestyle and identity" (p. 66). On the other hand, pro-environmental consumption practices may also be perceived of as activities that consumers can incorporated into or discarded as incompatible with another lifestyle (Evans and Abrahamse, 2009; Spaargaren, 2003). Previous research on PEVs reveals how consumers associate the purchase and use of these vehicles as part of both pro-environmental and technology-oriented lifestyles (Axsen et al., 2012; Axsen & Kurani, 2012).

Several scholars studying sustainable consumption, over the last fifteen years or so, increasingly focused on the material, habitual, and functional properties of consumption (Christensen and Røpke, 2010; Gram-Hanssen, 2010; 2011; Hand et al., 2005; Mylan, 2015; Shove, 2003; Shove et al., 2015). These scholars, building on theories of practice, Science and Technology Studies, and Actor Network Theory, produced a body of work analyzing how consumption practices as entities, are integrated into products and technological systems. This research suggests that it is consumption practices in combination with products and technological systems that generate unsustainable resources consumption. From a practice theory perspective, acts of sustainability consumption represent the performance of a "practice-as-entity" by individuals. Here, the unit of analysis is the practice itself as composed of cognitive, material, and symbolic elements and individuals represent the carriers of the practice (Reckwitz, 2002; Røpke, 2009). Through these successive moments of "practice-as-performance", fluid and idiosyncratic, the practice-as-entity and its constituent parts are sustained (or altered) over time. The unit of analysis is the practice itself as composed of cognitive, material, and symbolic elements and individuals represent the carriers of the practice. It is only through these successive moments of performance that the interdependencies between elements which constitute the practice-as-entity are sustained over time (Shove, 2010; Shove et al, 2012).

Practice theory advocates argue that relying on a "lifestyles" approach to consumption deflects attention away from the social processes behind consumer choices and implies that sustainability hinges upon the efforts of responsibilized individuals to adopt ethical consumption behavior (Lodziak, 2002). Soron (2010), like other practice theory scholars, argues that the lifestyle approach to consumption is increasingly problematic as policymakers seek to motivate sustainable consumption through policy measures aimed at individual behavior change.

Consequently, research to address unsustainable consumption, these scholars argue, needs to focus on these shared practices and the systems in which they are embedded rather than individual consumers. There currently exists minimal research on PEV consumption from a practice theory approach.

Conclusion

At the beginning of this chapter I discussed automobiles and the dominant, car-based system of automobility in general as a way to showcase the existing myths, ideologies, and materialities associated with cars. As Reese (2016) explains, "in the years since the concept of 'automobility' came to encompass the broader political and socio-cultural dimensions of automobile production and use, it has served to expand the scope of scholarly analysis of the car" (p. 154). Mobility scholars study how automobility has shaped urban and rural landscapes (Bonham, 2006; Featherstone, 2004; Urry 2004, 2013), civil society and political ideology (Cass et al, 2015; Freudendal-Pedersen, 2009; Rajan, 2006), the organization of daily social life (Patterson, 2007; Urry 2007; Wacjman 2008), and environmental symbolism (Clarsen and Veracini 2012; Flink 1990; Gunster 2004; Sachs 1992). Knowledge of automobility as an organizing system is fundamental to understanding the emergence and functioning of a PEV market—including consumer processes of valuation— as consumers and producers are deeply embedded in the material and symbolic elements of a car based mobility paradigm. Analyses of the cultural and social entailments of PEVs illuminate localized meanings, but a 'mobilities' understanding of the automobile in American culture connects PEV market processes to the larger system of automobility.

However, PEVs are not only automobiles; they also represent a sustainable or pro-environmental product and are subject to contemporary analyses of "green" consumption. As I have illustrated in this chapter, consumption, particularly "green" consumption, is increasingly connected to the core conceptions of sustainability ideology: responsible consumers and technological utopianism. A consequence of this connection is the framing of consumption, the environment, and sustainable development in explicitly moral terms. While writing this dissertation, I came across a tweet from Twitter user @madderka who asked, "How did straws and people who use them become the targets for reducing waste rather than like... the companies who bank on planned obsolescence for the machines they produce by the millions that contain all types of plastics and toxic metals?" As @madderka's question shows, this responsibilization does not always sit easy with consumers, and the tension between individual behavior and social context runs through the narratives of my participants.

By focusing on individual adoption of PEVs and treating consumers as choosers, PEV research and policy reinforces the ideal of the responsible consumer and the narrative of technological utopianism, and actively works toward realizing both. Moreover, this research and the policy measures it affects are often actively working toward realizing concrete changes to the PEV market by increasing consumer adoption of PEVs. Critics have pointed out that this unreflexive scholarly support of pursuing "sustainable" development fails to adequately address the capitalist system of production and consumption that brought about a socio-economic crisis in the first place.

CHAPTER 5: DIMENSIONS OF VALUE IN THE PEV MARKET

In this chapter I apply Beckert's (2011) conceptualization of value as the expected physical, positional, and imaginative performance of goods, and the corresponding dimensions of value, to the PEV market to analyze how PEVs become valuable to consumers. Beckert (2011) states, "for a good to have value, its purchaser must have a positive view of what [they] expect the good to perform: the good 'makes a difference' for the owner through its (potential) performance" (p. 108). In this sense, consumers perceive that a given quality (or qualities) of a PEV affects a particular performance, which becomes, if viewed as desirable, a source of value. As such, product "qualities create incentives or disincentives for purchasing decisions on markets" (Beckert & Musselin, 2013, p. 1). The sources of PEV value, discussed below, represent the result of (e)valuations across both groups (PEV drivers and ICEV drivers), which they must then translate into economic value to participate in the market, regardless of whether the consumer ultimately purchases the PEV or not. Economic value refers to the amount (usually money) an individual market participant is willing to exchange for a good or service. Specifically, the value an individual consumer derives from the expected performance of PEVs is translated into an amount which they can then compare to the price of the vehicle when deciding whether to make an exchange.

In the first part of this chapter I briefly revisit the theoretical approach to understanding sources of value that guides my analysis of (e)valuation by consumers in the PEV market. I then identify the prevailing qualities consumers attribute to PEVs, and explain how they provide symbolic and functional value for consumers. I organize each type of expected performance by subcategories of physical performance, positional performance, and imaginative performance. I use the remainder of the chapter to describe these expected performances of PEVs in more detail,

and provide meaningful examples, drawn from conversations with PEV drivers and ICEV drivers alike, of how they represent sources of value for consumers.

Dimensions of Value

Economic valuation is dynamic as consumers negotiate cultural constructions of objects and continually rework translations across scales of value. Rather than adopting the simplified understanding of economic value as arising from the intrinsic characteristics of a product, often applied in economist's analyses, I approach economic value from a sociological standpoint, which sees economic value arising from what Lamont (2012) terms processes of (e)valuation. Previous work exploring interactions between PEV drivers and non-PEV drivers illustrates how the qualities attributed to PEVs produce different valuations, revealing both the social construction of the qualification process and the complexity of (e)valuation practices (Burgess et al., 2013). Indeed, as Fourcade (2011) points out, the process of economic valuation "incorporates all kinds of assumptions about social order and socially structured imaginaries about worth," and "incorporates in its very making evaluative frames and judgements that can all be traced back to specific politico-institutional configurations and conflicts. (p. 1769). In Chapter 4, I explored sustainability as a historical and contextual logic of value or moral conventions that determines the justification of the qualities of a PEV as "worthy" or having a positive value. I argue that much of what is valued in the PEV markets reflects the broader social values informed by sustainability ideology and the entrenched system of automobility.

The economic value of a PEV takes shape from the combination of different expected performances (physical and symbolic), and the selection and prioritization of these sources of value depend on the individual actor. PEV drivers make their purchase expecting their vehicle to

provide simultaneous performances in their physical state, their social position, and their imaginative world. The (expected) physical performance of PEVs makes a difference in the physical world or alters the driver's physical state in one way or another. While the physical performance of any good may be perceived as objective, in the sense that it is a quality of the object itself, establishing the physical value of the object depends on the user's cognitive understandings. As work coming out of social construction of technology and actor network theory perspectives suggests, even the design and manufacturing process is shaped by dominant understandings of automobility which are then "objectified" in the vehicle itself (Dant, 2004; Redshaw, 2008). Moreover, as I discussed in Chapter 3, though the material characteristics of PEVs are relevant for their (e)valuation, the identification and measurement of "objective" qualities are socially constructed. Measurement standards not only measure qualities, but actively constitute them by selecting certain characteristics and dismissing others (Callon et al., 2002, p. 199). For example, in the PEV market, the lack of emissions from electric vehicles offers consumers a positive, tangible change in their physical world. Though PEV drivers describe zero or low emissions as a physical value, the valuation of this seemingly objective state arises from modern environmental values and depends upon the perception that vehicle exhaust presents a health hazard—itself rooted in social discourses of risk. The evaluation of the physical performance of PEVs very much depends on the values and ideals of consumers. To return to the previous example, the technical knowledge of pollutants influences the physical valuation of the vehicle. Differences in the valuation of the physical performances of PEVs coincide with the differences in understandings and practical knowledge of consumers.

The (expected) positional performance of a PEV makes a difference in the social location of the driver. The value assigned to the vehicle depends on the consumer's perception of the

promised transformative power over group membership, social status, and social belonging. Since the positional performance of a PEV is relational, it presupposes commonly held meanings (among relevant social groups) that form the basis of social positioning. The positional value of PEVs may be connected to processes of conspicuous consumption or lifestyle construction (as a method of actualizing narratives of self-identity). Positional value may also confer group membership through communities of practice as people consume products as a part of engaging in a practice. For many consumers, PEVs—like other automobiles—represent an extension and public expression of the self and the potential to convey and confer social meaning.

The positional effects of PEVs depend on shared meanings which constitute and express parts of the social identities of actors. Nearly all of the participants who drove a PEV constructed a narrative of PEV drivers as a social group. Common themes among descriptions of PEV drivers included pro-environmentalism and technological interest. For some consumers, the characteristics of PEV drivers as a social group represented a source of positional value, while other consumers had a negative view of some, or all, of the positional performance of PEVs based on their environmental qualities. For example, several PEV drivers who perceived an environmentalist association with electric vehicle consumption went through great lengths to repudiate what they described as the undesirable label of "*wacko-environmentalist*" or "*pot-smoking hippie*". Instead they found positional value of PEVs technological qualities associated with the vehicles or through cost savings.

Carfanga and colleagues (2014), drawing on Bourdieu's theory of habitus, offer an alternative view of the positional value of pro-environmental products, proposing that sustainable consumption is shaped by an "eco-habitus" connected to class status. They argue that the eco-habitus represents "a reconfiguration of high-status tastes that is part of a re-articulation of the

field of high-class consumption, fostered by a more general social valorization of environmental consciousness" (Carfanga et al., 2014, p. 160). This suggests that rather than the construction of self-identity or conspicuous status consumption, the positional value of PEVs comes in the form of cultural capital, which affirms class status, and reproduces social divisions. Previous studies have also connected consumption of sustainable products, including PEVs, with class status. Griskevicius, Tybur, and Van den Buergh (2010) argue that the positional value of green products comes not only from their "pro-environmental" status, but because they demonstrate that the consumer, in buying and using the product, has "sufficient time, energy, money, or other valuable resources to be able to afford to give away such resources without a negative impact" (p. 394). Their findings align with the general perception of PEV drivers shared by many of the participants in my research. In a focus group made up of early PEV drivers Brian, a LEAF driver, offers an illustrative description of PEV drivers as environmentalists, technologically-inclined, employed, and upper middle-class. He explains how PEV drivers are, *"environmentally conscious people…you have to have the lifestyle to support it. You have to have the commute, you have to have a route that you can rely on, that sort of thing. You have to have the financial means to afford another car. If you only can afford one car, [a PEV] is not going to be it. You find a class of people who can afford to have two cars who have reasonable routes to drive and who are interested in some new technology."*

A number of studies look to uncover the public perception(s) of PEV drivers, or HEV drivers in the case of (Heffner et al., 2007) with varying results. Researchers found that the same qualities attributed to PEV (HEV) drivers were viewed positively by some, as: ethical, environmentally oriented, forward thinking, technologically knowledgeable, and open-minded; and negatively by others, as: environmental radicals, ineffectual idealists, "tree-huggers" or

"techno-geeks"[9] (Heffner et al., 2007), hypocrites, and show-offs (Graham-Rowe et al., 2012; Griskevicius et al., 2010; Skippon & Garwood, 2011). In these studies, people's perception of the positional value of PEVs arose largely from their expectation of how others viewed them as PEV drivers. This suggests that the (e)valuation of PEVs, even for drivers who have already purchased them, is an ongoing process, dependent not only on broader social and cultural elements but also the localized context at any given time.

In narrative interviews, as Grauel (2016) notes, and elsewhere in their stories of consumption, consumers draw on socially established legitimating vocabularies and internalized ideological commitments to explain their behavior. In their narratives of PEV adoption, consumers work to produce coherence with their self-identity even as they engage in impression management (Grauel, 2016, p. 857). The performative aspect of PEV consumer narratives was especially clear during the workshops conducted during the second project, which brought together PEV drivers with non-PEV drivers. Here PEV drivers incorporated their PEV purchase and use into an expression of self-identity or self-narrative they were actively constructing and performing, partly in response to their own sense of self, but also in reaction to their audience. Indeed, in several discussions with PEV drivers, they explained how the attributes they valued about their vehicle changed with their use of the vehicle or with the accumulation of experience and knowledge, or even based on who they were talking with at the time and the kind of impression they wanted to make.

The (expected) imaginative performance of a good makes a difference in the state of consciousness of the consumer. Imaginative value depends on the ability of an object to

[9] Many of my respondents used the same label of "techno-geek" both positively and negatively when identifying the characteristics of PEV drivers, whether or not they included themselves in this group. This finding is supported by Kozinet's (2008) explanation of techspressive ideology and the rise of geek-chic in the 1990s.

represent transcendental ideals and values. In contrast to positional value, for an object to hold imaginative value, the individual consumer must privately attribute symbolic meaning to the good, though these meanings are socially informed. In the PEV market, imaginative value comes into play when an individual market participant sees a PEV as offering a bridge to their values, ideals, and fantasies based on the qualities they attribute to the vehicle. This can also manifest as symbolic associations with desired events, people, places, or times. CCT research shows that many consumers' lives are constructed around multiple realities and that they use consumption to experience realities (linked to fantasies, invocative desires, aesthetics, and identity play) that differ dramatically from the quotidian (Arnould & Thompson, 2005, p. 875-876). Patterns of symbolic meanings attributed to PEVs by consumers support the theory that though imaginative (e)valuation processes take place privately, these symbolic meanings are fundamentally social constructs.

Imaginative value includes what Beckert (2011) calls "contact charisma," which he argues is based on proximity to an idealized person or social group: "an accessory like a handbag, if carried by an idealized celebrity like Madonna, becomes 'infected' through this contact" (p. 116). Though he acknowledges the transcendent power of a good may arise from its connection to a leader or a social group, I believe the concept of charisma is also useful when applied to individuals within social groups. I posit that Beckert's concept of contact charisma may be applied to any charismatic leader, even within smaller social groups. Through contact charisma, the object itself is imbued with a value separate but derived from the idealized individual or group.

For many drivers PEVs serve as an imaginative bridge, or they evoke an identity and/or a charismatic power which comes to materialize the aura or characteristics of the individual or

group associated with the vehicle. In this sense, there is a transference of symbolic meaning from the idealized groups or individual to the object, and ultimately to the end user. For example, in several of the interviews conducted in 2015 with non-PEV owners, drivers expressed a strong interest in owning a PEV manufactured by Tesla Motors. Tesla held imaginative value for these consumers because of the company founder Elon Musk. The imaginative value of a Tesla came not only from its connection to Musk as a tech leader and visionary but also because the brand and thus the vehicle itself embodied these qualities and transferred them to the vehicle's owner. Several scholars studying consumption suggest that consumers pursue particular brands with an almost religious-like fervor as a way to engage in individual or group identity projects. These brands, which St. James, Handelman, and Taylor (2011) call transcendent brands, represent a means to engage in individual or group identity projects, in an almost religious-like manner.

Although I treat positional and imaginative value as analytically distinct, they are at times closely connected in the narratives of new vehicle drivers. Social positioning and group membership are often associated with transcendental ideals, and consumption may represent a means for consumers to communicate internal values and symbolic associations which influence their social positioning. Consequently, drivers rarely parse out positional and imaginative value when explaining their motivations for buying a PEV or narrating their purchase story. Similarly, drivers frequently derive both imaginative value and physical value from the same aspect of the vehicle. For example, driving a PEV provides physical value for drivers in the form of immediate reduction of air pollution as a result of its reduced emission, but this very same quality also provides imaginative value, which comes from drivers' belief that by reducing vehicle emissions they are contributing to the broader shift toward sustainable transportation and creating a sustainable future for younger generations.

My analysis of value construction in this chapter is partially informed by Appadurai's (1988) suggestion that by following the "social life" of an object researchers may "glimpse the ways in which desire and demand, reciprocal sacrifice and power interact to create economic value in specific social situations" (p. 4). The non-PEV drivers interviewed for this research, explored sources of value that could potentially motivate their purchase of a PEV. PEV drivers also reflected on the values as expected positive performances that motivated their initial purchase, but added accounts of changing value through use. As one PEV driver explained, "*Once you have the car, it changes your mindset. Your perception of the value of [the PEV] changes*." The process of consumption—including use, as well as exchange imbues PEVs with symbolic meaning. PEV drivers illustrate how the use of a commodity, after the act of purchase continues to influence the symbolic meaning consumers attach to objects. Existing PEV drivers provided explanations of how the use of their vehicle continued to shape the economic value they attributed to PEVs along different dimensions.

The qualities consumers assigned to PEVs fall into three main types: environmental, technological, and financial. Though the financial qualities of the PEV (e.g., cost saving on fuel, economic frugality, thriftiness) are undoubtedly important, I am focusing on the environmental and technological qualities of PEVs for two reasons. First, my argument in this dissertation explores the relationship between sustainability as a normative, environmental ideational regime and the (e)valuation practices of consumers in the PEV market. Second, as I discussed in Chapter 4, much of the existing research looks at how consumers assess the financial benefits of PEV adoption. My goal, with this research, is to build on this body of work and broaden our understanding of the symbolic value that consumers find in PEVs beyond the monetary benefits. That being said, I do touch on some discussion of the financial qualities of PEVs as they relate to

my analysis of the environmental and technological qualities of PEVs that provide value to consumers.

Sources of Value: PEV Drivers			
	Expected Performance [Value]		
	Physical	**Symbolic**	
		Positional	**Imaginative**
Environmental Qualities • Low/zero tailpipe emissions • Uses a renewable fuel source • Sustainable or pro-environmental product	• Reduces air pollution • Facilitates clean energy production and consumption	• Confers "wacko greenie" [environmentalist] status	• Represents sustainability
Technological Qualities • High-tech • Energy Efficient • "New" technology • Fast acceleration	• Increases fuel efficiency • Provides pleasure/enjoyment	• Confers "early adopter" status or "tech enthusiast" status	• Represents accelerated technological advancement

Table 1: Source of Value: PEV Drivers

Previous research on the valuation of PEVs by both non-PEV drivers and PEV drivers supports these categories. Heffner et al (2007), while conducting research on symbolic values and Hybrid Electric Vehicle (HEVs) drivers, found that most drivers associated HEVs with energy security, technological advancement, and environmentalism. Other scholars looking at PEVs specifically have linked PEV consumers with technological and environmental character traits including environmentalist and technological savvy or tech pioneers (Caperello et al., 2014; Graham-Rowe et al., 2012; Skippon and Garwood, 2011). Table A represents the sources of

value, grouped by type of quality (environmental and technological) and the form the value or expected performance takes (physical or symbolic). Following Beckert (2011), I further break down symbolic value into positional and imaginative value. In the following section I explain each of these specific sources, offering examples taken from conversations and interviews with drivers.

Environmental Sources of Value

Across the three research projects, respondents revealed the environmental sources of value of PEVs to be a strong motivator for the purchase and use of a PEV. Connolly and Prothero (2008), alongside other scholars, found that the identification of risks to the self (the body) and to the environment often overlap (Bickerstaff & Walker, 2001). They suggest that a growing perception of personal responsibility in the face of environmental hazards lends itself to self-focus and self-orientation when assessing risks to planetary health. This held true for many of my respondents who experienced environmental hazards simultaneously as a localized, often personal bodily risk and as a global risk. Consumer interest in PEVs reflected a concern for the health risks associated with air pollution from vehicle exhaust, environmental pollution from refining oil—including processes of extraction and transportation, and the fear of large-scale catastrophes in the form of global climate change due to GHG emissions and the depletion of natural resources at the national and international level. The environmental beliefs that shaped consumer's perception of the benefits of PEV purchase and use suggest that drivers felt a sense of personal responsibility towards the environment and ecological issues coupled with belief in the efficacy of action by individual consumers.

ICEV driver James lived in California and participated in the LEV study. In his design game he designed both a PHEV and a BEV and listed as his primary motivations for this choice: an interest in new technology, a desire to reduce his effect on climate change, an interest in reducing amount of imported oil and paying less money to oil companies. In the interview James explained that he and his wife had installed solar on their house, a decision motivated not by cost savings but by their concern about anthropogenic climate change. James connected this same concern to his interest in PEVs. "*So, the environment started becoming my big issue. So, I'm concerned why we progressed to where we are and what we look like going into the future. My wife and I don't heat our house. We don't air condition during the summer. So, we do not use a lot of electricity. We turn the lights off. We've always done that. Well, we went to the solar panel; the cost was not their advantage for us, it was the idea— the issue was: We need to do this. This is something that needs to be done. Because it's just like with the water issues we have in California. I think it's all involved in one issue, the environment. How it's going to affect the weather. And we decided, hey, we need to start doing something. So, we said, okay, we're going do it, even though it's not cost effective. And the timeframe, I may never make any money off it, but we're doing something that needs to be done. And in time, maybe everybody will look at that. So, the environment was the big reason why I went that way. Under Ronald Reagan's administration, republican administration, and republicans, clean water, clean air became an issue and that just led onto everything. Global warming really wasn't as an issue but I do remember in the late '80s when they started getting more on PBS -- we love PBS shows. I remember one time, they went to I think the arctic and they put down white sheets, just to see how the ice melted. So, I guess it just evolved, evolution and the reality of life that, hey, human beings are a problem. 'Mother Nature' can live without us. 'Mother Nature' will live but we will*

die. So, it's the survival of humans, really. Environmentally, survival of man, not survival of the earth because if we die off, everything will come back. So, it's all part that -- I think, to me, it's not only the water consumption, it's usage of gasoline. It's a lot of things that all affect the environment. And we all need to do it together. We just can't say, oh, let's wait 'til it becomes a major issue, then it's too late. So, I feel like, hey, the only way we can counter it is to go to technologies which are cleaner and better. Because oil is dirty, but we do need to have cars... And now with electric and all the other sources is the potential. I'm looking that we have a window of opportunity, but it has to be subsidized. You know, you can't get it off the ground unless you give it help. So, I felt like, yes, this is something we need to do because we need to get out of this other area. It's not good. And hey, if [oil] is going to run out, what are we going to do in 100 years from now? We can't wait 100 years to solve a problem. It's like the global warming, everybody wants to wait 'til we go over the cliff and then 'oh, now we'll work on it'. Well, sometimes it may be too late. So, I guess it's all these issues together." James' narrative of his development of pro-environmental values and practices revealed a growing awareness (and concern), shaped in part by media representation, of an environmental sustainability crisis. For James, his concern was directly related to the survival of human beings, rather than the conservation of nature. His account reveals his belief that individual action can mitigate the problems linked to oil consumption and can potentially motivate others to adopt similar energy efficient technologies. On the one hand, James connected his actions in the present with a sustainable future; on the other hand, he linked the current state of energy production and consumption with an unsustainable future if people fail to change their consumption practices.

The cognitive connection between environmental risk and consumption expressed in the interviews with new car buyers like James, including PEV drivers, echoed discourses of

sustainable development. As I discussed in the previous chapter, sustainability is an anthropocentric environmental discourse that puts people at the center of nature and frames the earth and its resources as existing to sustain human life. Anthropocentricism combines a desire to preserve the environment for descendants, practical utilitarian values, and an aesthetic appreciation of nature. The anthropocentrism of sustainability discourse and the reflexive critiques of industrial processes characteristic of risk society, in tandem with a dominant culture of individualism in the U.S., encourage a self-oriented experience of environmental risks.

James is representative of several drivers whose perceived personal experience with the effects of pollution gave meaning to environmental phenomena, a finding supported by previous research on pro-environmental behavior (Weber, 2010). Whitmarsh (2008) reveals a link between perceived experience of air pollution and concern about the risks of climate change. Several studies on public perception of environmental problems explore the relationship between local air quality and environmental concern, finding a connection between poor air quality and increased environmental concern (Hannibal et al., 2016; Liu & Mu, 2016). Akerlof and colleagues (2012) explain how perceived personal experience of the effects of global warming increases peoples' perception of the risks associated with climate change, and consequently increases the likelihood of taking action to mitigate these risks. The personalization of global environmental risks, they argue, reinforces the belief that the threat of hazardous global climate change can be addressed at both an individual and societal level. When people believe they experienced pollution or the effects of climate change, it raises their awareness of the consequences of engaging or not engaging in the pro-environmental behavior, and the ascription of personal responsibility for carrying out the behavior. As James' story illustrates, perceived personal experience is likely constructed through some combination of "direct experience,

vicarious experience (e.g., media exposure), and social construction" (Akerlof et al., 2012, p. 1), shaped by discourses of sustainability. Weber (2010, p. 334) notes, media representation and even factual scientific data is shaped by social, institutional, and cultural processes which amplify certain risks and solutions.

Consumers' expectation of the environmental value of PEVs is shaped by the negotiation of their daily practices and local culture within broader social and political processes. In the context of growing environmental anxiety, representations of sustainability ideology diffuse through discourse and mythic speech to inform people's perception and experience of risk. In their narratives of (e)valuation, respondents attributed qualities (and subsequently value) to PEVs in ways that reproduced the myths of individual responsibility and technological utopianism based on ideological commitments to sustainability, even as they negotiated the boundaries of both. Carfanga and colleagues (2014) suggest that some consumers employ an ecological consciousness, taking into account the environmental consequences of their action as they engage in consumption practices. Sustainability ideology shapes the underlying conceptual structures that map everyday consumption experiences as consumers "make judgements using ecological criteria and use discourses of ecological impact" (Carfanga et al., 2014, p.161). The diffusion of sustainability ideology functions to normalize a particular morality which delineates some products and practices as green and therefore good, as opposed to others which are "anti-green" (polluting, high-resource consumption) and therefore bad.

Though I recognize the significance of the myth of the responsible consumer, I am not suggesting that consumers are uncritical dopes manipulated by the process of responsibilization. Indeed, the narratives of my participants align with findings from previous studies of sustainable consumption that reveal that individuals do not adopt the role of responsible consumer without

reservation, especially where they are unsure of the efficacy of their actions. Consumers who express concern over a sustainability crisis often look beyond their immediate consumption for alternative solutions to environmental and socio-economic issues. Several studies show that consumers recognize their consumption practices as located within a broader context of their lifestyle, their communities and social networks, and participation in civic and political activism, and consequently understand it to be both individual and collective (Clarke et al. 2007; Connolly and Prothero 2008; Seyfang 2006; Willis & Schor, 2012). As they engage in the (e)valuation of PEVs, consumers actively identify the ways in which individual actions can affect environmental change versus what they perceive as the responsibilities of states and corporations (Soneyrd & Uggla, 2015). That being said, though many respondents believed that environmental concerns needed to be addressed at *both* the individual and societal level, the incorporation of individual environmental responsibility, with particular attention to individual CO_2 production and energy consumption, into their discussions indicated that the responsible consumer was a widely shared and accepted ideal.

The environmental value associated with electric-drive vehicles is well established in transportation literature, and several studies highlight the emphasis consumers place on the environmental benefits of driving a PEV (see Coffman et al., 2017 and Liao et al., 2016 for reviews). Much of the existing research on the electric vehicle market, however, finds that more consumers state financial benefits than environmental benefits as a primary motivation for PEV purchase (Ozaki and Sevastyanova, 2011; Caperello and Kurani, 2011; Graham-Rowe et al., 2012). The volume of PEV drivers who pointed to environmental values as strong motivators for purchasing a PEV in my research complicates these findings. This suggests that, for those who

place high importance on environmental concerns, environmental benefits may actually be a more significant source of value than financial qualities.

Within the category of environmental sources of value, the qualities that consumers attributed to PEVs included: reduced tailpipe emissions, the use of a renewable and/or clean fuel source (electricity), and the classification of the PEV as a sustainable, or pro-environmental product. These qualities provided physical value in the form of clean energy production and consumption, and the reduction of air pollution and individual CO_2 emissions or "carbon footprint". PEV drivers expressed concern with the immediacy of pollution, particularly air pollution, but were also apprehensive about the depletion of resources and global warming as more distant crises. The environmental qualities of the PEV connected the vehicle to environmentalism and represented a source of positional value for drivers by allowing them to adopt and express their identity as an environmentalist, or in the words of one PEV driver a "Wacky Greenie". Consumers found imaginative value in PEVs as the material representation of ideals of sustainability, particularly in regards to climate change, oil consumption and protecting the environment for future generations. When drivers talked about environmental value they often mentioned ensuring a future for their children or for humankind in general.

Technological Sources of Value

The development of automobile technology has increasingly incorporated digital technology into the design of cars. In ICEVs, as Featherstone (2004) points out, "now software controls work a complex feedback system to govern engine management, breaking, suspension, wipers, lights, speed via cruise control, parking maneuvers, speech recognition systems, communications and entertainment, sound systems, heating and conditioning, in-car navigation

and security" (p. 10). As people became accustomed to different human-machine interfaces and developed preferences for the digital assemblages of vehicle technology, "the software platform of the car became an increasingly important selling point for manufacturers" (Featherstone, 2004, p. 10). With PEVs the significance of the technological aspects of the vehicle are even greater than for ICEVs, as PEVs are not only thought of as automotive technology but are also constructed as an innovative, pro-environmental, high-tech product. PEV drivers are even able to monitor their charging and track the energy (fuel) efficiency of their driving habits through apps on their phone. The participants in this research framed the technological qualities of PEVs in three ways: as automotive technology, as digital technology (or high-tech), and as pro-environmental technology. When consumers held a positive view of these expected technological performances, their narratives reflected ideals of autopianism (e.g., freedom, speed, and power), digital utopianism (financial success, fulfillment of pleasure, connection to nature, independence), and sustainability's version of technological utopianism (energy efficiency, social progress, a sustainable future).

Since PEVs are constructed as an alternative fuel technology, many other studies of PEV consumers look to the relationship between the vehicle technology and stated or revealed preference. For research using the TPB, the technological elements of the vehicle are considered "objective" attributes and framed as either a barrier or incentive to adoption. For studies that take a VBN approach, consumers' interest in PEVs is examined in relationship to technology-oriented values or self-identity. Schuitema and colleagues (2013) found that consumers' derive positional value, in the form of social status and the expression of self-identity, from the possession of new technologies, including PEVs. Other studies have explored consumer's engagement in a technology-oriented lifestyle, finding a connection between lifestyle practices and interest in

PEV technology (Axsen et al., 2012, 2017; Axsen & Kurani, 2013; Plötz et al., 2014). Burgess and colleagues (2013) suggest that consumers' understanding of PEV technology falls into three categories: traditional, ambivalent, and positive. The traditional stereotype of PEV technology represents a negative perception of PEV technology as "outdated and underpowered". The ambivalent understanding of PEV technology represents a neutral perception of PEV technology as "embryonic, underdeveloped vehicles with potential for the future". The positive perception of PEV technology represents an understanding of PEV technology as "innovative, high-performing, modern" and "well-advanced" (Burgess et al., 2013, p. 41).

In addition, and often in relation, to the environmental sources of the value consumers attributed to PEVs, respondents revealed the perceived technological qualities of PEVs to be another strong source of value. As Axsen, Langman, and Goldberg (2017) note, "consumers can be motivated by perceptions of the technology's ability to reduce pollution or greenhouse gas emissions, or perceptions of the technology's ability to be part of an effort to encourage others to buy the same technology, manufacturers to produce more of the technology, or dealers to make more of the technology available for sale" (p. 165). Russell was a LEAF driver who participated in the workshop study. He lived with his wife and a young toddler in the central valley of California and commuted to work using the LEAF. "*I grew up on the East coast and I went to graduate school in Montana and part of the reason was to sort of get into the mountains and ski and rock climb and do those sorts of activities and after doing that and driving to ski resorts and such it's such an energy consuming thing that it seemed antithetical to what the whole reason was behind it and just being involved in outdoor pursuits I found myself limiting more and more the types of activities I did and spent more time on a bike just because of the efficiency and so it's nice to get back to a point I feel I can go do stuff without being constraining myself to a bike to*

minimize my energy usage. But yeah, I feel like philosophically and practically, trying to use technology to make the earth a nicer place to live so our kids aren't stuck with a burning inferno with climate change and stuff. I had a friend in Seattle and he mapped how species adapt to climate change... but it just ties back to the environmental consciousness but how to still live a normal life and integrate the technology we need with minimizing the toxic effects on human health. So that's sort of the overall things that push me to wanting an electric vehicle I'm definitely biased, both of us are, and always try to do if we go on vacations we try to bring in things that are more environmentally conscious and minimize our use of resources but do it in a way that's not cumbersome." Russell, like many of my participants, connected electric drive technology and PEVs with environmental preservation. Russell was not alone in acknowledging the tension arising from the consumption of natural resources to engage with nature. Several drivers saw the PEV as a way to alleviate the guilt they felt from using gas to participate in outdoor activities.

Even in the absence of environmental concerns, PEV consumers attribute value to the technological qualities of PEVs. PEV consumer research that takes a Diffusion of Innovation (DOI) approach to studying the relationship between PEVs, as a new technology and adoption, looks to the innovativeness of consumers to explain vehicle uptake (Rogers, 2003). Within the DOI framework innovativeness is generally understood as a character trait or lifestyle of novelty seeking— and in research is often measured as consumer interest in the new and different. Working from a DOI perspective, Jansson (2011) argues that "consumers high in novelty seeking tend to look positively on technology, have stronger intrinsic motivation to use such products, and enjoy the stimulation of trying new ways to approach old problems" (p. 195). His research documents a connection between AFVs and innovativeness, revealing that AFV drivers have

higher levels of novelty seeking than non-AFV drivers. Several participants in my research explained that their decision to purchase a PEV was motivated by a strong interest in new technology. Stan, an ICEV driver, explained the draw of PEVs for technophiles, "*I would say the new technology aspect of it, the fact that it's very new.... It's like that just a computer on wheels and people love that*." Among PEV drivers and non-PEV drivers alike there was a shared sentiment that, as a group, PEV drivers were consumers interested in technology or early adopters of technology in general. Ernie, who drove a LEAF and worked at a dealership, described his experience with early PEV drivers, who he found to be mostly interested in the vehicle's technology. "*Most people I find on electric cars are techno geeks: they know more about the car than I do; they're like electric guys here. I mean, they're really into all this stuff and they ask questions that, you know, I have to call the factory. You know, I mean, how many volts per cell, and there's 96 cells*."

Kozinets (2008) suggests that part of the draw of engaging with new, high-tech products, comes from the belief that technology can provide the supreme fulfillment of playful pleasure (p. 871). Kozinets labels this particular iteration of technological utopianism as "techspressive ideology" and argues that it emerged during the 1990s with the "geek-chic" framing technology as cool, creative, and fun. A number of participants drew on the techspressive vocabulary to explain their evaluation of PEVs describing the vehicle technology as "*a cool technology*", "*hip*", "*fun and awesome*" and in the words of one driver "*the LEAF is a beautiful package and I would equate it to an iPad. It's just a beautiful device*". These narratives suggest that the technological qualities of the PEV provide drivers with physical value through feelings of pleasure and excitement, but also positional value, conferring the status as part of the

technological vanguard (Grewal et al., 2000; Heffner et al., 2007) and imaginative value as a bridge to ideals of technological utopianism.

Within the category of technological sources of value, the qualities that consumers attributed to PEVs included: A high-tech product, efficient fuel consumption or energy efficient, a new technology, fast acceleration. These qualities provided physical value in the form of energy efficiency and pleasure and enjoyment. Consumers attributed positional value to PEVs perceiving the vehicle to position drivers as early adopters, tech enthusiasts, or even technologically savvy. The technological qualities of the PEV also connected the vehicle to environmentalism, and represented a mechanism for achieving sustainability. Consumers found imaginative value in PEVs as the representation of a pioneering ethos and of social progress through technological development. When consumers talked about the technological value of PEVs they often referred to feeling like they were part of bringing about technological advancement, which required an adventuring spirit and a willingness to take risks.

The Expected Physical Performances of PEVs

PEVs Reduce Air Pollution

Respondents discussed air pollution as a separate (though often related) environmental phenomenon from climate change caused by greenhouse gas (GHG) emissions. When drivers talked about air pollution they were referring to what the EPA identifies as ground level or "bad" ozone created “by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight” (Environmental Protection Agency, 2018). According to the EPA, breathing ozone can trigger a variety of health problems, particularly for children, the elderly, and people of all ages who have lung diseases such as asthma or other

respiratory problems. Though the emissions from industrial facilities and electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of NOx and VOC, most drivers only discussed vehicle exhaust as a cause of air pollution. Occasionally drivers brought up the environmental cost of producing alternative fuels—in particular coal burning electric utilities as a counter balance to the touted environmental benefits of PEVs. Those that did bring up the environmental costs of energy production indicated that for the most part air pollution from electric utilities was not a problem in their area as their electricity came from sources other than coal.

Non-PEV drivers and PEV drivers shared concern about the health hazards of conventional gasoline vehicle emissions. ICEV driver Ryan and PEV driver Peter from the central valley of California both emphasized the health risks of air pollution as an incentive to purchase a PEV. Ryan and Peter are representative of several participants who believed PEVs offered an immediate material improvement in their local air quality by reducing vehicle exhaust. For Ryan, despite the expected reduction of air pollution by PEVs, this does not translate into enough economic value to buy the vehicle. For Peter, on the other hand, concern for his family's health, in particular that of his children, meant that the reduction of air pollution provided by PEVs increased the value of the car and contributed to his decision to make a purchase.

Ryan took part in the third project, which included both an interview and a survey component with a vehicle choice game administered to new car buyers. During the design game Ryan chose a traditional hybrid electric vehicle rather than a plug-in. In the survey, Ryan indicated that his motivations for this choice came from his unfamiliarity with the technology and a disinclination to pay the potential cost increases of electric vehicles in comparison to conventional vehicles. Regardless of these concerns, during the interview Ryan elaborated on his

perception of PEVs and cited air pollution as a strong motivator for moving to an electric vehicle. He lives in the central valley of California and drives a 2009 Ford Explorer. Ryan explained his concern stating, "*well, there's the, environment. You know, as much as I like my Explorer, it does put out emissions; every car does. If you can get rid of those emissions and have a cleaner environment for us to breathe, that'd be a plus. Have you seen those pictures of the people walking around China with the masks on and everything around them is gray? I don't want that.*" Ryan seemed unsure as to whether consumers would purchase electric vehicles in volumes large enough to effectively reduce air pollution but made it clear that clean air represented a strong impetus for purchasing and using an electric vehicle. He stated, "*So, if we can get rid of the emissions and clean up our air, I'm all for it. You know, I want to breathe. You know? So, that would be a very good incentive. Have everything clean again.*" Ryan's experience of air pollution and exposure to media representations of the consequences of ICEV emissions in China influenced his opinion on the need for a solution to the problem of air pollution. His perspective, however, reflects some of the ambiguity shared among participants about the effectiveness of individual adoption of PEVs in affecting environmental change.

Peter also lives in the central valley of California, but several hours south of where Ryan lives. Peter participated in the second project which involved interviews and focus groups. He had purchased and at the time of the interview drove a PEV. Peter's experience with what he perceived to be the health effects of air pollution changed his perspective on pro-environmental behavior. His decision to buy a PEV was driven, in part, by the health risks he believed ICEV exhaust posed to his children. Peter explained, "*my daughters were born premature. So that slaps you in the face when they're in the incubator for 3 weeks with lungs trying to develop. So every time I start my car, [I think] why am I putting dinosaur juice in my car that stinks when I*

start it? This [the PEV] is better for them. I didn't care about that stuff before." Peter's perspective of PEVs and the risks of ICEV related air pollution arose in part out of concern for the health of his children. Peter's (e)valuation of PEVs is representative of a broader phenomenon documented by studies that document high levels of concern, among parents, about pollution as a risk to their children, rather than concern for themselves (Bickerstaff & Walker, 2001). For Peter, and other drivers, the reduced emissions of PEVs represent not only a source of physical value but also a source of symbolic value, connected to the imagined future they are creating for their children and grandchildren.

PEVs Facilitate Clean Energy Production and Consumption

Alternative energy sources produce energy with less pollution and are not necessarily renewable, while clean energy sources are non-polluting— in that they do not release emissions during the energy production process. Renewable energy sources may include clean energy sources but are not necessarily non-polluting. Understanding of the production process shaped individuals' perspectives of whether an energy source was clean or not. Among consumers there existed some concern about the reduction in air pollution from PEVs being offset by air pollution caused by energy production needed to fuel an electric drive vehicle.

The definition of clean energy varied according to different participants. Some participants conflated alternative energy sources and renewable energy sources with clean energy sources, while others were very specific that clean energy sources meant non-polluting. For a few drivers, the value of clean energy came not from the method of energy production, but from the feeling that electricity was physically cleaner, in part because there are no spills as there are with gasoline. PEV drivers Richard and Bill both mentioned the draw of electricity as a fuel

source, which according to them was an improvement over gasoline, but both – like several other drivers— expressed concern with the methods of producing electric power. Richard believed the government would push utility providers to develop cleaner methods of electricity production with the growing popularity of electric vehicles. For Bill and his family moving toward clean energy production meant producing and consuming his own electricity using solar panels. A number of PEV drivers shared Bill and Richards' perspective, framing the purchase and use of an electric vehicle as only one part of a larger shift toward personal, privately produced clean energy, which included both production and consumption. Richard, though his focus was on clean energy consumption through PEV purchase and use, believed that environmental benefits of owning a PEV would be enhanced at the societal level, through government mandated changes to energy production. For Bill, the environmental qualities of the PEV are enhanced at the individual level, through the use of household solar energy to produce the fuel for his vehicle.

Richard was a retired Volt owner living in an apartment complex in the central California valley. He installed a home charging system in his apartment complex but needed to use an extension cord to reach from his assigned parking spot to his EVSE. A self-proclaimed environmentalist Richard cast himself as "*the type of person who digs through the trash*" to get all the recycling in his willingness to expend extra effort to limit pollution. Richard explained how the shift from ICEVs to PEVs represented a move toward clean energy production beyond the environmental benefits of using electricity in lieu of gas. "*The great thing about it is as more [gas vehicles] get obsolete, electric cars will get less obsolete because as the government pressures the utilities to make cleaner and cleaner electricity it means your car is cleaner and cleaner because of the electricity you use and you can't do that with any other car...*" Richard valued his PEV because, running on electricity, it allowed him to travel without actively

polluting. Richard's belief in future state-mandated changes to electricity production assuaged his fear of continued pollution at the production level and enhanced his positive perception of the physical performance of his vehicle.

Bill described himself as a "*hippie, earthy, backyard do-it-yourselfer*". He and his wife purchased a LEAF shortly after moving to California. Before they moved, they drove a converted bio-diesel SUV, and before the SUV Bill drove a 1973 square-back converted electric vehicle. Though Bill was the driving force behind the LEAF purchase, his wife does most of the driving since he commutes using a motorcycle. For Bill, buying an electric vehicle was closely connected to an across-the-board move away from gasoline fuel toward clean energy production and consumption. Bill and his wife framed their purchase of a PEV as part of a larger energy consumption practice. The physical value of the PEV came from the ability of an electric vehicle to move the family toward their goal of clean energy production and consumption. Bill described the other changes he and his family made to the way they consume energy, "*we are moving that way, there are modifications that we did to this house when we moved in that are just now being tidied up. [Now] we will move to putting in solar heat and then floor hot water. Bang for buck hot water is probably an 8,000-dollar system, so that I can get rid of my gas heater that's outside my last gas appliance. The other reason for going totally electric for the infrastructure of household was then to put solar panels on the roof and sort of push our cells off grid*." Bill envisioned complete independence from industrial power production as the path to clean energy consumption. "*Granted the LEAF and all the electricity in our house is being produced by something, somewhere. Whether that's coal burning or natural gas burning locally or some power plant it still creates problems down the line so the tradeoff is— do something now or pay the consequences later. But I think we are going to pay those consequences anyways. We had*

purchased a house and when we purchased it we were burning about 2,000 gallons a year worth of fuel oil and the was just the domestic hot water and heating the house"

Bill's perspective on clean energy production reflects a common concern shared by PEV drivers and non-PEV drivers alike. Though some consumers attributed the environmental value of clean energy to PEVs, others remained unconvinced that a move to electric power as a source of fuel offered a cleaner alternative to gasoline. For many of these skeptical drivers, guaranteed solar energy production increased the environmental value of PEVs enough to motivate the vehicle purchase. Prior research on PEV drivers and participants in green electricity programs suggest disparate levels of prior commitment to green electricity among PEV drivers. Those with high prior commitment to electric vehicles viewed EVs and green electricity as stemming from the same environmental motivations (Kurani et al., 2012). PEV lessees and green electricity program enrollees were found to share many of the same motives for using their respective products (Axsen and Kurani, 2013).

PEVs Increase Fuel Efficiency

As I discussed in the previous chapter, energy efficiency is at the forefront of sustainability discourse. For several drivers the energy efficiency of PEVs was related, in one way or another, to sustainable energy concerns. Alan, a LEAF driver who attended the technology-oriented focus group in the LEAF project explained his interest in the PEV as an energy efficient technology, especially when compared to ICEVs. "*I think I first read about battery electric cars in a Popular Mechanics article back in the 60s. Before that, I'd always been looking at alternative propulsion – back to the early 1900s when they had the steam. I always thought that gasoline engines were a horrible clattering mess. There had to be a better*

way. The battery was so efficient and the engine and the drive train, etc." For Alan, energy efficient technologies represented a way to reduce his consumption of finite resources and maximize the potential of any energy he does consume.

For some drivers, however, the energy efficiency of electric drive technology was not necessarily connected to sustainable energy, but instead represented a personal benefit in terms of maximizing fuel efficiency, either in terms of cost benefits or to reduce waste. Frank was an early Volt buyer from California who we interviewed for the LEAF project. Frank commuted long distances for work several times a week and explained that the draw of the PEV was the energy efficiency rather than any environmental concern. "*I'm not a hippy. I'm not an environmentalist. I'm a conservative but I like efficiency and I felt from just the pure efficiency standpoint it was more efficient and I like the fact that I could re-coop energy from when I'm breaking or coasting. I wanted something that was energy efficient and really good on the technology*." For Frank, the energy efficient technology of the PEV represented, an interesting technology, a way for him to save money on fuel costs, and a means of maximizing his energy use. Frank also spoke of his interest in putting solar panels on his house as a way to produce enough energy to fuel his vehicle. Casey was a LEAF driver who participated in the LEAF project as a member of the focus group selected based on their interest in technology. As the group was explaining their purchase narratives to one another, Casey articulated his interest in the electric drive technology. "*I've been a technophile for a long time... A friend of mine who is another technician told me about the LEAF long before it came out and he said, 'This would be something that you might be interested in for your next vehicle.' So, I really looked at it. I'm very familiar with the way the technology works. I know the induction motor has been around since the early 1900s. It's a very simple technology. It's really nice, the idea of being able to*

have it recapture energy. As soon as you stop applying the accelerator, it starts recovering energy back to the battery. It's a very elegant system that way. I think it's very cool. I make a game out of it on my commute." Different models of PEVs include as part of the in-vehicle interface a way of tracking one's environmental contributions, for example, with the LEAF drivers can track how many "trees" they "save" during their travel. Additionally, drivers can use their phones to see how their driving efficiency ranks among other drivers of the same make and model of car.

PEVs Provide Pleasure and Enjoyment

The concept of physical value allows for the incorporation of emotions, as physically felt phenomena, into an analysis of valuation. Studies of ICEV consumers support the importance of affective aspects in how consumers (e)valuate cars (Nilsson & Küller, 2000; Steg, 2005). These types of qualities also play a significant role in the (e)valuation of PEVs. Indeed, Schuitema and colleagues (2013) demonstrated that consumers value the physical attributes of PEVs in large part because they are associated with hedonic (the pleasures of driving a PEV) and symbolic qualities. Graham-Rowe and colleagues (2012) find that PEV users value their vehicle for what they perceive as its affective value, describing a "feel–good" sensation that they attribute to driving the car.

During his interview, Mark, who drove a LEAF and participated in the workshop project, described why he liked driving the car. "*From a purely fun level it's like a giant go cart to be able to have all the torque going to the wheels instantly*." Sebastian, who was one of the early LEAF drivers that participated in the LEAF project, shared a similar sentiment. He connected his interest in electric vehicles to his experience as part of an electrathon racing team in college.

"*Driving the car I think is great. It performs much like I expected from the electric run driving days with the electric motors. Mechanically I really like the car, it handles well and it's a lot of fun to drive. I don't generally drive it as, I don't know, fuel efficiently as a lot of people do but with my commute and all that's not necessary*." As Sebastian explained, he purchased the LEAF expecting it to provide a similar experience to the cars he drove for the racing team and prioritized the pleasure of driving the car over fuel efficiency. Stock and Shulz (2015) suggest that consumers adopt technological products they connect to pleasurable experience motivated by fun and their interest in technology in general.

One of the key points that emerged from several PEV driver narratives was that these consumers viewed some of their interactions with the vehicle as play. They told stories of taking their children for "fast" rides in the car, using the integrated "game" to maximize their driving efficiency and compete with other drivers. As with ICEVs, consumers associated adventure, speed, and power with driving PEVs. Myths of automobility are even embodied in the physical design of the car which reinforces their symbolic association with driving (Wright & Curtis, 2005). PEV users also expressed their valuation of the car through a frame of curiosity. They wanted to know how things worked and how products could be pushed to their limits and made to do things that others, including the manufacturers, may not have known they could do. Some PEV drivers shared stories of taking their vehicles on long trips to explore the limits of the car's range, to test the availability and ease of away-from-home charging, or of implementing user designed modification to their vehicle. PEV drivers shared a sense of excitement as testers for this new and different mobility technology, an emotion closely tied to the imaginative value consumers derive from the perception that PEVs connected them to a pioneering and adventuring ethos.

Expected Positional Performances

PEVs Confer "Wacko-greenie" Status

Broader research on sustainable consumption has engaged with the potential of pro-environmental products to provide positional symbolic value to consumers. Researchers have variously conceptualized positional value as an increase in social status (loosely defined) or as group membership. A number of studies suggest that beyond individual acts of consumption, the adoption of a green self-identity or lifestyle is driven not only by an internalized moral code but also by the desire to raise one's social standing or to declare group membership (Griskevicius et al., 2010; Sexton & Sexton, 2014). Some researchers posit that consumers actively pursue positional value through conscious acts of conspicuous consumption or identity construction, while others believe the positional value of pro-environmental consumption is related to an "eco-habitus" and comes from consumers' high cultural capital which expresses and reproduces their status through pro-environmental tastes (Carfanga et al., 2014; Elliot, 2013). In studies of the PEV market, researchers frequently connect the positional value of PEVs to the perceived environmental attributes of electric drive technology, and suggest that for many consumers this positively influences their likelihood to purchase the vehicle. Although they were looking at HEVs, in 2007 when the New York Times reported on the motivations behind Prius purchases, drivers indicated that the primary reason for buying a Prius was to make a statement, to show the world that the driver cares (Griskevicius et al., 2010). As one participant explained, "*It's really about status. I feel like the LEAF is sort of the extension of the Prius you know, like when the Prius came out there were people you know, like the Professor type professionals, not necessarily really wealthy but you know they had the means to buy maybe something more*

expensive than the Prius but Prius was a new type of status symbol ... The badge of I'm being green I'm doing what I can, which I'm not saying that's bad, but it's not necessarily just that they really do want something good for the environment".

Patty, an ICEV driver surveyed and interviewed in the final project outright expressed her desire to be seen as an environmentally conscious consumer. "*But I feel there is an underlying tone of -- that is the statement you're trying to make. Like, this matters to me, the brands we choose are really like important. Like, I certainly don't want to be associated with things that are horrible and I think there's a sense that I'd also like to be making that statement. I want it to be -- I don't want it to be in your face about it but I want to feel like I'm in the club.*" During her car history narrative Patty explained that as a student she could not afford a PEV, nor did her travel demands allow her to own a limited range PEV as her only vehicle. In her survey design game, she chose a PEV for her next vehicle and in the interview Patty was adamant that her next car would be a PEV.

Unlike Patty, most of the respondents who participated in this research did not explicitly articulate a desire to gain social standing through their PEV purchase, particularly with regards to what they perceived to be the pro-environmental qualities of the vehicle. One prominent exception to this trend is illustrated by ICEV driver Nichole, who drove a 2013 Honda Fit and designed a Honda Fit EV in the LEV survey design game. In the interview, Nichole explained her motivation to move to a PEV from an ICEV. "*I mean it's everything. I mean you're polluting, it's money, and you know, it's just -- there's the stigma. I feel like people look at SUV's and just like, 'oh my God, I can't believe they have an SUV'. You know? Everyone's so, you know, green these days*." Nichole's comment represents her desire to move away from the "stigma" of a gasoline vehicle and position herself among the environmentally conscious PEV

drivers, a perspective that was shared among several respondents and openly talked about in their discussions and interviews. Even then, the positional performance of the PEV was framed as a way to avoid a negative social stigma rather than advance one's social standing.

In general, drivers expressed their motivation for purchasing a PEV in overtly moral terms, as arising from an internal commitment to pro-environmental action, rather than as concern for their social position. Based on his interviews with consumers regarding ethical consumption, Grauel (2016), suggests that the presentation of moral motivation as an internal force, shaped by external, social established moral justifications, is employed to authenticate and legitimate consumer behavior. According to Grauel, these performances of internal morality represent expressions of self-identity, through which individuals work to establish themselves as a person deserving of moral esteem. Like, Miller and Bentley (2012), I found that among individuals who perceived themselves as sustainability leaders, felt that displaying their "greenness" represented a means of motivating and inspiring others to adopt sustainable consumption choices, in this case buying a PEV.

Floyd and Marlene, a retired couple living in California, bought a PEV one year prior to their interview and declared they would "*buy another EV in a heartbeat*". They attributed their purchase of a 2011 LEAF to a desire to "*save the planet, promote green electricity and green electricity hopes*". Floyd and Marlene cast themselves as pioneers of commercial electric vehicles who were "*working out the bugs*" of electric vehicle technology to facilitate widespread adoption. Marlene described the collective identity of PEV drivers as, "*nerdy liberals who want to save the planet, have environmental concerns and a pioneering spirit*" and indicated that she and her husband fit into this group. Floyd elaborated on his wife's opinion stating, "*let's face it the adopters are the ones who really want to save the planet it's the CO_2 emissions and the nitric*

oxide emissions and the smog and things that that are environmental concerns, [like dumping] the oil and gas into the ocean. But by and large I would say the early adopters are the people who would be concerned about the environment and smog and global warming and the impact that automobiles have on that." Though they do not explicitly state the positional value they attribute to the PEV in terms of social status, it is clear that Floyd and Marlene enjoy belonging to what they perceive to be the type of people who drive PEVs. Edgar, another early LEAF driver interviewed in 2012, attributed his co-workers' perception of him as an environmentalist to his PEV. He explains, "*At work I am kind of like the 'wacky greenie' who drives an electric car. I am evangelical about [the LEAF]*." Floyd, Marlene, Edgar, and others like them, share an expectation of recognition as environmentalists or "greenies" based on their purchase and use of a PEV, which presumes a shared understanding of morality. As Horton (2004) notes, "a green identity is not an essence, and owes its appearance of solidity to the regular, routine performance of green cultural practice" (p. 75). In the research conducted for this dissertation, as they constructed and performed a green identity, consumers internalized and reproduced the broader morality of sustainability ideology.

PEV drivers who saw themselves as environmentalists often spoke of themselves as rational, moral, and responsible people emphasizing these traits by characterizing others as ignorant, emotional, and irresponsible individuals, whose inaction served to exacerbate the sustainability crisis. Steven who owned a Camry Hybrid, and took out a lease on a LEAF in 2011 which he was driving at the time of the interview, explained his perception of the personal relevance of climate change. In Steven's opinion climate change represents a man-made environmental threat that will have grave consequences if not addressed. "*Global warming in my opinion is so real that those who don't believe in it have their heads in the sand, and it's*

unfortunate that I can't have a good technical discussion with people about that because its more an emotional issue for them, but all indications are very clear we're going to slowly broil our entire population and everything else in the world if we keep going the way we are." For Steven, buying a PEV not only represented a way to address his fear of global warming and affect environmental change by actively reducing his CO_2 emissions and but also positioned him as logical and scientific against the misguided emotional other with their "*head in the sand*". Similarly, Melissa, a Volt driver expressed her frustration with people who deny climate change, especially in the face of what she perceived to be an obvious connection between vehicle exhaust and climate change. "*And then you have these people denying that this is happening. I'm like, how can you? You're going to not listen to researchers and just listen to a few people that are just blowing smoke in your -- literally, just blowing smoke in your face? I mean there's so many things -- so, every little step that I can do as one person and influence other people, because it's not like I just do it and don't say a word."* In their research on young environmentalists Perera, Auger, and Klein (2016) similarly found that 'green' consumers classified "supposedly uninformed consumers as 'ignorant others' and thus showed their green credentials in part by negatively labeling others and considering them as part of the outgroup" (p. 8).

Alternatively, among both PEV and non-PEV drivers, the pro-environmental qualities of PEVs provided, in their opinion, a negative positional performance. Other researchers have revealed that the stereotypes associated with PEVs and HEVs are often unfavorable and people frequently display an "us vs. them" mentality when they frame themselves as everyday consumers against green consumers (Caperello et al., 2014; Graham-Rowe et al., 2012; Heffner et al., 2007). As one ICEV driver interviewed during the LEV study put it "*you know, people to go around thinking I got an electric car, so I'm better than you. Bullshit, you're not. You ain't*

no different than me, you just have more money." Among the participants in this research, several attached a stigma to green consumption and were reluctant to associate themselves with the stigma of being an "environmental wacko" (Caperello et al., 2014) or a "*pot-smoking hippie*". This exchange among Albie, Marc, Winston, and Lucas, four non-PEV owners at the end of one of the three workshops is illustrative of this perspective. Albie: "*Not being captive to the oil companies I think is a real benefit*." Marc, "*Absolutely. And I'm not an environmentalist wacko, again to use that term, but I like clean air. You know I like things being clean*." Winston: "*You said that too. I'm not crazy but I do like to be conscious*. Lucas: "*Keep a low carbon footprint, like, why not?*"

The negative stereotypes associated with environmentalists often represent pro-environmental consumption as radical, irrational, and financially irresponsible. Franklin and Dunkley (2017) suggest that the media industry perpetuates these negative stereotypes by portraying environmentalists as "high[ly] eccentric" (p. 3). Thøgersen (2011) suggests that green consumption practices threaten people's perception of themselves as competent and rational individuals. Consequently, as we see with Albie, Marc, Winston, and Lucas, consumers reframe PEV purchases as motivated by selfish reasons or by other sustainability concerns, and downplay the environmental benefits of their behavior, emphasizing instead the ease with which sustainable consumption can be achieved. Samantha, a PEV driver who participated in the same workshop distanced herself from a pro-environmental identity and explained, during an interview, how her purchase of a PEV was motivated by the financial benefits of buying and using the vehicle. "*I don't really consider myself to be an environmentalist. Like, I like my air conditioning on, I'm not a vegetarian you know, I started to look at the electric vehicle based solely on the math. And then my job… and this is going to sound a little weird but I work for the*

Air District…so I was around environmental stuff… but I wasn't really taking my own advice. I went and bought an SUV. And I felt a little bad about that." Interestingly, although Samantha bought the car "solely for the math" she goes on to reveal how the environmental value of the PEV emerged after her purchase of the car. "*[The PEV], it's sort of been this light bulb in all honesty. It's been like the gateway drug. The electric vehicle, and the incentives have been the gateway drug to all of these other things I'm doing in an environmental capacity and like I said they totally got me…. I do not see myself having another gas vehicle. And I'm in a position, if in three years I need to go buy a Honda or you know the Prius or the Volt or whatever it is that's going to be out there in three years and it ends up being a 30,000 dollar car I'll be like, 'maybe the government wasn't so silly in their incentives because now there's no incentives and I bought a 30,000 dollar car and I'm perfectly happy with it' But I don't see myself having a gas car again, unless something happens to the world and the infrastructure and there's not the option*." In her narrative, Samantha reveals a reflexive awareness of her "us vs. them" mentality even as she sees herself becoming part of the 'greenie' group saying, at one point, "*Now I definitely joke that I feel morally superior driving around…especially when I'm behind one of those cars belching black smoke."* That being said, in the workshop setting Samantha, like many of the other PEV drivers in her region, focused heavily on what they perceived to be the financial benefit of PEVs rather than the environmental ones. These drivers, when explaining the "logic" behind their PEV purchase, emphasized the calculation of financial savings, presenting themselves as rational self-interested consumers.

PEVs Confer "Early Adopter" and "Tech Enthusiast" Status

We interviewed Loren, a 2011 LEAF driver, as part of the LEAF project. According to Loren, people generally pigeonholed PEV drivers as environmentalists but that there was a less obvious technological element that characterized PEV users as a group. He explained, "*I mean it's just not easy to figure out the other aspect to [PEVs] is that most of the people that buy LEAFs, that I've met, are very techno savvy and they really like to have information*." Loren was representative of the majority of participants, whether they drove a PEV or not, who associated technology-oriented characteristics with PEV drivers. These characterizations ranged from perceptions of PEV drivers as tech enthusiasts, "techno-geeks", and early adopters to individuals who were tech savvy or technologically informed, and people who worked with technology at their jobs (e.g., engineers, computer programmers, scientists). In recognizing the ubiquity of these perceptions, some drivers found positional value from the ability of PEVs to actualize their technology-oriented self-identity, which they associated with these characteristics.

Several PEV owners explained how their car granted them group membership in the "technological vanguard" or conferred, in their opinion desirable, the social status of an early adopter with access to brand new technology. Among these drivers, part of the draw of owning a PEV came from a desire to be the first to own a new technology and a way to show off this ownership. Edgar was a participant in the technology-oriented focus group implemented in the LEAF project. He told the rest of the group that he loves surprising pedestrians with the PEV. "*Whenever I get the chance, I turn the fake noise off so when I drive by someone, someone will go, 'god damn that's quiet,' and I'll look in the rearview mirror and I'll see someone turn around and I can see them thinking, 'That's really quiet.' I'm hoping they'll just get it – that it's a new technology and it's something you've never seen before. Get used to it."* During her interview, Samantha, from the workshop study, expressed how the PEV gave her a sense of

"*moral superiority, or pride or just um, excitement of how you know awesome the technology is*." Other PEV drivers from the same workshop expressed similar sentiments during their small group project, where one explained, "*I like having something that's new and different. I finally have something that my neighbors don't have. I don't know if its pride or technology. I like having something that people want to talk about you know, and kind of being out there on the cusp.*" This opinion was enthusiastically supported by other PEV drivers.

For other drivers, the value in being the first to own a PEV came from what they perceived was as an opportunity to be a leader or an "ambassador" for PEVs, and to develop a level of expertise that enabled them to offer other drivers information and to encourage adoption rates. Garrett was an interviewee from the LEAF project who had purchased a LEAF approximately six months before the interview. In reference to earlier iterations of PEVs in the 1990s, Garrett offhandedly mentioned he purchased his current PEV rather than leased it, telling interviewers that he wanted to own the car even if it was a complete failure and was committed to being an EV driver. This he attributed, in part, to his interest in technological innovation. Garrett, "*Yes, absolutely. The majority of the people that I know at work either request [a ride] or just by happen stance. I'll go to lunch and it's like 'Hey. I'll I drive the EV' and it's like everybody wants to get a ride in it and most everybody asks me questions about it and one guy called me the ambassador of electric vehicles ushering in this new era of vehicles. I've wanted one for a long time so I actually got one pretty quick. I was actually surprised that I knew about this stuff but I was interested a long time ago so when the LEAF project started and I put my $100 dollars down I was skeptical that it would even ever happen...Um I haven't thought about it in those terms although I did consider some of my friends when I was gunning to get this car. Some of my friends said 'you should start a blog you know so you could tell everybody your*

experience' and I thought that was a great idea." In the interview, Garrett explained that he experiments with the LEAF, and his experimentation is "ongoing". Initially he was only testing the driving range but now he is also experimenting with public charging, and was planning to make a test drive to Los Angeles from San Diego. Garrett also regularly checked the "progress" of the public charging network, explaining that it is both "interesting" and "fun". At the end of his interview Garrett claimed that purchasing the LEAF was the best car buying experience and he would do it all over again. Sven, another early LEAF driver shared a similar perspective saying, "*It just appealed to me. I thought well, if an electric car is ever going to happen—and it should happen—somebody will have to be the pioneer. So I felt that I'd like to get involved in helping to create a demand for a charging network and to get people accustomed to seeing all the electric vehicles by driving one*." Among respondents who worked at high-tech companies, several explained that they, as well as their work colleagues, were interested in the vehicle because it represented the next "new big thing". In part, they were keen to associate themselves with the kind of people who adopted new technological innovations who they viewed as like-minded people.

Expected Imaginative Performances

PEVs Represent Sustainability

Ten years ago Connolly and Prothero (2008) argued that the growing dominance of sustainability discourse, particularly the concepts of sustainable consumption shaped how consumers perceived and narrated their consumption practices. They explained that "the practices consumers engage in are now discussed in terms of the environmental sustainability of such practices." (p. 119). For consumers in the PEV market this still holds true today as

consumers draw on the vocabulary of sustainability discourse to describe the environmental and technological qualities of PEVs, and the ways in which these qualities contribute to the value of the vehicle. However, the sustainability discourse, as I discussed in chapter 4, is broader than just environmental issues, and connects ecological sustainability with political and economic concerns. All three are reflected in the narratives of consumers who connect PEVs issues of energy production, foreign policy, and economic development. As Beckert (2011) notes, when consumers see a product as offering a bridge to ideals and values, this can become a source of imaginative value they attribute to the vehicle. He explains, "when goods become material representations of otherwise abstract or distant events, values, and ideals, they offer a mental realization of the desired. The symbolically charged good evokes sensations that virtually embody the realization of the desired state" (p. 117). For the consumers who find imaginative value, in PEVs, the vehicle represents the material embodiment of sustainability ideals but also provides a means of participating in effecting a sustainable future.

Climate Change: Melissa a Volt driver, was a participant in the third research project, and completed both a survey and subsequent interview. Melissa already owned a PEV and in the survey design game she selected a PEV, citing the air pollution, climate change, desire to pay less money to oil companies, and to reduce the amount of imported oil as her primary motivations for designing a PEV. During the interview, Melissa explained how for her, driving a PEV represented "doing her part" to reduce climate change and air pollution. She stated, "*emissions [are] a big thing. I mean just sitting in traffic, every so often, I'll sit behind a car that I'm like, how did you pass your smog test? Like, I'm literally like, there is black soot flying at me. It smells. It just makes me sick. Honestly, just the fumes and stuff, when I'm stuck in traffic.*

I'm just thinking of the number of vehicles here. We've heard about climate change. We've heard about the ozone layer depleting. And I'm just like, anything that I believe can make a positive impact and slow that process down because we're in bad shape. I don't know what's going to happen. I'm seriously worried… The money aspect of it is nice, but just the fact that, most of the time, I'm driving on electric, not using gas, not expelling carbon dioxide into the environment—whatever else it's expelling—I feel pretty good about it." For Melissa and others like her, the imaginative value they derive from driving a PEV comes from their concern about anthropogenic global warming, the bogeyman of man-made environmental hazards.

Several PEV drivers and ICEV drivers mentioned climate change as a very real and present concern in their lives. Like Melissa, and Steven the LEAF driver I introduced earlier, and Russell, from the workshop project, who described the potential for a "*burning inferno*" if global warming goes unchecked, several of the respondents in all three studies expressed concern about anthropogenic climate change and associated global warming with GHG emissions from ICEVs. The concerns about climate change expressed by participants in this study are shared by an increasing segment of the population. In the United States, climate change has rapidly become a concern to the broader population, in particular, concern over global warming. The data for this project came from interviews that took place between 2012 and 2015 and as I discussed in Chapter 4, at that time climate concerns represented a hot political topic in the United States and a major focal point for sustainability advocates. Data from climate change research, collected in 2016, revealed that 70% of people in the United States believe that global warming is taking place, while only 13% of Americans do not think global warming is occurring. In total, more than half of the Americans surveyed believed that global warming was a result of human activities, while 30% believed that it was due, in large part, to natural events. Of those surveyed,

57% expressed some concern about global warming and 40% claimed to have personally experienced the effects of global warming (Leiserowitz et al., 2017).

Renewable Resource Consumption: The category of renewable energy sources includes naturally occurring, (theoretically) quickly and naturally replenishing methods of energy production, using sources such as solar, geo-thermal, and water. The following quotes illustrate the use of a renewable fuel source as a source of imaginative value consumers attributed to PEVs. ICEV driver Miranda, who participated in the third research project, owned a 2008 Honda Civic and a 2008 Mazda 3. In the vehicle design game section of the survey Miranda designed a plug-in hybrid as her vehicle of choice. In the survey, when explaining her choice in the game, she ranked saving money on fuel, saving on the up-front cost of vehicle purchase, and paying less money to oil companies as her primary motivations in choosing a PEV. In her follow up interview, however, Miranda focused more on environmental issues as a driving force in pushing her toward an electric vehicle. She described the depletion of natural fuel sources as a problem that can be addressed by moving away from gasoline vehicles to electric vehicles. Miranda explains, "*well, I think because there's so many vehicles and the way that we are going, the future isn't going to have fossil fuels, our natural resources are going to be drained because of how much we drive and how much we consume. So any little bits that we can do would help. I mean I'm not a full, green person, but I mean if you can, I mean we can prevent limiting and depleting all of our resources, we don't want to do that. And electric is something that we can renew that we can actually make and generate and I think that would be a good -- anything that we can do to help [not] deplete all of our natural resources right now. You know, we're kind of killing our environment.*" Miranda, a non-PEV driver, represents a large portion of non-PEV

drivers interviewed who suggested that the depletion of resources represented a potential future energy and environmental problem and indicated the use of electricity as a practical solution.

Sally Anne purchased her LEAF at the end of August 2011. The 52-year-old computer programmer had been very interested in electric vehicles since her early 40s. When she purchased her previous car, around 2000, she felt that electric vehicle technology was not practical. During her interview, she explained the driving motivation behind purchasing her LEAF was a concern over the depletion of oil. "*So, I don't think anybody believes that gasoline is going to be the way to go for the next 100 years. I think it's pretty clear that it is going to continue to be harder and harder to supply that much oil to that many vehicles*." Sally Anne conceded that using electricity as a fuel source might be environmentally problematic in the short term, due to methods of production, but believed that by driving a PEV she would be working in the present to save an important resource, which would be beneficial in the long run. As I discuss in greater detail below, for Sally Anne the technological qualities of PEVs were closely related to the environmental qualities, and combined, they increased the imaginative value her vehicle offered. She framed her purchase and use of the LEAF as a shift toward renewable energy consumption but also as an "experiment" in testing out sustainable technology. She explained, "*So, electric vehicles are good because you can centralize the creation of electricity. The gas and electric company takes care of creating the electricity through whatever means is going to work best for them, and then there is this whole thing about that end of the system in creating electricity out of whatever it is they are doing. It could be actually a negative if you are being supplied by actually dirty coal plants. It might actually be cleaner, more sustainable, to have a gasoline engine, but um I think that if you looked at where oil is right now, and where it is most likely to go in the next 100 years, making the shift into other technologies is something that has*

to happen eventually, and I'd like to help have it get started. I think we have to go, we have to look at those aspects of it, but we also have to look at the sustainability of the oil market and how much it's… it's harder and harder to get to um oil these days. We can always find a new, some new oil field somewhere. Alaska was a great example of that, you know, nobody thought Alaska was worth anything until we figured out there was all the oil underneath it. And um, I'm sure there are other places like that on the planet, but thinking long term, having different ways of creating energy is a good thing. To have all our energy from just a very small number of sources is difficult for, you know it's difficult for a society, you know it's not sustainable for a lot of things". Sally Anne is among the many PEV drivers who cited the use of renewable resources as an environmental quality that provided a strong motivation for purchase. As Tesla driver Landon said, "*That's a pro for the EV. 'Drill baby drill.' Well, screw you Sarah Palin, I've got an EV*." These drivers saw their purchase of a PEV as an opportunity to actively address the depletion of energy resources by using an alternative, renewable fuel source, thereby ensuring energy sustainability in the immediate and distant future.

Economics and Politics: As PEV drivers discussed the environmental value of electric vehicles they coupled the depletion of fossil fuel—as an environmental crisis and an energy crisis—with the international politics of importing oil. They emphasized the economic and political risks of using oil as an energy source and framed PEVs as representative, in part, of a solution to these related hazards. Oliver drove a 2011 LEAF and participated in the non-techie focus group. At the time, Oliver worked for an organization that offered benefits for supporting alternative forms of transportation. Before buying the LEAF Oliver drove a converted EV (Ford Escort Wagon) in the 90s for around 9 years and was able to plug it in at his work. During his

purchase narrative, Oliver shared the story of how his interest in electric vehicles began in the 1990s, when he joined an EV club after attending an Earth Day event. "*Well, I was working in Japan for a while and then I came back from Japan to the United States in the early 90s, and if you recall, the economy in Japan was booming still; the U.S. economy was, like, in the doldrums at that time. And I went to ---- Park for the Earth Day events and I met a guy who was going to do conversions, so I learned a little bit about that and decided we could help clean the air, reduce oil dependence, support local industry or something that was getting started at that time. In the 90s, I did it for multiple reasons… to reduce our trade deficit, reduce our oil dependence and all that stuff. I sat down and calculated it. We used to import 65 percent of our oil; now we're importing about 45 percent of the oil, because we're pumping more [gas] out plus we're changing our habits, you know, picking different cars that get better gas mileage. So I sat down and calculated it, and maybe my calculation's wrong, but roughly I calculated, if you spend $1,000 on gasoline a year, or $2,000, which is really easy, or $3,000, if you drive an SUV, about 30 percent of that is going to pay for foreign oil, so that's $300, $600, to $900, that you are just sending overseas. Well, electricity is so much cheaper if you're charging at night, you have more money to spend on the local economy, and you're not sending money overseas, so it's good for the local economy. So that's what I talk to people about is -- I say one of the things I like about electric cars is you don't have to send your money overseas every time you're filling up, because that's what we're doing, and we save it for the local economy, help with it.*" Oliver connected his experience in Japan with the initial impetus that sparked his interest in electric vehicles. For Oliver, the concept of the electric vehicle evoked a connection he had already made between the technological development of post-war Japan and national economic success. At the time, Oliver felt that the United States' economy was "*in the doldrums*" and perceived electric

vehicles not only as a way to address environmental concerns but also to stimulate the national economy. Significantly, Oliver described learning about the economic and political benefits of the adoption of PEVs at an Earth Day event, indicating that others beyond himself, made similar associations. Other PEV drivers expressed discontent with the state of electric drive technology in the United States, pointing to Japan as an example of successful technological and related economic advancement.

A number of consumers, both PEV drivers and non-PEV drivers discussed the politics of oil consumption. These consumers generally held a negative view of the countries that supply oil to the United States and/or the oil companies involved in producing fuel for mass consumption. For some, the hostile relationship between the United States and oil producing countries, in particular the armed conflicts over the nation's energy supply, represented their primary concern about the political sustainability of oil consumption. Daniel, was a Volt owner whose wife drives a LEAF said, "*I think what probably triggered it [his PEV purchase] was 9/11; the war in Afghanistan and then the war in Iraq. I mean at least to me the war in Iraq was clearly an oil war.*" Nathan, another participant in the LEAF study, purchased the LEAF but his wife drove the car and he used a bicycle or public transportation for his individual travel needs. Nathan explained that his interest in electric vehicles started with the idea of converting his gas car to an electric vehicle in 2006. Nathan thinks industry should focus on developing only electric vehicles. "*Well I was greatly affected by our international political affairs. And when we invaded Iraq I just though this is irrational, we are doing this to maintain this energy flow. So I wanted to figure out a way to take us out of fossil fuel consumption to the extent that we were doing.*" Nathan attributes his changed consumption behavior to deep concern over the international politics of oil. For others, such as Marlene, it was the politics of the oil producing countries that

contributed to the value of her PEV. She explained, "*I don't like the politics of a lot of places we spend money [for oil]. I don't like the way women and children are treated in some of the places we do business with.*"

There were several participants who expressed greater concern over the political and economic sustainability of fossil fuels than any environmental issues connected with the use of oil as a fuel source. Miles was a 64-year-old retired San Diego resident who owned a 2011 LEAF and an original (HEV) Prius model. His interest in electric drive technology, which he attributed to the oil crises of the time, originated in the 1970s. Miles explained that he is a climate change skeptic, which to him meant that he was unconvinced that global warming was a human-caused phenomenon. Regardless of the driving factors of climate change, Miles ultimately believed that any action on his part to mitigate global warming would be futile. Instead, he was interested in moving the United States away from fossil fuels, for political reasons. Miles explained, "*So trying to get rid of fossil fuel, you might ask, 'why not to save the planet?' but [I want] to save the United States. Mainly get us of out of the Middle East. I think we are being held hostage there and I think it is mostly due to fossil fuel, in fact I think the whole country's problems have a lot to do with that. I don't think of the scale of global warming like other people, I'm not educated enough about it. I can do something about this... I'm getting rid of gas appliances because it is fossil fuel depending on where you live. I don't know but here I know it's coming from imported gas like Russia or somewhere Canada, so I really like the fact that I still have close to a zero electric bill despite the fact that if have my LEAF plugged in, despite the fact that I turn on my hot tub that I've had turned on for years and it eats up a lot of electricity. Now that I generate my own so I can turn it [the hot tub] on. You can still make the argument that it is decadent but I don't care."* To Miles buying a PEV was closely related to his purchase of solar

panels. In fact, Miles suggested that car companies work out some sort of package where consumers could buy both a car and a photovoltaic system. Miles purchased solar panels for his house before he purchased his PEV and wants to use them to provide energy for all his household and transportation needs.

Here we see how consumers understand sustainability in terms of economic development. From this perspective, reliance on oil as an energy source is problematic on two fronts. First, by importing an energy source Americans are sending money that should be put back into the local economy, to other countries. Second, as it becomes scarce, the cost of oil will increase and the United States will be competing with other countries for access to its main source of energy. Consumers also expressed sustainability in political terms, framing the concept of sustainable energy consumption as political security, either to protect the United States, or as a way of avoiding international conflict. Finally, a number of participants, like Marlene, expressed political sustainability through a moral lens condemning oil producing countries and/or oil companies.

Future Generations: It is evident from these sections above, that visions of a sustainable future represented a common theme among consumers as they discussed the value of PEVs. Some consumers however, specifically associated PEVs with sustainable energy consumption through the lens of preserving the "earth" for future generations, and more commonly their own children and grandchildren. Rod and Bella were two ICEV drivers who participated in the LEV study and live in California. At the time of the study, Bella was a grandmother and Rod and his wife had just started trying to get pregnant. In the survey both Rod and Bella each chose to keep a larger vehicle, which meant giving up an alternative fuel option during the design game. When

asked about their survey responses in the interview Rod and Bella talked about balancing their desire to prevent increasing environmental risks for their (grand)children with financial concerns and a reluctance to try what they believed was a unproven technology.

Rod saw the PHEV as an optimal stepping stone toward a fully electric vehicle—a compromise between green energy and comfort and safety— and one that he would consider trying in the near future. For Rod the current cost of PEVs was prohibitive, especially given his recent purchase of a new vehicle. In his interview, Rod talked about environmental motivations for electric vehicles, and although he liked driving a large car he supported the development of electric vehicle technology. "*I love the promise of the fact that we can potentially preserve mother earth for our future generations. That's what I love. And I strongly support President Obama about that because what are we gonna leave them? And the low emissions cuts down on the smog, because like I said, my in-laws are Filipino and so we go over there and we've also been to China, the smog there is bad. It is. And so, I don't want that for future generations, and so with the low emissions, we can maybe not eliminate it, but maybe hopefully make it bearable so that they can have a future, too. And this helps the environment, this helps to preserve mother earth for us to give to our future generations. We cannot keep using our fossil fuels because for one thing, that supply is drying up.*"

Bella owned a 2011 Honda CRV and a 2007 Honda Civic. In the survey she expressed concern about charging and range limitations and wanted higher incentives. During the interview, however, she brought up environmental hazards as a strong motivation for her increasingly "pro-environmental" consumption habits. Bella explained that she would be much more willing now, as a grandmother, to buy a PEV than previously. For her the value of the vehicle came from its connection to her grandchildren's future. "*The older I get, the more green*

I'm becoming. I'm becoming what I always hated, which is a tree hugger. And I pulled all the way over to the other side. It's scary to me, but it's also because I'm a grandmother now and I want to save the planet for my kids. Where before, I didn't give a s----. Blow it up. You know? The hell with it. So I'm becoming more green. So, it would be money, but it would also be environmental impact, recyclability, fuel, how it's made, how much it's going to cost. You know, is it going be available to me when I need it. So, there's a few things that I take into consideration now that I used to not take into consideration. I'm learning how to think properly. You think after, you know, 50 years, I'd have known. But yeah, I'm evolving. I'm evolving. That's what it is. My thought process and what needs to be done, versus, you know, where we're at, the climate and the amount of water and gas, and things that we have available to us."

PEVs Represent Accelerated Technological Advancement

Alan, from the technology-oriented focus group, shared his PEV purchase narrative with the group, explaining how he and his wife signed up for a test drive and went home already picking out the color of their prospective LEAF. Alan described his struggle choosing the car because he had planned, for a long time, to buy a luxury vehicle upon his retirement. Ultimately, however, Alan chose to purchase the LEAF because, as he told the group, it allowed him to be part of the future of automobility. "*My retirement car for many years I thought was going to be a Mercedes CLS 550. I love that car. I just love the way it slopes. I don't love many cars but that was going to be it. The moment of truth was I just couldn't accept 18 miles a gallon anymore. My wife and I had conversations about it. It didn't seem where the world was going and there was part of the fact that this was, for as beautiful as it was, this wasn't where we wanted the world to go. And the world was obviously going another way because [the LEAF] was a real*

car, real quality, and we wanted to be part of it. The guy right next to us – the house next door – has a LEAF also. We're side by side... There was very much a feeling that this was part of something that in some ways was history making and it was a very exciting feeling. She wanted the blue, I wanted the silver, we compromised on the white and we love it." Alan described his PEV as representing an alternative direction in the advancement of automobile technology with strong potential. This perception of PEVs gave meaning to his purchase and offered him and his wife a source of imaginative value. Like Alan, several participants framed PEV technology as the future of cars, which legitimated their interest or actual purchase of the vehicle, and characterized ICEVs as irrelevant or counterproductive. In the PEV market consumers tend to associate vehicles in the present with an imagined future value, extending the grasp of time into a period that has not yet arrived. ICEV driver, Charles who is in his 60s and retired explained his desire to purchase a PEV for his next vehicle, *"That's where I think the industry is going. I think anyone who is buying a conventional or gas car these days is not very farsighted."* This suggests that how consumers perceive the future informs their consumption practices in the present (Reese, 2016).

Sally Anne, the LEAF driver and computer programmer not only found imaginative value from the environmental qualities of the car, she also derived value from the technological qualities of the car. "*I've always been interested in the concept in the um, in the technology and the concept of an electric car. It seems to me to be a much better way of um, fueling an automobile, and I've been keeping tabs on some of the other alternate fuel technologies along the way, but it doesn't feel like to me any of those are really ready for prime time, and at the time of course neither was the electric cars, but um you know when I looked at the LEAF... when I looked at the LEAF, it appeared to me like it was going to be practical... Oh definitely I've*

always been interested in the concept of the electric car… but it has to be practical. It has to actually work for you, and um although I haven't dug into the real nitty gritty of the of the power system or technology, um I think it is um, I think it is interesting, but I didn't buy the car because it was cool technology so much as I was more interested in the fact that I think an electric car should be where we should be headed, and this is the perfect opportunity to experiment with that. I'm usually not an early adopter because I work in technology. Anybody who works in technology knows how crappy version 1.0 is... So this is a rare thing for me to jump on the first model year, but I was in the first market year for the car well you know if I buy another car I might keep it another 10 years or so and just decided to go ahead, knowing that there were going to be problems and also making the decision that if people like you showed up that I'd actually talk to you and help you figure out what's going on here because this is a grand experiment in the market.

For Alan, Sally Anne, and other consumers, the imaginative value of the PEV came from their expectation that the vehicle represented an advanced mobility technology, and that with the help of drivers like themselves, PEVs would accelerate technological progress. In connecting themselves with PEVs, consumers often positioned themselves not just as drivers, but also as pioneers and adventurers. As one PEV driver explained, to be an early adopter meant "*you do need, I think, a little bit of a pioneering spirit*." Another driver described the experience of owning a PEV as providing a "*sense of being a little bit of a pioneer*." Turrentine et al (2011) similarly found that EV lessees expressed feelings of excitement and adventure evoked by experiencing and mastering a new technology. Part of this pioneering "ethos" was associated with a conquering spirit, as LEAF driver Steven explained, "*I embrace technology. I have no sense of 'oh my god, this is daunting'*."

ICEV driver Jack was a Californian who participated in the LEV study. In the survey he designed a gasoline vehicle and a FCEV. In the interview, however, Jack explained that he intended to purchase a PEV as his next car. For Jack, the newness of PEV technology represented a strong motivation for moving from and ICEV to a PEV. He said, "*it's the cool factor, just having something that's new. And being on kinda like the cutting edge of things. I always like to get new gadgets and things whenever I get the chance. And the chance to kind of push forward this new technology is appealing to me. Just because it's new, and I like things like that*." In part, for Jack, the technology of the PEV offered a physical source of value as he enjoyed playing with new technology and liked to puzzle out how the vehicle works. At the same time, for consumers like Jack who enjoyed being part of the technological vanguard, the PEV offered the embodiment of "being on the cutting edge". By owning and driving the vehicle, these consumers felt like they were pushing forward technological development while also existing in a state of constant innovation.

Conclusion

The economic value of a commodity is not pre-determined by producers nor is it fixed, but rather consumers negotiate value in the construction and maintenance of markets. Products provide different sources of value to different people in ways not necessarily intended by producers or marketers and the meaning products take on may be multivalent and stand in opposition to one another. Even as individuals assign value to commodities, the substantial symbolic elements involved in the process of constructing value are socially constituted. Standards, status positions and social networks, social norms, and shared meanings all inform the valuation process. As a result, 'the assignments of value are subject to a dynamic process of

change" (Beckert, 2009, p. 257) based on varying social and cultural configurations. Aspers and Beckert (2011) conclude that,

> A theory of economic value must explain both how economic value is socially constituted and how economic value is the result of markets. To examine value assessments in markets, it is helpful to distinguish analytically between the questions of what it means to say that a good provides value for an actor and the question of how actors determine the value of a good. The first question refers to the dimensions in which a product or an asset can be valuable, the second to their evaluation. (p. 11)

Goods can become economically valuable to consumers in several complex symbolic and functional ways. Aspers and Beckert (2011) identify several dimensions of economic value: use value; investment value; individualistic value; relational value; functional value; and symbolic value, and actors construct rationalizations and explanations to reconcile disjuncture across dimensions of value. In this chapter I used Beckert's (2011) theory of physical and symbolic dimensions of value as a heuristic for looking at the sources of value within the PEV market to explain *why* people value PEVs.

Barthes' analysis of mythology allows us to understand how PEVs provide value to consumers. Within this framework, PEVs are mythically inscribed cultural objects, transformed from mundane products into material representations of sustainability. As such, they allow consumers to realize, at least mentally, sustainable development ideals. For some consumers, the PEV transforms a broader, global sustainability crisis, which would otherwise be both daunting and intangible, into something comprehensible and accessible on an individual and local level. For consumers who find imaginative value in the PEV, the expected performance of the vehicle transcends the "here and now", connecting drivers with desired future states, locations, or socialities (Beckert, 2011, p. 115). PEVs provide imaginative value to people by allowing them to act as "responsible consumers", participating in the reality that the ideals of sustainability

represent. This ultimately serves to reinforce sustainability as a dominant ideational regime, positioning individuals as responsible for environmental and socio-economic damage and reform.

CHAPTER 6: CONCLUSION

Beckert (2009) explains that the resolution of value is not simply the definition of a fixed "economic value" of a commodity in the market but rather "how individual actors are convinced, by their own valuations of a commodity to want to acquire the corresponding commodities as buyers in the marketplace" (p. 257). For markets to operate as such, potential market actors must overcome the uncertainty of interaction sufficiently enough to accept the risk of exchange. It follows then, that to understand markets we must understand the processes through which consumers construct value. It was this question, of how consumers resolved issues of value in emerging markets that structured my argument in this monograph.

I opened this dissertation with the claim that the sociological and transportation literature is lacking when it comes to explaining how consumers construct product value in markets. Throughout the dissertation I explored the different literatures that engaged with consumers, consumption, and markets. There exists a significant amount of transportation research and sustainability research in both political and academic arenas focusing on PEV consumption, but within this body of research, a limited number of analyses draw on qualitative research methods and sociological theories of markets. Qualitative methods allow researchers to access the priorities and considerations behind mobility choices. However, in transportation literature, social and psychological studies of driving behavior emphasize individual cognitive and affective determinants of transportation choices, to the neglect of a broader understanding of the underlying social structures that shape consumer behavior. I was particularly critical of transportation literature's focus on consumption as an individual act because, as Willis and Schor (2012) point out,

> The idea that consumption is an individual act, in contrast to citizen activity, fails to recognize the range of actions that take place both in the state and the

> consumer market. Not only is consumption social and collective in obvious ways, such as the prevalence of people shopping in groups, or consuming together, but, as the work of many consumer researchers has made clear, people's understandings of, motivations for, and conduct of consumption is deeply and profoundly social" (p. 163).

This makes even more necessary further qualitative research models that explain how such 'internal' psychological attitudes and preferences are constituted collectively as well as individually.

I turned to economic sociology, specifically the sociology of markets, which looks at macro-structures as explanans and explananda of market order and the stabilizing (and destabilizing) processes that enable and constrain exchange. Market sociologists explain the constitution of markets through analyses of networks and fields, relations and relationships, and the performativity of market technologies (Fligstein & Dauter, 2007; Fourcade, 2007). Much of this work orients toward demonstrating that markets are culturally, cognitively, structurally, and politically embedded (Zukin & DiMaggio, 1990). Economic sociology then, posits market activity, including consumer choice, as directed by networks, institutions, and cultural scripts.

I followed this discussion by looking outside of market sociology to the study of consumption, which focuses on cultural consumption and/or consumer preference as social (re)production (e.g., of class, gender, race) and boundary work, identity and lifestyle construction, the upshot of capitalist manipulation and a means for resistance, globalization, and commodification (Warde, 2015, 2017). In this section I traced the changing understandings of consumption from critical theory's critique of mass consumption to the current focus on identity construction and praxis. These accounts focus on explaining the whys of consumer preference but seldom how the constitution of preference solves problems of market co-ordination.

What I revealed is that, in part a result of their historical trajectories of development, new economic sociology orients toward explaining the order of markets, the production of market value (on the supply side), and the commodification process while studies of consumption focus on explaining why and how consumers consume, though there are notable exceptions among both groups. This bifurcation, along with economic sociology's general disregard of consumers, I argued, means that inquiry into the role of consumers in market processes, particularly product qualification processes, is limited. Instead, I drew on insights from both market sociology and studies of consumption (and consumers) to explain how PEV consumers confront the fundamental problem of value co-ordination in markets.

My methodological approach and awareness of the humanistic/experiential discourse allowed me to bring the subjective experiences of consumers into an analysis of the PEV market. However, working in the tradition of later CCT scholars meant incorporating both structural and agentic understandings of consumption and being aware of the flaws of individualist assumptions, which run the risk of over-emphasizing the self-actualizing subject or simply aggregating individuals' choices. As Askegaard and Linnet (2011) suggest in their critique of CCT scholarship, "there is a lack of adequate attention to social and cultural context in many analytical works, which focus instead on the agency of consumers and their identity projects" (p. 391). To avoid a narrow individualist interpretation of consumption I also looked to the ideological dimension of markets theorized by critical theorists and cultural studies, and drew on economic sociology to analyze the underlying social structures that become visible through patterns in individual narratives.

Fourcade and Healy (2007) suggest that markets are sites of moral conflicts between social actors committed to different justificatory principles and the locus of political struggles

between various interests. In Chapter 4, I explained how the deeply moral ideological discourse of sustainability saturates the PEV market. To do so I drew on Somers and Block's (2005) concept of ideational embeddedness, which includes "the ideas, public narratives, and explanatory systems by which states, societies, and political cultures construct, transform, explain, and normalize market processes" (p. 264). By investigating the actual solutions market actors find for the coordination value, my work revealed how the PEV market is a fully social institution enmeshed in a complex matrix of politics, culture and ideology (Krippner 2001: 782 in Beckert, 2009). I employed the concept of orders of worth as a directive, rather than a series of defined sets of conventions, to look at how (e)valuation practices draw on norms and values, narratives, identities, institutions, symbolic boundaries, and cognitive schemas. I traced the connections between the (e)valuation process narrated by consumers to the broader social context of automobility and sustainability that shaped them.

There were good reasons for choosing the PEV market despite the relatively small space it occupies in the larger automotive industry. As I mentioned in my introduction, certain types of markets (i.e., financial markets, markets for aesthetic goods, and markets in which ethical issues figure prominently) hold a special attraction for sociologists because the qualities of a product, and their assessment, are in very noticeable ways, socially constructed and as such appear separate from the materiality of the product (Hendricks, 2016). Even though these types of markets have proved fertile ground for formulating theories of value and evaluation, valuation studies needs to direct increasing attention toward empirical studies of other types of markets. As it stands, less well researched are markets for mass consumer goods where the functionality of the product used to be paramount but is increasingly valued based on symbolic meanings. The PEV market, however, is unique even among industrial markets because it encompasses

consumption of a mass-produced consumer good, but may also be thought of as both a market for an ethical and even aesthetic good. My work contributes to theories of value construction, and the PEV market offered an interesting case study because in new markets, dimensions of value are dynamic and emergent rather than relatively stable.

For the past two decades, bringing about and managing a shift toward more sustainable modes of production and consumption has garnered increasing attention in both the political and intellectual arenas. Across the automobile and tech industries, academic disciplines, and among policymakers, governments, and special interest groups, awareness of and interest in PEVs is growing. Much of this attention focuses primarily on innovation and technology oriented toward energy consumption, looking for evolutionary rather than revolutionary transitions. Transportation research and policy foregrounds two perceived challenges that must be overcome in order to move toward more sustainable transportation: an unstable oil supply and climate change.

There exist two important contradictions inherent in sustainability ideology. First to achieve sustainable development, practical applications must reconcile, in capitalist market systems, two historically opposed phenomena—economic growth and the preservation of the environment. Sustainability advocates employ narratives of sustainable development to project this reconciliation while sidestepping any fundamental changes to the market system and model of economic development that helped bring about a crisis of sustainability in the first place (Escobar 1996, p.49). Conceptually, sustainability calls for individuals to consume less, or at least more efficiently, as a means to lower the amount of natural resources wasted in the production-consumption process. At the same time, the language of individualism itself motivates and sustains market fundamentalism (Fourcade and Healy, 2007; Mudge, 2008), even

in the face of calling for reduced or efficient consumption. Yet as I illustrated, sustainability continues to represent a dominant environmental ideational regime in the United States. In Chapter 3 I explained how the narratives of consumer responsibilization and technological utopianism helped to reconcile this tension, lending to the continued dominance of sustainability ideology.

By focusing on individual adoption of PEVs and treating consumers as choosers, PEV research reinforces the ideal of the responsible consumer and the narrative of technological utopianism, and actively works toward realizing both. Moreover, this research is often actively working toward effecting concrete changes to the PEV market by increasing consumer adoption of PEVs. As Reese (2016) notes "envisioning a future necessarily means making assumptions about what can change and what will continue; as such, envisioning a future legitimates certain forms of subjecthood, power, and action. This is particularly the case in 'authoritative representations' – texts such as design standards or technological 'roadmaps' that officially define what will be possible and desirable in the future" (p. 153). Scholars who adhere to the TPB look to change consumers' attitudes toward PEVs suggesting technological development, information distribution, and the removal of barriers as means of accomplishing this change. Scholars who adopt the VBN theory look to change people's internal norms and values as a means of changing consumption patterns. Both bodies of work provide sustainability advocates with discursive support and material empirical evidence of the success and future potential of sustainable transportation. The expression of sustainability's intellectual-professional and bureaucratic face illustrates the predominance of sustainability as an ideational regime equipped with the means of verifying itself.

In Chapter 2 I talked about an entrenched system of automobility to show that the significant political, cultural, and civic presence of automobiles is not a new phenomenon in the United States, and that PEVs represent a new type of technology brought to the auto market in a specific socio-political context. Car-based automobility is a hegemonic project, and in order to remain dominant, the contradictions inherent within the system must be resolved in ways that discourage alternative and oppositional forms of mobility. Sustainability discourse represents the breaking open of the environmental tensions of automobility and illustrates how policy elites, industry stakeholders, academics, and other interested groups work to challenge or sustain the current organization of mobility. The relationship between sustainability and the (e)valuations of consumers on the PEV market shows how different framings of PEVs, if taken up, will influence the production, consumption and use of PEVs as well as their cultural representations, shaping the dominant paradigm of meanings and values of PEVs in unique ways.

The PEV market represents an informative case study of the valorization and evaluation of goods. By approaching the PEV market as a co-ordination problem, drawing on theories of (e)valuation, I addressed the limitations of both sociological and transportation analyses. By explaining how consumption in the PEV markets is socially structured, my dissertation brings new insights to transportation research that can help to reframe how policymakers view consumer behavior. Rather than define PEV consumption as pro-environmental behavior I looked at PEV consumers as market actors behaving in a specific socio-historic context where pro-environmental (or sustainability) discourse constitutes one of many influences on market processes, which is to say, I explained how sustainability discourse, including analyses of pro-environmental behavior, as an influential discourse, shaped processes of value attribution and evaluation.

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