

Driving Adoption of Electric Vehicles to the Early Majority

Addressing the Adoption Barriers of Pragmatic Consumers Through an Education and Awareness-Building Campaign

Portland State University MBA Capstone Project

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November 2011



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Acknowledgements

The report was prepared for John MacArthur, Oregon Transportation Research and Education Consortium and Lisa Adatto, Transportation Electrification Executive Council member. The authors would like to thank our advisor, Bill Jones (Portland State University School of Business Administration). The team also would like to thank all the individuals that provided their time and input into the development of this report.

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Table of Contents

GLOSSARY OF TERMS AND ACRONYMS	6
EXECUTIVE SUMMARY	7
INTRODUCTION	11
Project Goals	12
Methodology	12
Findings	12
Campaign Recommendations	12
Report Organization	13
A FRAMEWORK FOR ELECTRIC VEHICLE ADOPTION IN OREGON	15
The Innovation of PEVs	15
Communication Channels.....	15
Time	16
Characteristics of the Social System	18
Takeaways from the Innovation Framework.....	18
DESCRIBING AND FINDING THE EARLY MAJORITY PEV BUYER	19
Hybrid Consumers and Expected PEV Consumers	19
Hybrid Sales in Oregon	21
Profile of the Expected PEV Early Majority Consumer	21
Finding Oregon’s Early Majority	23
Urban vs. Rural Oregon.....	23
Household Income	25
Target Age Group	26
Housing	27
Environmental and Political Leanings.....	27
Fleet Buyers.....	27
ADOPTION BARRIERS AND ENABLERS FOR OREGON’S EARLY MAJORITY	30
Barriers to Adoption	30
Adoption Enablers	31
REVIEW OF PEV EDUCATION AND OUTREACH EFFORTS TO DATE	32
Marketing Efforts by Car Manufacturers.....	33
Marketing Efforts by States	35
Marketing for Charging Stations	35
Website Review	38
REVIEW OF PEV TRIAL OPPORTUNITIES.....	41
Trialability.....	41
Direct Consumer Trials.....	42
Fleet and Motor Pool Trials	42
Public Drive Events.....	44

SUCCESSFUL SOCIAL MARKETING CAMPAIGNS IN OREGON..... 44

CAMPAIGN FOR REACHING OREGON’S PEV EARLY MAJORITY 45

 Key Messages for Reaching Oregon’s PEV Early Majority 45

 Campaign Actions for Reaching Oregon’s Early Majority 46

 Action 1: Survey consumers about PEVs..... 47

 Action 2: Develop educational and awareness-building materials..... 48

 Action 3: Empower people to be PEV influencers51

 Action 4: Create and implement a cost-effective advertising campaign..... 52

 Action 5: Cultivate partnerships with organizations that can help promote PEVs 54

 Action 6: Create opportunities for potential buyers to try PEVs 56

 Action 7: Promote public and private fleet adoption 57

CONCLUSION..... 59

APPENDIX A: FINDINGS FROM SOCIAL MARKETING AND CONSUMER LEARNING

LITERATURE REVIEW61

 Consumer Learning and PEVs.....61

 Consumer Learning and Other New Products..... 64

 Marketing Behavior Change 65

APPENDIX B: COMPARISON OF EARLY ADOPTER AND EARLY MAJORITY PEV BUYERS 67

APPENDIX C: CITATIONS FOR NISSAN LEAF AND CHEVROLET VOLT SALES DATA..... 69

APPENDIX D: SECOND-TIER CHARGING STATION APPLICATIONS 70

APPENDIX E: FULL LIST OF POTENTIAL MESSAGES 71

APPENDIX F: DETAILED SURVEY FRAMEWORK 72

APPENDIX G: EXAMPLES OF VIDEOS TO INCLUDE ON EV OREGON WEBSITE 73

APPENDIX H: PORTLAND METRO AREA MEDIA OUTLETS..... 74

WORKS CITED 76

Glossary of Terms and Acronyms

Alternative fuel vehicle: A vehicle that runs on any form of alternative fuel, whether it is electricity, solar energy, ethanol, biodiesel, etc.

BETC (Business Energy Tax Credit)

DOE (Department of Energy)

Early adopter: In the technology adoption lifecycle, the second group to adopt a new product.

Early majority adopter: In the technology adoption lifecycle, the third group to adopt a new product.

EV (electric vehicle): A vehicle comparable to the conventional gasoline-fueled vehicle, except that refueling is done through electricity and stored in a battery instead of a tank. Power is then transmitted to the wheels via an electric motor, rather than a traditional internal combustion engine (ICE). EVs are also referred to as PEVs in this report.

EVSE (electric vehicle supply equipment): Equipment used in charging electric vehicles.

GM (General Motors)

HHI (household income)

ICE (internal combustion engine): An engine that generates power by the burning of gasoline, diesel, or other fuel with air inside the engine; the hot gases produced are used to drive a piston or do other work as they expand.

Innovator: In the technology adoption lifecycle, the first group to adopt a new product.

Later majority adopter: In the technology adoption lifecycle, the fourth group to adopt a new product.

ODOT (Oregon Department of Transportation)

OEM (original equipment manufacturer)

OEVA (Oregon Electric Vehicle Association)

OTREC (Oregon Transportation Research and Education Consortium)

PEV (plug-in electric vehicle): A battery-operated electric vehicle powered by electricity stored in batteries that are recharged by taking electricity from the local electric grid (also referred to as an EV in this report). Includes the Toyota RAV4 EV, Honda EV Plus, GM EV1, and Ford Ranger EV, which are discontinued. Also includes the Tesla Roadster, Nissan Leaf, Mitsubishi i-MiEV, Ford Focus Electric, and Ford Transit Connect.

PGE (Portland General Electric)

PHEV (plug-in hybrid electric vehicle): A hybrid electric vehicle with batteries that are recharged by plugging into an electric power source. An electric motor drives the vehicle with electricity stored in rechargeable batteries with the option to recharge with electricity or with an onboard gasoline-powered generator.

RETc (Residential Energy Tax Credit)

Technology adoption lifecycle: A bell curve that measures the adoption of innovation over time.

TEEC (Transportation Electrification Executive Council)

Executive Summary

Oregon's reputation as an early adopter of green technologies has led several automakers and the U.S. Department of Energy (DOE) to choose the state as one of the first test markets for deployment of electric vehicles and the associated infrastructure. However, significant barriers exist to the widespread adoption of plug-in electric vehicles (PEVs): PEVs are more expensive than their established competition, consumers face a relatively steep learning curve to become familiar with PEVs, and the adoption of PEVs requires consumers to change their established behaviors and habits. Yet widespread consumer adoption is crucial to the success of PEVs. Without commercial success for PEVs, automakers are unlikely to continue selling the cars or developing their technology.

Of course, if PEVs succeed in other states but not in Oregon, the state will lose out on the potential benefits that can come from this emerging industry. Economic growth opportunities including new investment in PEV technologies, services, and infrastructure are all on the line. The purpose of this project was to contribute to the success of PEVs in Oregon by developing a marketing plan that can enable their widespread adoption. Specifically, the goal was to devise a critical path for successfully marketing PEVs to early majority consumers in Oregon. To meet this goal, we undertook three tasks:

1. Identify and describe Oregonian consumers (individual and organizational) who make up the early majority adopters.
2. Develop elements of a strategic communications campaign specifically to educate Oregon's potential early majority PEV consumers.
3. Design trialability experiences to give early majority consumers a hands-on experience with PEVs.

The methodology for completing these tasks involved a combination of quantitative and qualitative research and analysis. We collected data from sources including the U.S. Census Bureau and Oregon DMV, reviewed consumer surveys related to PEVs, conducted a literature review of best practices in social marketing and consumer learning, and reviewed the efforts to date for marketing PEVs. We also interviewed individuals from marketing firms, ODOT, Metro, and buyers and managers for commercial fleets to gain further insights into the parts of a marketing campaign that will facilitate the adoption of PEVs in Oregon.

We have used the work of Everett Rogers as a framework for understanding what factors may be important in the adoption of PEVs. Rogers's seminal work *Diffusion of Innovations* identified four elements that work together to enable or inhibit diffusion, arguing that an innovation and its qualities are communicated over time within a social system. The time aspect is particularly relevant to our work. Rogers and his colleagues identified what is today known as the technology adoption lifecycle, a bell curve that divides the market for a product into five psychographic groups. The third of these

groups, the early majority, is the focus of our paper because this group is expected to make up 34 percent of the eventual market. PEVs must meet the needs and expectations of early majority buyers to reach any sort of widespread adoption. While these buyers are unlikely to be interested in purchasing PEVs in the immediate future, their importance to the eventual success of PEVs means it is not too early to start a campaign for this group that will correct misconceptions about PEVs and create opportunities to observe and try the vehicles.

Before any campaign can begin, the audience for it must be identified. To describe early majority PEV buyers, we have looked at leading market research on expected PEV adoption as well as hybrid electric vehicle buyers. Market research and forecasts predict that, among other characteristics, early majority PEV buyers are likely to have a household income of above \$100,000, reside in urban or suburban areas, be in their 40s, and be sensitive to environmental issues and U.S. dependence on foreign oil.¹ Hybrid vehicle adoption, which is frequently used as a proxy for PEV adoption in forecasts and deployment studies, seems to confirm these characteristics.

Our research has found that in Oregon, the largest numbers of people matching the expected early majority PEV buyer profile are in the areas of Clackamas, Multnomah, and Washington counties. Readers should note, however, that it would be short-sighted to perceive efforts to reach Oregon's early majority consumers as only benefiting urban Oregonians. Many potential benefits exist for rural Oregon with the widespread adoption of PEVs. Perhaps the most significant is that rural Oregon is the source of much of the energy that will power electric vehicles, and as the early majority adopts PEVs, demand for clean energy from the wind, solar, and cogeneration facilities at lumber mills, dairies, wastewater treatment plants, and landfills will grow.

In our interviews with fleet buyers, we found that these buyers are likely to be very economically rational in their buying decision, looking for incentives to offset the initially higher purchase price of PEVs compared to ICE vehicles. Those buyers who successfully adopt PEVs are also likely to be very rational in choosing the locations where they will deploy the vehicles, looking for routes that are particularly well-suited to PEVs' current capabilities.

To develop a campaign to reach early majority PEV buyers in Oregon, we first identified the barriers to and enablers for adoption for this group. Based on a review of consumer surveys and interviews with marketing firms, we believe the most significant barriers to buying a PEV will include range anxiety, initial cost, charging time, infrastructure support, safety issues, and the complexity of finding information. Our education and outreach campaign is designed to deal with many of these barriers.

Our next step in developing a campaign was to review marketing efforts for PEVs already underway from a variety of sources, including car manufacturers and states.

¹ Deloitte, *Gaining Traction: A View of Electric Vehicle Mass Adoption in the U.S. Automotive Market* (Deloitte, 2010), 3, https://www.deloitte.com/view/en_US/us/Services/consulting/c3b1a4c65c948210VgnVCM10000oba42f00aRCRD.htm.

From this review, we found that while many good resources exist that could be adapted, there is still room for development of new resources specific to Oregonians. We also reviewed the marketing for charging station infrastructure that exists, since a robust infrastructure will be important to early majority PEV buyers. In this area, we believe the best solution will be crowd-sourced websites and applications, which have already been developed.

We also conducted a website review of information available for people interested in PEVs. Based on our review and identification of best practices, we believe any Oregon-specific website should include the following elements: basic information about how an electric vehicle operates, a link to a charging station locator site, a home charging station installation guide, a list of available incentives, a vehicle comparison tool, a total cost of ownership calculator, a place to sign up for a test drive, a link to “Join the EV Movement” with social media accounts and other opportunities to show support for PEVs, fleet tools, and a video library.

Finally, our review of opportunities for people to try PEVs themselves found that this will be a vital piece of any campaign. Studies have consistently shown that given the opportunity to try PEVs, drivers will disregard their prejudices toward the vehicles.

Based on our research and knowledge about the capabilities of OTREC and TEEC, we have developed a seven-part campaign to support PEV adoption in Oregon with three key messages. We believe that the messages that should be included wherever possible in a campaign are the following:

1. Buying an electric car is more than another vehicle purchase; it is a way to join a movement for positive change. We believe this can be summarized by the slogan, “It’s not just a car. It’s a movement.”
2. While the up-front cost of a PEV is above that of many ICE vehicles, consumers should be encouraged to consider the total cost of ownership. This can be done in many ways, like by comparing maintenance costs and fuel costs.
3. Current range limitations can be dealt with by planning, trip chaining, and other practices that organizations like Metro have already encouraged drivers to adopt.

The campaign we have developed will provide opportunities to explicitly address these messages (through promotional materials and advertising) and to implicitly address them (for example, through creating opportunities for people to observe and try PEVs). They also provide a number of different levels of resource commitments to choose from, giving OTREC and TEEC options depending on what they can afford in terms of both financial and human resources. The seven elements of this campaign are as follows:

1. Survey consumers about PEVs.
2. Develop educational and awareness-building materials.

3. Empower people to be PEV influencers.
4. Create and implement a cost-effective advertising campaign.
5. Cultivate partnerships with organizations that can help promote PEVs.
6. Create opportunities for potential buyers to try PEVs.
7. Promote public and private fleet adoption.

We have provided these roughly in chronological order. That is, before launching into the rest of the campaign, we believe a survey should be conducted to reassess the current public understanding and awareness of PEVs. The next actions are to educate consumers about PEVs and raise awareness about PEVs (2-5) and can be undertaken nearly simultaneously—though it may help to have some materials developed first to aid influencers and partner organizations. Once these actions are well in hand, we believe it will be time to begin creating opportunities to help people try PEVs as well as help fleet buyers.

Together, the elements of this campaign address many of the challenges to widespread electric vehicle adoption in Oregon. Many other actions must be taken to enable PEV adoption in Oregon—such as building a robust infrastructure to support them. This outline of an education and awareness campaign can, however, play an important role in the widespread adoption of PEVs in Oregon.

Introduction

Over the past decade, Oregon has emerged as a national leader for sustainability initiatives and clean technology, and as a state where concern for the environment and livability rank high on the public policy agenda. This reputation as an early adopter of green technologies was largely responsible for Oregon's selection by the U.S. Department of Energy (DOE) and automakers Nissan, Ford, and Mitsubishi as one of the first test markets for deployment of electric vehicles and associated infrastructure in the push to meet President Obama's stated goal of putting one million electric vehicles on U.S. roads by 2015.

However, significant barriers exist to the widespread adoption of PEVs:

- PEVs are more expensive than their established competition, including hybrid vehicles and vehicles that run solely on an internal combustion engines (ICEs). Without a clear price advantage, Oregonians will need to be convinced of other ways in which PEVs are superior to ICE vehicles.
- Consumers lack knowledge or are misinformed about electric vehicle facts, from the basics of how the vehicles operate, to their comparative safety and reliability.²
- Many Oregonians will need to be convinced that PEVs meet their driving needs, especially regarding range and recharging convenience.
- Consumers tend to have a poor understanding of how "green" electric cars are.³ Despite PEVs being far more environmentally friendly than traditional vehicles, consumers are still concerned about the environmental impact of the car batteries and the effect of coal-sourced power on a PEV's carbon footprint.
- The adoption of PEVs requires consumers to change established behaviors and habits, a notoriously difficult problem for any new technology.

Widespread consumer adoption is crucial to the success of electric cars. Without sustainable commercial success of PEVs, automobile manufacturers will have little motivation to continue producing electric vehicles, let alone develop second generation designs or more advanced batteries. Furthermore, if PEV adoption succeeds in other states but fails in Oregon, Oregon will forfeit potential job creation and other economic

² Sarah Amspacher, *Public Opinion of Electric Vehicles in Oregon* (report for the Oregon Summer Fellowship Program, Portland State University, 2010), 5-7.

³ In a 2009 survey of Multnomah County residents by the survey research firm of Davis, Hibbitts, & Midghall, Inc., 36 percent of respondents indicated that the environmental impact of electric vehicles was "about the same" as for hybrid vehicles, and 3 percent believed they were worse for the environment. Davis, Hibbitts, & Midghall, Inc., Fusion MR, LLC, and Portland Hatfield School of Government, "Electric Vehicle Survey: October 2009, Multnomah County" (Portland, OR: Portland State University, 2009), 3, received from George Beard (Alliance Manager, Research & Strategic Partnerships, Portland State University) by e-mail, October 17, 2011.

benefits expected to flow from new investment in PEV technologies, services, and infrastructure.

Project Goals

The goal for this project was to devise a critical path for successfully marketing PEVs to early majority consumers in Oregon. To meet this goal, we undertook three tasks:

1. Identify and describe Oregonian consumers (individual and organizational) who make up the early majority adopters.
2. Develop elements of a strategic communications campaign specifically to educate Oregon's potential early majority PEV consumers.
3. Design trialability experiences to give early majority consumers a hands-on experience with PEVs.

Methodology

Our methodology involved a combination of quantitative and qualitative research and analysis. We collected data from public sources like the U.S. Census Bureau and Oregon DMV, reviewed privately conducted consumer surveys related to PEVs, conducted a literature review of best practices in social marketing and consumer learning, and reviewed the efforts to date for marketing PEVs. We also interviewed individuals from marketing firms, ODOT, Metro, and buyers and managers for commercial fleets to gain further insights into the parts of a marketing campaign that will facilitate the adoption of PEVs in Oregon.

Findings

Combining market research on current hybrid electric vehicle owners with predictive analysis for prospective PEV buyers and Oregon demographic information leads us to predict that, among other characteristics, early majority PEV buyers are likely to have a household income of above \$100,000, reside in urban or suburban areas, be in their 40s, and be sensitive to environmental issues and U.S. dependence on foreign oil.⁴ In Oregon, the largest numbers of people matching the expected early majority PEV buyer profile are in Clackamas, Multnomah, and Washington counties (see Finding Oregon's Early Majority). The source of much of the energy that will power electric vehicles, however, is outside of those population centers, so benefits from PEV adoption to rural areas should not be discounted.

Campaign Recommendations

We recommend the following actions be taken as part of a campaign to promote PEV adoption in Oregon:

⁴ Deloitte, *Gaining Traction: A View of Electric Vehicle Mass Adoption in the U.S. Automotive Market* (Deloitte, 2010), 3, https://www.deloitte.com/view/en_US/us/Services/consulting/c3b1a4c65c948210VgnVCM100000ba42f00aRCRD.htm.

- Conduct a survey to better understand the barriers consumers see when they view PEVs. Another survey post-campaign should be conducted to determine the efficacy of the campaign.
- Develop educational and awareness-building materials for use at events, public offices, and charging stations. Develop an educational website to introduce consumers to PEVs. Distribute stickers or clings with quick response (QR) codes to current PEV owners to help them guide consumers curious about PEVs to the website.
- Create a cost-effective advertising campaign, primarily to combat misconceptions about PEVs and educate consumers about existing and planned infrastructure. “It’s not just a car. It’s a movement.” is a tagline we believe could be particularly effective, as it combines the social pressure aspect of social marketing with a focus on the future of the new technology.
- Cultivate diverse partnerships:
 - Partner with high-end stores to help consumers assess their PEV readiness by tracking their mileage over a period of time to be entered in a drawing for gift cards for the grocer.
 - Partner with Nissan, Mitsubishi, Toyota, Ford, and GM to make their cars available at events where consumers can try the PEVs.
 - Partner with car-sharing companies or car rental companies to get customers into PEVs for longer-term trials.
 - Partner with the same companies to help PEV owners manage longer-range trips using a voucher system for car rentals.
- Promote public and private fleet adoption by developing calculators that compare total cost of ownership and greenhouse gas emissions between PEVs and ICE vehicles. Provide assistance to companies in evaluating fleet usage and routes for PEV compatibility.

Report Organization

The remainder of this report is divided into nine parts:

1. **A Framework for Electric Vehicle Adoption in Oregon:** Detailed explanation of the theories behind the diffusion of new technology, particularly those of Everett Rogers and Geoffrey Moore, and application of them to the case of PEV adoption in Oregon.
2. **Describing and Finding the Early Majority PEV Buyer:** Definition of the likely demographic and sociological profile of the early majority buyer.

3. **Adoption Barriers and Enablers for Oregon's Early Majority:** Identification of the likely barriers to adoption of PEVs in Oregon as well as factors that can help the process.
4. **Review of PEV Education and Outreach Efforts to Date:** Review and evaluation of the work currently being done to communicate with the public about PEVs.
5. **Review of PEV Trial Opportunities:** Review and evaluation of the programs that have given members of the public opportunities to try PEVs.
6. **Successful Social Marketing Campaigns in Oregon:** Review and evaluation of social marketing campaigns (efforts to encourage behavior change to more environmentally responsible practices) in Oregon.
7. **Campaign for Reaching Oregon's PEV Early Majority:** Outline of the messages, strategies, and tactics that can aid widespread adoption of PEVs in Oregon.
8. **Conclusion:** Review of our findings and recommendations and suggestions for further avenues for action to enable widespread adoption of PEVs in Oregon.
9. **Appendices:** Eight appendices consist of a consumer learning and social marketing literature review, a comparison of early adopter and early majority PEV buyers, a citation list for a graphic on Nissan Leaf and Chevrolet Volt sales, further information on charging station applications, a comprehensive list of possible messages for a campaign, a detailed framework for a consumer survey, a list of potential videos for Oregon's electric vehicle website, and a list of media outlets for reaching potential early majority PEV buyers in the Portland area.

A Framework for Electric Vehicle Adoption in Oregon

Plug-in electric vehicles (PEVs) represent the first radical innovation in vehicle technology since the widespread adoption of internal combustion engine (ICE) vehicles. As such, they are largely unfamiliar to consumers and their ability to meet the needs and expectations of most consumers is unproven. Many questions remain as to how quickly, or even whether, Oregonians will switch from the entrenched technology of ICE vehicles. A useful guide for understanding the factors that can help or hinder the adoption of PEVs is provided by Everett Rogers's seminal *Diffusion of Innovations*. In that work, Rogers identifies four elements that enable or inhibit diffusion:⁵

- the nature of the innovation itself
- the channels for communicating information about the innovation
- time
- the social system into which the innovation is introduced

These four elements work together. That is, an innovation and its qualities are communicated over time in a social system. This relationship as it applies to the mainstream adoption of PEVs is discussed below.

The Innovation of PEVs

For PEVs to be widely adopted, Oregonians must perceive the benefits of PEV ownership as exceeding the inherent risks and uncertainties of adopting this new vehicle technology. Rogers and others posit that the likelihood of adoption is directly linked to consumer perception of five qualities of an innovation: observability, relative advantage, compatibility, trialability, and complexity.⁶ In other words, PEVs will be more likely to be adopted if the following statements hold true:

- The financial and lifestyle advantages of PEVs can be demonstrated by the first buyers.
- PEVs fit in with prevailing social values.
- PEVs are not difficult to charge and maintain.
- PEVs can be tried or tested before purchase.

Communication Channels

Mass media, social media, and other interpersonal communication channels will all be important in educating consumers about the qualities of PEVs. Communication is important for enabling PEV adoption because educating consumers about the vehicles' inherent benefits has been shown to correlate positively with intent to purchase a PEV.⁷

⁵ Everett M. Rogers, *Diffusion of Innovations* (New York: Free Press, 2003).

⁶ Rogers, *Diffusion of Innovations*.

⁷ In a recent study of drivers in New York City, for example, 21 percent said they were more likely to purchase an electric vehicle after simply being given factual information about the vehicles. The City of

Mass media such as TV, radio, or print are obvious tools for disseminating such information. In Oregon, manufacturers have already begun to target consumers through commercials and advertisements (see Marketing Efforts by Car Manufacturers later in this report). PGE has also begun to provide information for potential PEV consumers, especially as it relates to charging and infrastructure needs of the vehicles.

PEV adoption cannot succeed, however, without positive informal and word of mouth promotion by early adopters. Interpersonal channels have proven to be very powerful in creating or changing strong attitudes held by individuals (see Appendix A) and car manufacturers are already aware of the importance of these channels. Mark Perry, director of product planning and strategy for Nissan North America, has said, “Collectively we can spend hundreds of millions of dollars, but at the end of the day it will be friends, neighbors, shared experiences, seeing vehicles on the road, seeing cars in a grocery store parking lot, seeing access to public charging that will stimulate sales.”⁸ Thus, for PEVs to succeed, initial buyers must be satisfied enough to publicly and privately promote the advantages of electric vehicles. Social media tools will be an important way to help those who are pleased with PEVs express that opinion to a large audience.

Time

Communicating the qualities of a new innovation like a PEV happens, as previously noted, over time. Rogers and others have used time as a way to measure and classify various consumer groups as they adopt an innovation. The model they developed to do this is widely known as the technology adoption lifecycle (Figure 1).

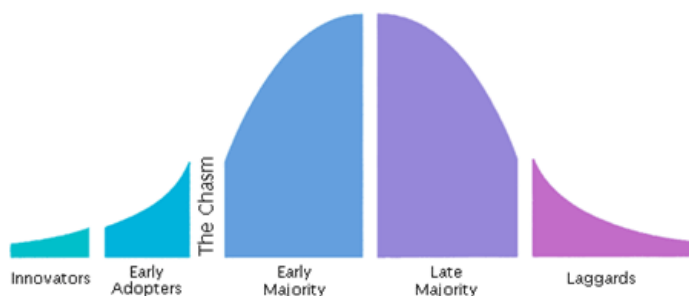


Figure 1. The technology adoption lifecycle⁹

As Figure 1 and Table 1 illustrate, this classification system divides consumers into five groups. The first to adopt an innovation are the “innovators,” and the last are the “laggards.” Two of these groups are of particular concern to our project: the early adopters and the early majority. Early adopters were characterized by Rogers as

New York, *Exploring Electric Vehicle Adoption in New York City*, (New York: The City of New York, 2010), 13, http://www.nyc.gov/html/om/pdf/2010/pr10_nyc_electric_vehicle_adoption_study.pdf.

⁸ Jeff Cobb, “Electric Vehicle Manufacturers to Early Adopters: Drivers Needed,” GM-Volt.com, June 16, 2011, <http://gm-volt.com/2011/06/16/electric-vehicle-manufacturers-to-early-adopters-drivers-needed/>.

⁹ Illustration from Bala Thekkedath, “Ethernet-Based Access Networks: The Chasm and Beyond,” *International Engineering Consortium Newsletter 2* (August 2006), http://www.iec.org/newsletter/aug06_2/broadband_2.html.

visionaries and trend setters who readily perceive and extol the potential advantages of new a technology, using extensive social networks to spread information about the innovation to the masses.¹⁰ Early majority buyers are believed to usually have some demographic traits in common with early adopters, such as an above-average education level, but are slower in the adoption process because of psychographic differences (Table 1).¹¹

Table 1. Characteristics of different groups in the technology adoption lifecycle¹²

Innovators	<ul style="list-style-type: none"> • Risk takers • Willing to change behavior to make technology work • Thrive on the challenge of new technology
Early Adopters	<ul style="list-style-type: none"> • Visionaries • Willing to pay a premium for innovation • Identify as trendsetters
Early Majority	<ul style="list-style-type: none"> • Pragmatic and practical, must be convinced of benefits • Willing to pay a premium for convenient solutions • Need measurable benefits, choices to evaluate
Late Majority	<ul style="list-style-type: none"> • Resistant to change • Risk averse
Laggards	<ul style="list-style-type: none"> • Greatest concern is cost • Not interested in trends or having what is new

The effect of these psychographic differences was explored in detail by Geoffrey Moore, who argued that there is a gap, or “chasm,” between early adopters and the early majority (see Figure 1). Moore classified the early majority as pragmatists who are far less willing to take risks than the early adopters. As pragmatists, Moore argued, early majority buyers generally have the following attributes in common:¹³

- They want not just a product, but an infrastructure that supports that product.
- They want choices.
- They want a solution to their problem (whatever that may be).
- They are willing to pay a reasonable premium for that solution and the convenience it provides.

Moore cited a number of technologies—primarily “disruptive” technologies requiring behavior change—that failed to catch on among the early majority after seeing real success among early adopters.¹⁴ Given the very different psychodynamic profiles between early adopters and the early majority, Moore cautioned that favorable product reviews by early adopters may be insufficient to convince the early majority. He argued

¹⁰ Rogers, *Diffusion of Innovations*, 283.

¹¹ Ibid.

¹² Rogers, *Diffusion of Innovations*; Geoffrey A. Moore, *Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers* (New York: HarperBusiness, 1999).

¹³ Moore, *Crossing the Chasm*, 42-45.

¹⁴ Moore, *Crossing the Chasm*, 13-18.

that appealing to early majority consumers requires a particular marketing approach—one very different from what is effective with early adopters. Moore recommends focusing initial marketing efforts on a limited group (defined geographically or socially, or both). As the more risk-positive early majority make their first purchases within that more limited space, other early majority buyers will have the references they require to ascertain a product's quality and suitability. Over time as the number of references grows, the new technology can diffuse to other areas.¹⁵

Whether Rogers's or Moore's theory applies to the purchase of PEVs in Oregon remains to be seen. Only time will tell if early adopters in Oregon will be able to influence potential early majority buyers to consider PEVs. To deal with this uncertainty, our marketing plan incorporates strategies for whether this happens or not. We have identified ways that OTREC and TEEC can call on and empower early adopters to positively influence others' opinions of PEVs. We have also planned for a targeted use of more resource-intensive methods to raise awareness among early majority consumers. We believe taking a mixed approach, as described in our recommendation section, will be the best use of OTREC's and TEEC's resources.

Characteristics of the Social System

A social system, with its social norms and behavioral expectations, has an important effect on the success or failure of an innovation. Oregon's social climate appears to be promising for the adoption of PEVs. The Pacific Northwest, and Oregon in particular, is known for an especially robust innovator and early adopter culture and as a receptive market for "green" or environmentally sensitive innovations.¹⁶ Oregonians take pride in this distinction.¹⁷ Several researchers have written about the diffusion of "green values" as they relate to hybrid adoption, demonstrating that in geographic areas with clusters of green consumers, hybrid car ownership may be an important means for consumers to identify with community values and norms of caring for the environment.¹⁸ We expect the same to be true of PEV ownership.

Takeaways from the Innovation Framework

Planning for the diffusion of PEVs in Oregon requires taking into account the innovation, communication channels, the needs and expectations of potential consumers, and the social system these elements exist in. While OTREC and TEEC do not have the power to heavily influence car manufacturers and shape the qualities of PEVs, we have looked for opportunities for these organizations to effectively convey

¹⁵ Moore, *Crossing the Chasm*, 66.

¹⁶ Ziba Design and Grady Britton in discussion with the authors, July 2011.

¹⁷ Davis, Hibbitts, & Midghall, Inc., Fusion MR, LLC, and Portland Hatfield School of Government, "Electric Vehicle Survey," 5, 6.

¹⁸ Matthew E. Kahn, "Do Greens Drive Hummers or Hybrids? Environmental Ideology as a Determinant of Consumer Choice," *Journal of Environmental Economics and Management* 54, no. 2 (2007): 129-45; Jonn Axsen, "Interpersonal Influence Within Car Buyers' Social Networks: Observing Consumer Assessment of Plug-in Hybrid Electric Vehicles (PHEVs) and the Spread of Pro-Societal Values" (dissertation, University of California, Davis, 2011); Matthew E. Kahn and Ryan K. Vaughn, *Green Market Geography: The Spatial Clustering of Hybrid Vehicle and LEED Registered Buildings* (Los Angeles: University of California, Los Angeles, Richard S. Ziman Center for Real Estate, 2008).

those qualities. We have identified important communication channels, formal and informal, that TEEC and OTREC can use. We have reviewed national consumer survey research about PEVs and adapted it to statewide demographic and psychographic data to find and describe Oregon's potential PEV consumers. Ultimately, the challenge in facilitating widespread adoption of PEVs will not just be *finding* Oregon's early majority consumers, but addressing their needs and mitigating their concerns. This document offers a blueprint for understanding those consumers and speaking to their concerns.

Describing and Finding the Early Majority PEV Buyer

Hybrid Consumers and Expected PEV Consumers

Hybrid vehicle adoption is widely used as a proxy for electric vehicle adoption in PEV deployment studies and U.S. sales forecasts. Cumulative hybrid sales in the U.S. passed the two million mark in May of 2011,¹⁹ with 44,500 hybrids now registered in Oregon.²⁰ When the Prius was launched in 1999, Toyota specifically targeted the innovator and early adopter segments in its marketing campaign. By 2004 the company launched a new, larger version of the vehicle with a new campaign aimed to capture the early majority market.²¹

In the time since hybrid sales “crossed the chasm” to reach early majority consumers, hybrid buyer demographic and psychographic characteristics have been tracked with great interest by market researchers, with special attention given to consumer motivations for adopting hybrid vehicles. A recent comprehensive review of hybrid buyer survey research identified five groups of specific motivational constructs that drive consumer interest in the vehicles (Table 2). Some of these, such as the technological pioneering, are more characteristic of the innovator and early adopter profiles. The more pro-societal motivators, though, are common to both early adopter and early majority consumers.

¹⁹ Christie Schweinsberg, “U.S. Hybrid Sales Hit 2 Million Mark,” Ward’s Auto, June 7, 2011, http://wardsauto.com/ar/hybrid_sales_million_110607/index.html.

²⁰ According the Oregon DMV data as of February 2011. Received by e-mail correspondence from Ashley Horvat (ODOT Office of Innovative Partnerships and Alternative Funding Transportation Electrification Project Analyst), September 16, 2011.

²¹ Stanislas Dupré, *Talk the Walk: Advancing Sustainable Lifestyles Through Marketing and Communications* (United Nations Environment Programme, 2005), 34, www.unglobalcompact.org/docs/news_events/8.1/ttw_fin.pdf.

Table 2. Motivational factors for hybrid buyers²²**Technological**

- Attracted to new technologies
- Being a pioneer in the technological sphere
- Educating others about a new type of vehicle
- Sharing technological knowledge

Environmental

- Reduce pollution
- Mitigate climate change/global warming
- Decrease natural resource consumption
- Preserve the environment
- Mitigation of personal ecological footprint

Financial

- Opportunity to pay less for fuel
- Preferred or free parking
- Carpool lane access
- Tax credits or other tax incentives

Community Norms

- Being part of socially responsible activities
- Being a pro-environmental trendsetter
- Being considerate of others
- Doing the right thing
- Sharing a common community ideology

Energy Independence

- Unaffected by fuel price fluctuations
- Independence from oil producers

Because of the likelihood that hybrid and PEV early adopters and early majority will share common characteristics, we are particularly interested in these findings for tailoring messages for PEV awareness and education.

Demographic data gathered from more recent hybrid buyers show these consumers to be well educated, urban, older than most car buyers, and possessing high household incomes:

- Hybrid drivers have household incomes above \$100,000 per year versus \$85,000 for the average buyer, with one in four hybrid buyers earning more than \$150,000 per year.²³
- They are more likely to live in cities than in rural areas.²⁴
- They are about 10 years older than most car buyers, with consumers between 55 and 74 driving more hybrids than any other age group.²⁵
- They tend to be better educated and more politically liberal and sensitive to environmental concerns than the average buyer of light vehicles in the U.S.²⁶

²² Ritsuko Ozaki and Katerina Sevastyanova, "Going Hybrid: An Analysis of Consumer Purchase Motivations," *Energy Policy* 39 (2011): 2219-20.

²³ Elsa Wenzel, "Study: Hybrid Drivers Tend to be Wealthy, Healthy," CNET, December 6, 2007, http://news.cnet.com/8301-11128_3-9829737-54.html.

²⁴ "Hybrid Drivers Get More Tickets," HybridCars, July 15, 2009, <http://www.hybridcars.com/hybrid-drivers/study-hybrid-drivers-get-more-tickets-25919.html>.

²⁵ Ibid.

²⁶ Tom Turrentine, Kenneth Kurani, and Rusty Heffner, "Fuel Economy: What Drives Consumer Choice?" *Access Magazine*, Fall 2007, 17-19, http://pubs.its.ucdavis.edu/publication_detail.php?id=1159; Jonathan

These findings are consistent with the early majority profile of PEV buyers as developed by market researchers (see the Profile of the Expected PEV Early Majority Consumer section).

Hybrid Sales in Oregon

The early and continued popularity of hybrids among Oregonians (along with residents of Washington and California) is a factor that led to Oregon being selected as one of the initial five targets for the U.S. Department of Energy's PEV demonstration project. Hybrid market penetration has been particularly strong in Portland, which has led all metropolitan areas in the U.S. in annual hybrid sales per 1,000 households year after year, with 8.8 new hybrids per 1,000 households in 2009, compared with the U.S. metro area average of 1.8 per 1,000 households.²⁷

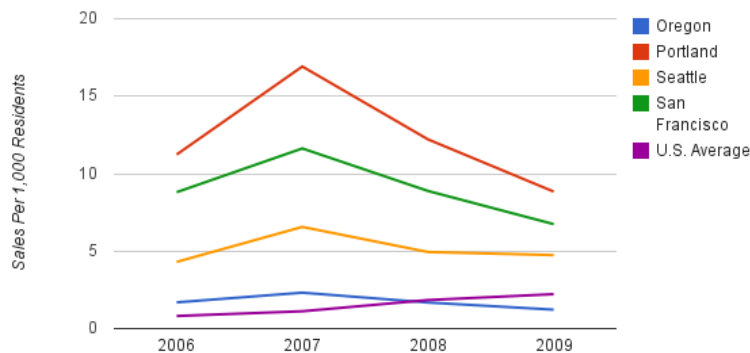


Figure 2. Hybrid sales per 1,000 residents in different geographical areas²⁸

Profile of the Expected PEV Early Majority Consumer

Several recent market studies have explored market opportunity, target customers, and barriers to adoption of electric vehicles in the United States.²⁹ Major market studies have fairly conservative projections for PEV sales over the next decade, forecasting PEV

Klein, *Why People Really Buy Hybrids*, (Wellesley, MA: Topline Strategy Group, 2007), http://www.cleanenergycouncil.org/files/Topline_Strategy_Report_Why_People_Really_Buy_Hybrids.pdf.

²⁷ "December 2009 Dashboard: Year-End Tally," HybridCars, January 20, 2010, <http://www.hybridcars.com/hybrid-sales-dashboard/december-2009-dashboard.html>.

²⁸ Ibid.

²⁹ See, for example Zpryme Research & Consulting, *The Electric Vehicle Study*, (Zpryme Research & Consulting and Airbiquity, 2010), http://zpryme.com/SmartGridInsights/The_Electric_Vehicle_Study_Zpryme_Smart_Grid_Insights_Airbiquity_Sponsor_December_2010.pdf; Accenture, *Plug-in Electric Vehicles: Changing Perceptions, Hedging Bets* (Accenture, 2011), <http://www.accenture.com/us-en/Pages/insight-plug-in-electric-vehicles-changing-perceptions-summary.aspx>; Zhenhong Lin and David Greene, "Who Will More Likely Buy PHEV: A Detailed Market Segmentation Analysis," (presentation, 25th World Battery, Hybrid, and Fuel Cell Electric Vehicle Symposium & Exposition, Shenzhen China, November 5-9, 2010; and Electrification Coalition, *Electrification Roadmap* (Washington D.C.: Electrification Coalition, 2009).

sales to grow quickly over the next few years but to remain a niche product through at least 2020.³⁰ One often-cited study by Deloitte, *Gaining Traction: A Customer View of Electric Vehicle Mass Adoption in the U.S. Automotive Market*, is particularly thorough in its original survey of 2,000 current vehicle owners and interview data from executives of major automotive OEMs, dealers, and energy companies.³¹ The 2010 Deloitte study segmented adopters according to their current interest in and attitudes toward the vehicles to develop a U.S. profile of early majority PEV consumers, which includes the following characteristics:³²

- They have a much higher-than-average household income of \$114,000.
- They tend to reside in urban or suburban areas.
- They have garages with electrical power (88 percent).
- They drive a low weekly mileage (<100 miles per week).
- They are willing to pay a premium for the convenience of faster charging and longer range.
- They are more likely to be male (67 percent) than female (33 percent).
- They are most likely to be between the ages of 40 and 44.
- They are likely to vote.
- They are sensitive to environmental issues and to U.S. dependency on foreign oil.

This final characteristic is one of particular significance for marketing to both early adopter and early majority consumers. (See Appendix B for more comparisons between early adopter and potential early majority PEV buyers.) In one recent survey of a broad sample of 1,769 Americans, 21 percent of respondents were interested in purchasing a PEV and also agreed or strongly agreed with statements such as “the environment is a concern” and “I want to reduce my cost of fuel and dependence on foreign oil.”³³ The researchers’ conclusions were consistent with those from the hybrid buyer surveys

³⁰ Deloitte, *Gaining Traction: A View of Electric Vehicle Mass Adoption in the U.S. Automotive Market* (Deloitte, 2010), 22,

https://www.deloitte.com/view/en_US/us/Services/consulting/c3b1a4c65c948210VgnVCM100000ba42f00aRCRD.htm. Deloitte expects PEVs to capture only about 2 percent to 5.5 percent of the sales in the new vehicle market by 2020. See also Zpryme Research & Consulting, *The Electric Vehicle Study*, 46. Zpryme expects PEV sales to reach about 203,200 units by 2016, in line with Deloitte’s optimistic forecast for PEVs.

³¹ Deloitte, *Gaining Traction*.

³² Deloitte, *Gaining Traction*, 3. Deloitte does not disclose their specific methodology for consumer segmentation, referring to it as their “proprietary, demand-driven analytic methodology.” Ibid.

³³ Veerender Kaul and Michael Coury, “Automakers Braving to Launch Electric Vehicles to Skeptic U.S. Consumers: Who Will Be the Early Adopters, and Will Their Needs and Expectations Be Met?” (webinar presentation, Frost and Sullivan, February 9, 2010), 24, <http://projectgetready.com/resources/other/frost-and-sullivan-consumer-ev-survey>.

described earlier: the environmental benefit of PEVs was a key driver of adoption across all categories of consumers, with “green image” and reduced fuel costs as the second- and third-most important consumer motivators.³⁴

Finding Oregon’s Early Majority

Using the most recent data available from the U.S. Census Bureau and other sources, we estimate that the highest concentration of Oregonians with characteristics consistent with the Deloitte profile will be found in the greater Portland area. As demonstrated below, the Portland metro area is a good fit for early majority consumers in terms of urban concentration, household income, age, housing trends, and environmental and political leanings.

Urban vs. Rural Oregon

Oregon, like several other Western states, has two very different population groups, one living in dense urban and suburban centers, the other living in or near small rural towns, or on isolated ranches and farms. Electric vehicle consumer surveys have consistently indicated that rural consumers will be among the last group to adopt electric vehicle technology. Rural Oregonians are much more likely to drive trucks or SUVs and have range and usage needs exceeding current PEV specifications. They tend to have lower household incomes and are politically more conservative and generally less sensitive to environmental matters than urban Oregonians—characteristics that correlate negatively with hybrid and early PEV adoption in survey research. Assuming that hybrid registrations will be a relatively good predictor of the distribution of initial PEV sales across the state, the following map of total hybrid and PEV numbers in Oregon by county to date is a powerful visual of where PEV adoption is likely to occur first.³⁵

³⁴Kaul and Coury, “Automakers Braving to Launch Electric Vehicles to Skeptic U.S. Consumers,” 29.

³⁵ There are numerous ways to define rural, vs. urban, Oregon, including via the algorithm applied to census blocks by the U.S. Census Bureau. We are using the definition of urban consistent with the geographic classification system created by Oregon’s former Office of Rural Policy in 2004.

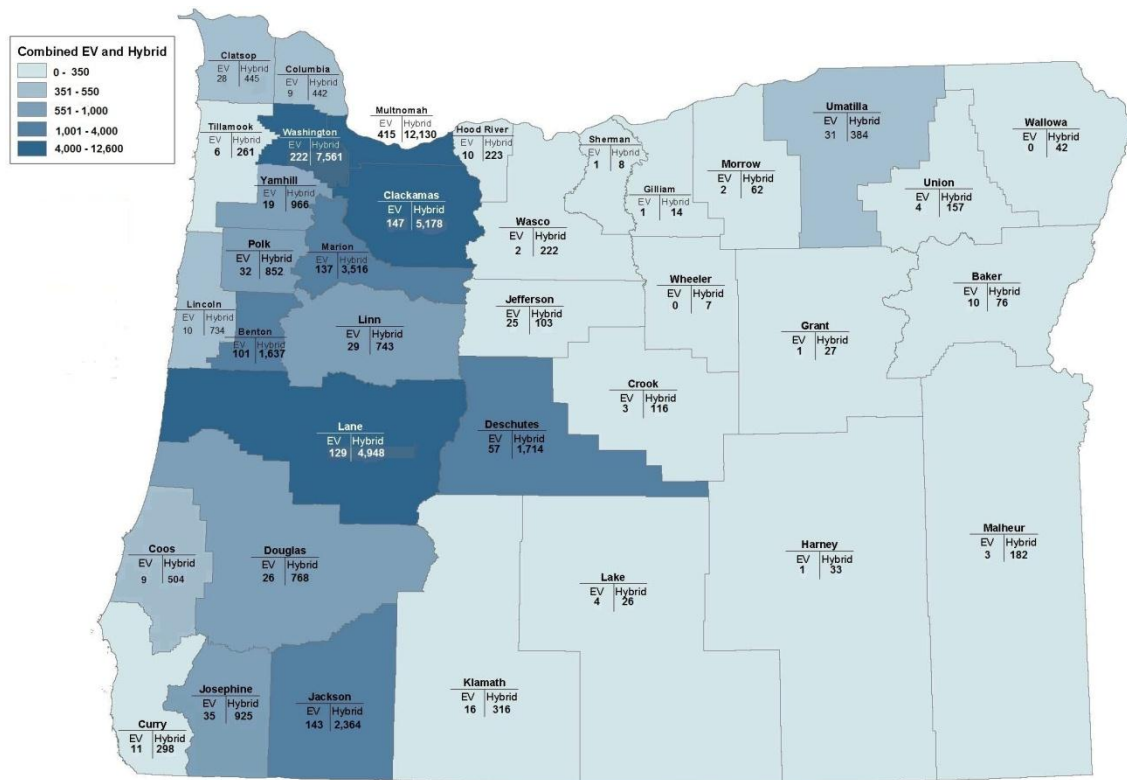


Figure 3. Total hybrid vehicles and PEVs in Oregon counties as of November 2011³⁶

Oregon’s early majority PEV consumers are likely to be found in communities with a population of 50,000 or more and in the surrounding area within a 10 mile radius of these cities. There are six urban areas in Oregon: Portland and vicinity, Eugene, Salem, Medford, Bend, and Corvallis. These are the areas where PEV education and awareness efforts will initially be most fruitful.

It would be short-sighted, however, to perceive efforts to reach Oregon’s early majority consumers as primarily benefiting urban Oregonians. Rural Oregon is the source of much of the energy that will power electric vehicles.³⁷ Demand for clean, renewable energy from the wind, wave, solar, and cogeneration facilities at lumber mills, dairies, wastewater treatment plants, and landfills is likely to increase with widespread adoption of PEVs. Thus, there are potential economic benefits for rural Oregon from PEV adoption even before the vehicles are ready to meet these potential buyers’ needs and expectations.

Smaller urban and rural areas will benefit from a campaign to the early majority buyers in the longer term as well. As potential later adopters, the consumers in these areas are likely to be the beneficiaries of PEV technology improvements and price reductions.

³⁶ Data from Ashley Horvat (ODOT Office of Innovative Partnerships and Alternative Funding Transportation Electrification Project Analyst), e-mail correspondence with the authors, October 31, 2011.

³⁷ Oregon Department of Energy, *2011-2013 State of Oregon Energy Plan* (Salem, OR: Oregon Department of Energy), 29, http://www.oregon.gov/ENERGY/docs/reports/legislature/2011/energy_plan_2011-13.pdf.

These improvements and reductions will not materialize, however, without early majority consumers first adopting the vehicles at a scale where manufacturers can decrease their long run average costs. Therefore, it is first necessary to focus on marketing to the mostly urban early majority buyers; over time, it will be appropriate to target education and outreach efforts to other areas of the state. PEVs, like hybrids and other new innovations, may take more than a decade to be widely adopted in Oregon. In the long run, however, residents in all of Oregon’s 36 counties will benefit from increased PEV adoption rates.

Household Income

Among the counties where Oregon’s six urban centers are located, Multnomah, Washington, Clackamas, and Deschutes counties have the wealthiest residents, with median household incomes above the national median of \$50,221 according to 2009 data. The chart below indicates 2009 median household incomes for all counties representing urban Oregon.

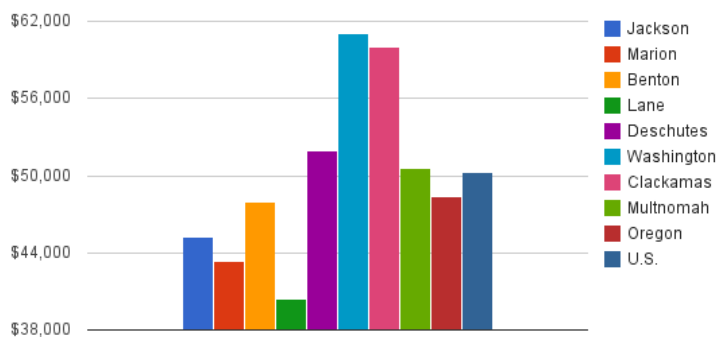


Figure 4. 2009 median household income of counties with urban centers³⁸

When considering total number of Oregon households with annual incomes in the target range of \$100,000 to \$150,000 or higher, the majority are found in the Portland tri-county area, as illustrated in Figure 5.

³⁸ U.S. Census Bureau: State and County Quick Facts (searched for median household income data sets for each county, the State of Oregon, and the United States; accessed August 24, 2011), <http://quickfacts.census.gov/qfd/states/41000.html>.

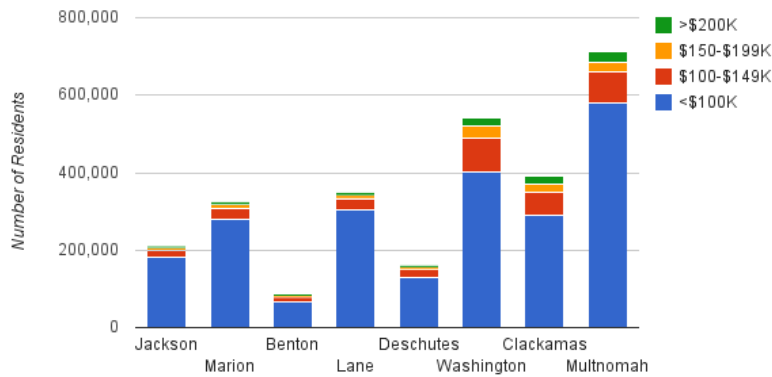


Figure 5. Household income distribution in Oregon counties with urban centers³⁹

Target Age Group

Of the approximately 521,000 Oregon residents between the ages of 40 and 49 in 2009, nearly half live in the greater Portland area, residing in Multnomah, Clackamas, or Washington counties. Lane and Marion counties, representing the urban centers of Eugene and Salem, have the next highest concentration of citizens in the target age group, as shown in Figure 6.⁴⁰

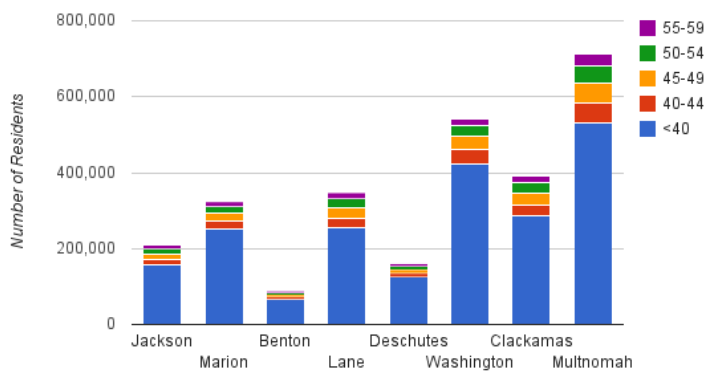


Figure 6. Population of Oregon counties with urban centers by age⁴¹

³⁹ U.S. Census Bureau: American Community Survey (searched for “Oregon” then for household income by category data sets for each county, the State of Oregon, and the U.S. for 2005-2009; accessed August 24, 2011), <http://www.census.gov/acs/>.

⁴⁰ Oregon Office of Economic Analysis, *2010 Annual Population Report*, Table 9, Population by Age and Sex for Oregon and Its Counties (Estimated): July 1, 2009. <http://www.pdx.edu/prc/annual-oregon-population-report>.

⁴¹ Ibid.

Housing

Home ownership is an important variable for the PEV early majority because the ability to install and own PEV charging equipment removes a significant barrier to adoption. In the Portland tri-county metropolitan area, a higher number of single-family dwellings have a garage or carport compared with the national housing stock (72 percent vs. 66 percent). In addition, Portland residents are more likely to live in single-family dwellings (71 percent) than residents of other parts of the country (67 percent).⁴² This is important because residents of multifamily housing structures are likely to need the permission or cooperation of landlords or homeowner associations to install charging devices, and they will be disinclined to invest in a permanent property improvement such as that represented by a charger.

Environmental and Political Leanings

Oregonians, especially those in urban areas, tend to be more sensitive to environmental issues, dependency on foreign oil, and high gas prices (which are uniformly higher in the western United States),⁴³ and they are more likely to vote than Americans on average.⁴⁴ These are all characteristics that correlate with the early majority PEV consumer and portend well for PEV adoption.

When Multnomah County residents were asked in a 2009 Davis, Hibbitts, & Midghall survey, “How important is it that Oregon becomes a leader in the nation for using PEVs as an alternative to gasoline fueled vehicles?” 49 percent of participants said, “very important,” and another 41 percent said, “somewhat important.” When those 90 percent responding “very” or “somewhat important” were asked why they felt PEVs were important for Oregon, 59 percent indicated that it was because Oregon has a green and innovative reputation and should maintain its position as a green leader.⁴⁵ PEV campaign messages should capitalize on Oregonians’ pride regarding their state’s reputation for sustainability leadership.

Fleet Buyers

There are relatively few potential institutional PEV consumers compared to the number of individual consumers. Therefore, rather than rely on survey data to identify the needs and expectations of fleet buyers, for this portion of our research we chose a qualitative approach. We conducted interviews with fleet buyers or managers at UPS,

⁴² U.S. Census Bureau, *American Housing Survey for the Portland Metropolitan Area: 2002*, Current Housing Reports, Series H170/02-34, (U.S. Census Bureau, 2003), 1, 16, 7.

⁴³ “What Are the Greenest Cities When It Comes to Cars?” Cars.com, April 9, 2008, <http://www.cars.com/go/about/us.jsp?section=P&content=rel&date=20080409>; Federal Trade Commission, *Gasoline Price Changes: The Dynamic of Supply, Demand, and Competition* (Federal Trade Commission, 2005), <http://www.ftc.gov/reports/gasprices05/050705gaspricesrpt.pdf>.

⁴⁴ Thom File and Sarah Crissey, *Voting and Registration in the Election of November 2008*, Current Population Reports (U.S. Census Bureau, 2010), 8, 11, <http://www.census.gov/hhes/www/socdemo/voting/index.html>.

⁴⁵ Davis, Hibbitts, & Midghall, Inc., Fusion MR, LLC, and Portland Hatfield School of Government, “Electric Vehicle Survey,” 5, 6.

Staples, Northside Ford, PGE, Frito Lay, and Enterprise.⁴⁶ Each of these companies already has experience with PEVs.

Even in the most progressive instances, fleet managers have only shown willingness to try out PEV technology in small test cases. These trials have been chosen to meet local regulations and emission requirements (e.g., those in California), as well as to take advantage of federal, state, and local incentives. PEV trucks have a significant cost difference with internal combustion engine (ICE) trucks, one that, so far, cannot be recovered through the lower cost of fuel and maintenance alone. As a result, incentives are still needed to make the technology accessible to buyers. To further illustrate this, Mike Britt, chief alternative fuels manager for UPS, said UPS plans to continue to “follow the funding” as they make their alternative fuel vehicle purchase decisions.

All the companies we interviewed had a relatively detailed selection processes in place before purchasing PEVs to ensure that the vehicles would be able to meet the functional requirements for which they were purchased, although some companies performed more analysis than others. Fleets in urban settings, where the vehicles don't have to travel long distances between charges, and with routes that are limited to a predetermined, in-range length were considered good candidates. Each company planned to charge vehicles overnight, usually in the loading bay, so they would be ready for the next day's delivery. Each company we interviewed plans to evaluate the PEVs to see how they have performed after the initial trial. Additional purchase decisions will be made based on that evaluation.

In our interviews we found that the companies that performed the most intense pre-purchase analysis were the happiest with their PEV performance and were more inclined to expand the program in the near future. The companies that expressed less satisfaction with their PEVs were experiencing issues with power and payload, perhaps indicating that the routes and payload needs weren't analyzed with enough care before making the PEV purchase. This points to the need for tools to help fleet managers evaluate which routes and payload would be best suited for PEVs. Fleet managers are focused on total cost of ownership and tend to be analytical in regards to their purchases. Therefore, we believe the best way to reach this market is by providing analytical tools to buyers.

Of those satisfied companies, there are some surprising positives that have emerged during their trials: Staples found that its drivers are driving more efficiently in an apparent attempt to compete with each other on who can return to the garage with the most charge at the end of a route. PGE found that the high-lift PEV trucks are much easier and safer for crews to work with, since ground-to-high-lift communication is much easier without the noisy truck motor running to power the lift.

⁴⁶ Interviews conducted with Rod Bergquist (fleet sales, Northside Ford Truck Sales), August 18, 2011; Mike Britt (chief alternative fuels manager, UPS), August 24, 2011, Jim Strickland (service delivery operations manager, Staples), August 26, 2011; Christie Conrad (Enterprise Rent-a-Car), August 18, 2011; Rick Durst (Transportation Electrification Division, PGE), September 12, 2011; Kevin Fairham-Wheeler (Transportation Electrification Division, PGE), September 23, 2011; Rich Wilson (regional fleet manager, Frito-Lay), September 8, 2011.

Another important finding our interviews uncovered is that fleet managers' and drivers' perceptions change about PEVs in general after their experiences, even though the bulk of the experiences are with PEV trucks. They expressed a better understanding of the PEV technology and an affinity for the performance of the vehicle (described as "quiet," "peppy," "smooth," and "reliable"). Due to the increased comfort level with the technology, they expressed an interest in purchasing a PEV for personal use in the future, something they admitted they would not have considered before their interaction with the fleet PEVs.

This change in attitude matches our findings on other PEV trial experiences (see the Review of PEV Trial Opportunities section of this paper): the more that people interact with PEV technology, the more they become comfortable with it and begin to consider it as a viable transportation option. It also indicates an increased number of PEVs in fleets may be a way to reach potential early majority PEV buyers. Even if fleet buyers and drivers do not purchase PEVs for their personal use, their endorsements of PEVs could influence others.

Adoption Barriers and Enablers for Oregon's Early Majority

Preparing for the successful roll-out and adoption of electric vehicles in Oregon involves much more than building a state-of-the-art charging infrastructure and cultivating a proud-to-be-green social structure. While charging availability and a supportive planning and regulatory environment are definite requirements for PEV success, all of the major barriers and enablers identified as relevant to early majority consumers, *including but not limited to* consumer outreach and education, must be addressed in order to meet Oregon's goal of widespread PEV adoption.

Barriers to Adoption

Given the needs of potential early majority buyers, the problems with getting them to adopt PEVs in Oregon are clear: a product that requires behavior changes and incorporates unfamiliar technology seems inherently risky to early majority buyers. The process of refueling at a gas station is a highly ingrained behavioral pattern for drivers—perhaps more so in Oregon where drivers do not even pump their own gas. While ambitious infrastructure plans are underway, public charging stations are not yet widely available. Finally, the prices of PEVs to date are well above those of fuel-efficient ICE vehicles (Table 3). As discussed in the following section, incentives to make the price of PEVs more competitive are important enablers to the adoption of PEVs, and the lack of such an incentive from the state of Oregon could hinder PEV adoption in the state.

Table 3. Compact Car Pricing Comparison⁴⁷

Small/Compact cars	Reservation Fee	MSRP Range (after rebate)		Federal Rebate
		Low	High	
Honda Fit	\$0	\$15,175	\$19,540	\$0
Hyundai Elantra	\$0	\$15,195	\$20,445	\$0
Ford Focus	\$0	\$16,500	\$22,700	\$0
Mitsubishi i-MiEV (PEV)	\$299	\$21,625	\$23,625	\$7,500
Toyota Prius (Hybrid)	\$0	\$23,520	\$28,790	\$0
VW GTI	\$0	\$23,695	\$30,925	\$0
Nissan Leaf (PEV)	\$99	\$25,280	\$26,220	\$7,500
Ford Fusion (Hybrid)	\$0	\$28,600	\$28,600	\$0
Chevrolet Volt (PEV)	\$0	\$32,780	\$32,780	\$7,500

We conducted a review of consumer surveys and interviews with marketing firms to gain further insight into the perceived barriers to adoption by individual consumers. The previously cited Deloitte study profiling the early majority identified six major barriers: familiarity with PEV technology, automobile brand loyalty, availability of home charging units, public infrastructure, and purchase price.⁴⁸ A 2010 Harvard study cited lack of information and technology uncertainty as important barriers to

⁴⁷ Prices are from manufacturers' websites.

⁴⁸ Deloitte, *Gaining Traction*, 9-14.

adoption.⁴⁹ Project Get Ready, a nonprofit PEV promotion initiative, has concluded that hesitation about a new mobility paradigm and high initial costs are the most significant consumer-specific barriers.⁵⁰ The 2009 Davis, Hibbitts, & Midghall survey indicated that Multnomah County residents were more than twice as likely to buy a PEV if the vehicle range was extended from 100 to 200 miles.⁵¹ From this research and discussions with Portland-area marketing and advertising firms, we identified the following barriers as being particularly significant for PEVs in Oregon:

- range anxiety
- initial cost
- charging time
- infrastructure support
- safety issues
- complexity of finding information

Our interviews to date have found similar results as the barriers to adoption for fleet buyers. Cost and limited range were the two biggest barriers to widespread adoption cited for fleet PEVs. Interestingly, however, within the confines of the limited range, performance was not considered a drawback. In fact, Staples drivers claim that driving their PEVs is less stressful and tiring than driving the noisy, vibrating diesel vehicles in the traditional fleet.⁵²

Adoption Enablers

There is little disagreement among OEMs, utilities, and the Transportation Research Centers focusing on the electrification of transportation that the most important enabler for PEV adoption is the charging infrastructure.⁵³ Thanks to the DOE's EV

⁴⁹Alfred Wiederer and Ronald Philip, *Policy Options for Electric Vehicle Charging Infrastructure in C40 Cities* (Cambridge, MA: John F. Kennedy School of Government, Harvard University, 2010), <http://www.innovations.harvard.edu/download-doc.html?id=1108934>.

⁵⁰ Rocky Mountain Institute, "Consumer Barriers," *Project Get Ready Interactive Database*, accessed September 3, 2011, <http://projectgetready.com/category/menu>.

⁵¹ Davis, Hibbitts, & Midghall, Inc., Fusion MR, LLC, and Portland Hatfield School of Government, "Electric Vehicle Survey," 9. Survey participants were asked to rate their likelihood of buying an electric vehicle with a range of 100 miles (assuming a federal and state tax credit, plus fuel cost savings) on a scale from 1 to 9, (1="not at all" and 9 = "strongly consider," and 20% rated their purchase consideration as 7, 8 or 9. When the question was repeated with the vehicle range increased to 200 miles, 45% rated their purchase consideration to be 7, 8 or 9.

⁵²Jim Strickland (service delivery operations manager, Staples), in conversation with the authors, August 26, 2011.

⁵³ See, for example, "Electric Vehicle Infrastructure Is the Ultimate Enabler of Electric Vehicles," *Huffington Post*, September 27, 2011, http://www.huffingtonpost.com/2011/09/27/ecotality-electric-vehicle-chargers-future_n_976661.html; Mark Hirschey, *What's Your Strategy for the Electric Vehicle Market?* (Oliver Wyman Consulting, 2009), http://www.oliverwyman.com/media/OW_UTL_EN_2009_Electric_Vehicle_Market.pdf; Antonio Benecchi, Matt Mattila, and Shamsuddin Nauman Syed, *PEV Readiness Study* (Roland Berger Strategy

Project, the West Coast Green Highway, and the many other public and private efforts in the race to create a public PEV charging infrastructure, Oregon is on track to be one of the most PEV-ready states for public charging stations. Close behind charging infrastructure the following factors are the most frequently cited potential enablers:

- supportive legislative and regulatory environment
- policies for streamlining the permitting and installation of chargers
- collaboration among key stakeholders
- green power generation
- purchase incentives
- fleet penetration
- community outreach and education about PEVs
- identification with the environmental benefits of PEVs

Oregon is often cited as one of the most “PEV Ready” areas in the country.⁵⁴ The state has been an active supporter of alternative fuel vehicles since 1991, and it has one of the most developed charging infrastructure deployment efforts of any region in the United States. Oregon is considered a model in its strategic planning for PEVs, its policies for streamlined process for permitting and installing home-based EVSE, and its collaboration between PEV industry stakeholders, utilities, universities, government, and agents of economic development. Portland is frequently cited as a model city for facilitating the electrification of mobility and for its “attitude” of proactive PEV adoption.⁵⁵

Unfortunately, Oregon is likely to fall short of other states in the areas of purchase incentives and fleet penetration. The absence of these key enablers is likely to seriously hinder PEV adoption by Oregon’s early majority because vehicle affordability and visibility in the community are two important requirements for the important early majority consumer category. The final enabler, community outreach and education about PEVs, is the subject of this report.

Review of PEV Education and Outreach Efforts to Date

Given that OTREC and TEEC will have limited resources for their PEV education and outreach efforts, it will be important to conserve those resources wherever possible. We

Consultants, 2010), http://www.rolandberger.com/media/publications/2010-10-14-rbdc-pub-PEV_Readiness_Study_Electric_Vehicles_in_America.html.

⁵⁴ Benecchi, Mattila, and Syed, *PEV Readiness Study*, 7, 11, 13. Benecchi et al. describe Portland as a “leader in PEV readiness”; U.S. Department of Energy, “Oregon’s Plug-In Vehicle Activities and Processes,” DOE Energy Efficiency & Renewable Energy website, accessed October 16, 2011, http://www.afdc.energy.gov/afdc/vehicles/electric_deployment_case_study_oregon.html.

⁵⁵ See Benecchi, Mattila, and Syed, *PEV Readiness Study*, 17. Benecchi et al. discuss city “attitude” as one of the factors assessed in gauging city momentum for PEV readiness.

have conducted a review of PEV marketing efforts already underway for two reasons: (1) so OTREC and TEEC can avoid duplicating the efforts already undertaken by other organizations and (2) so OTREC and TEEC can adapt best practices by other organizations, rather than try to create materials and outreach efforts totally from scratch. The following is an overview of our findings. In our recommendations section, we identify the actions we believe OTREC and TEEC should focus on based on this research.

Marketing Efforts by Car Manufacturers

A number of car manufacturers have already put effort into marketing PEVs in Oregon (Table 4). The measurable result of this marketing—the sales numbers breakout for Oregon—is not widely available. We can, however, compare the national sales numbers for the two widely-available PEVs, Nissan Leaf and Chevrolet Volt (Table 5 and Figure 7).

Table 4. PEV Advertising Efforts by Car Manufacturers in Oregon

	Online	Print	TV	Radio	E-mail	Events	Outdoor
Nissan Leaf	X	X	X	X	X	X	X
GM Volt	X	X	X	X	X	X	X
Mitsubishi i-MiEV	X	X			X	X	

Table 5. Nissan Leaf vs. Chevy Volt U.S. Sales⁵⁶

	Dec '10	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	2011	'11 Target	% of Target
Leaf	19	87	67	298	573	1,142	1,708	931	1,362	1,031	849	8,048	12,000	67%
Volt	326	321	281	608	493	481	561	125	300	723	1,108	5,001	10,000	50%

Sales numbers expressed in units sold

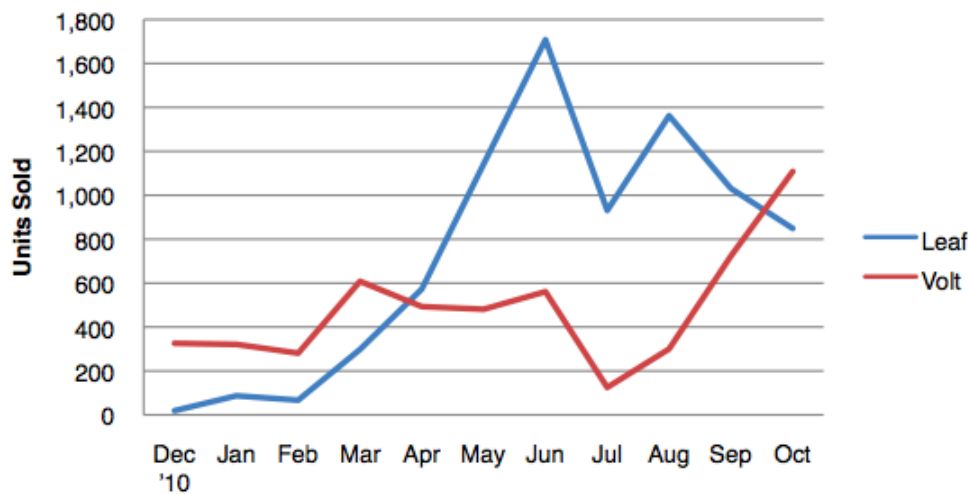


Figure 7. Nissan Leaf vs. Chevy Volt U.S. Sales⁵⁷

⁵⁶ Data drawn from a series of articles from Green Car Reports. See Appendix C for list of articles.

⁵⁷ Ibid.

For the Leaf, Nissan has put together the largest marketing effort behind PEVs in Oregon so far. Oregon was one of the initial roll-out markets for the Leaf, along with Arizona, California, Hawai'i, Tennessee, Texas, and Washington.⁵⁸ Nissan's media-friendly Drive Electric tour included stops in Oregon, which created coverage in the local and national press.⁵⁹ During the initial roll-out, local advertising included billboards, TV spots, and magazine ads. Online, Nissan took full advantage of Google advertising. Leaf ads came up not just in response to expected terms like "Nissan Leaf," but for search terms like "Chevy Volt" and "new car." Interested consumers who entered the Leaf site were directed to put down a \$99 proof of interest deposit to secure a vehicle.

Being the first to market with a full PEV, Nissan was able to take advantage of early adopters and innovators who had been eagerly waiting for a widely-available, mass-produced electric car. Since Nissan was aiming squarely at this market, their marketing was not targeted at educating consumers about electric vehicles as much as shepherding PEV-interested buyers toward purchasing the Leaf. The measured release of the Leaf and the \$99 pre-order payment ensured Nissan a pre-screened consumer base with whom they could communicate directly via e-mail and targeted Internet ads. They used this list to mine for demographic and marketing data with subsequent surveys and contests.

Other PEVs have barely begun to scratch the surface of Oregon's PEV market. GM did not include Oregon in its Chevy Volt roll-out until the second phase in August 2011. Like Nissan, GM carefully mined the marketplace for eager early adopters and innovators and communicated directly with them via e-mail about the launch of the Volt. Unlike Nissan, GM has not invested heavily in other local advertising, aside from a TV spot that started running in August. Our interviews with local GM dealers have revealed that this low level of marketing has been more than sufficient for their sales needs. Each eligible Oregon dealer only receives an allocation of two to three Volts per month, and the dealers we spoke with have been able to generate lists of potential buyers ready to purchase Volts as soon as they were available.⁶⁰

Oregon has also been chosen as a launch state for Mitsubishi's i-MiEV, and the cars have recently become available for test drives in Portland. Despite a week where the "i" was supposed to be front and center on stage with the national car press, minimal press coverage has been generated that we could locate online. Similar to the Leaf and the Volt, the i-MiEV is only available by pre-order, with a \$299 (refundable) proof of interest payment required.

⁵⁸ Brad Berman, "Nissan Leaf Reservation Will Reopen on May 1," *Plugincars*, April 20, 2011, <http://www.plugincars.com/nissan-leaf-reservation-will-reopen-may-1-107057.html>.

⁵⁹ "SolarWorld Campus in Oregon Showcases Nissan LEAF, the Nation's First Mass-Produced, 100% Electric Vehicle," *The Street*, November 1, 2010, <http://www.thestreet.com/story/10906611/1/solarworld-campus-in-oregon-showcases-nissan-leaf-the-nation8217s-first-mass-produced-100-electric-vehicle.html>.

⁶⁰ Phone interviews conducted with Portland-area GM dealers' sales staff on September 20, 2011: Doug Harris, Wilsonville Chevrolet; Allen Evans, Town & Country Chevrolet; Jeff Anderson, Wentworth Chevrolet; Chris Borquist, Wentworth Chevrolet.

Marketing Efforts by States

The state of Oregon has not yet launched any significant marketing effort behind electric vehicles, aside from the RETC and BETC legislation in place to stimulate demand. The state and its many agencies have focused more on building up the necessary infrastructure to support the desired growth in electric vehicles in the state, specifically along the I-5 corridor and strategic beach and mountain access points.⁶¹ The promotion of PEVs is part of the state's plan to meet greenhouse gas emission levels set by Oregon's House Bill 3543 and Senate Bill 1059. A 2009 study in Oregon by ODOT found that electrification of vehicles will be vital to meeting Oregon's goals for reducing greenhouse gas emissions.⁶²

By contrast, the state of California tries to help consumers decipher the efficiency levels of vehicles, as evidenced by their website www.driveclean.ca.gov.⁶³ This website is a good place for consumers to compare car models by efficiency and environmental impact. California has also undertaken two programs focused on providing consumers, both retail and commercial fleet, with information and decision-making tools to help them make an informed decision about PEVs and other types of low-emission vehicles: the iZero Emission Vehicle Program and DRIVE program.⁶⁴

There are other, less robust efforts to educate consumers in other states, most notably North Carolina, Colorado, and Washington.⁶⁵ However, the focus in these states is more on charging station installation than on promoting PEVs themselves.

Marketing for Charging Stations

In the realm of publicly available charging stations (EVSEs), there is a wide array of data resources to find and track where the stations are located, which companies supply the electricity, and what types of charge the stations supply. This information is important because early majority PEV buyers are likely to want both a robust charging infrastructure to be in place and the ability to easily find and use that infrastructure. Many PEVs include onboard GPS systems (including the Nissan Leaf, Chevy Volt, and Mitsubishi i-MiEV in the SE trim level) that are supposed to have up-to-date lists of all public charging stations, but the process for updating these systems are cumbersome.

⁶¹ Christina Williams, "AeroVironment to Install I-5 Electric Vehicle Chargers in Oregon," *Sustainable Business Oregon*, June 1, 2011,

<http://www.sustainablebusinessoregon.com/articles/2011/06/aerovironment-to-install-i-5-electric.html>.

⁶² Oregon Department of Transportation: Transportation Planning Analysis Unit, *Background Report: The Status of Oregon Greenhouse Gas Emissions and Analysis* (Salem, OR: Oregon Department of Transportation, 2009), viii, <http://www.oregon.gov/ODOT/TD/TP/docs/HB2186page/Background.pdf>.

⁶³ "Drive Clean," California Air Resources Board, accessed September 30, 2011, <http://driveclean.ca.gov/>.

⁶⁴ "Zero Emission Vehicle (ZPEV) Program," California Environmental Protection Agency Air Resources Board, accessed October 14, 2011, <http://www.arb.ca.gov/msprog/zevprog/zevprog.htm>; "Drive: California's Alternative & Renewable Fuel & Vehicle Technology Program," The California Energy Commission, accessed October 14, 2011, <http://www.energy.ca.gov/drive/index.html>.

⁶⁵ "Centralina Clean Fuels Coalition," Centralina Clean Fuels Coalition, accessed October 14, 2011, <http://www.4cleanfuels.com/index.php>; "RMI/Move: Mobility + Vehicle Efficiency," Rocky Mountain Institute, accessed October 14, 2011, <http://www.move.rmi.org/>; "West Coast Green Highway," Washington State Department of Transportation, accessed October 14, 2011, <http://www.westcoastgreenhighway.com/>.

Applications for smart phones and even websites with charging information are therefore likely to be important resources for early majority users. Unfortunately, many of these resources are in poor condition (see Appendix D). Below, we review the best options available, which may be of use for TEEC and OTREC as they look for places to refer PEV owners to.

As of October 21, 2011, we were able to find 12 different iPhone applications for locating charging stations (Figure 8). We recognize that this may not be a comprehensive list because it is difficult to locate some of these applications for installation on a smart phone. Different applications appear depending on the search criteria. A generic search for “electric vehicles” brings up several, while “electric chargers” produces others. Still others only appear if you search for them by name (including Ecotality’s Blink). Obviously, this lack of search optimization is a problem in itself—it may be helpful to PEV users if OTREC and TEEC recommend specific applications rather than leave users to search on their own.



Figure 8. Charging station locator applications for the iPhone⁶⁶

Based on our review, we believe the top two applications available at present are Plugshare and Recargo (Figures 9 and 10). Both allow users to submit charging station information as well as submit comments, a check-in status, and add photos for a charging site. As a result, both have the most up-to-date information available of the applications at the time of our review. The only missing data point is whether or not an EVSE is currently in use, which is available from the brand-specific applications.

⁶⁶ Accessed with searches for “electric vehicles,” “electric chargers,” and individual names of applications on October 21, 2011.

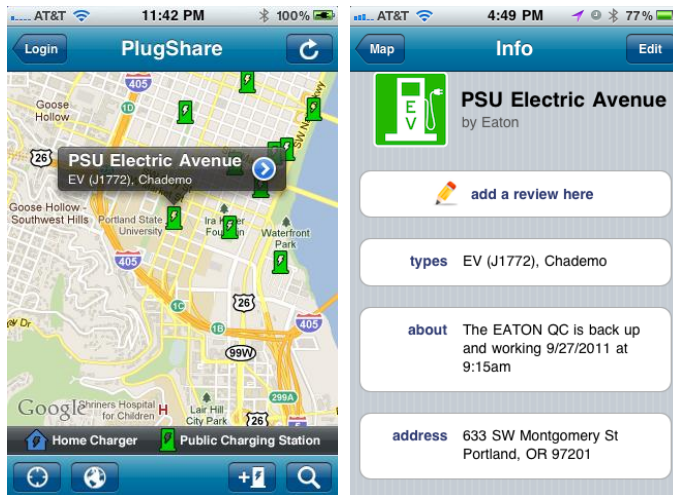


Figure 9. Plugshare user interface⁶⁷

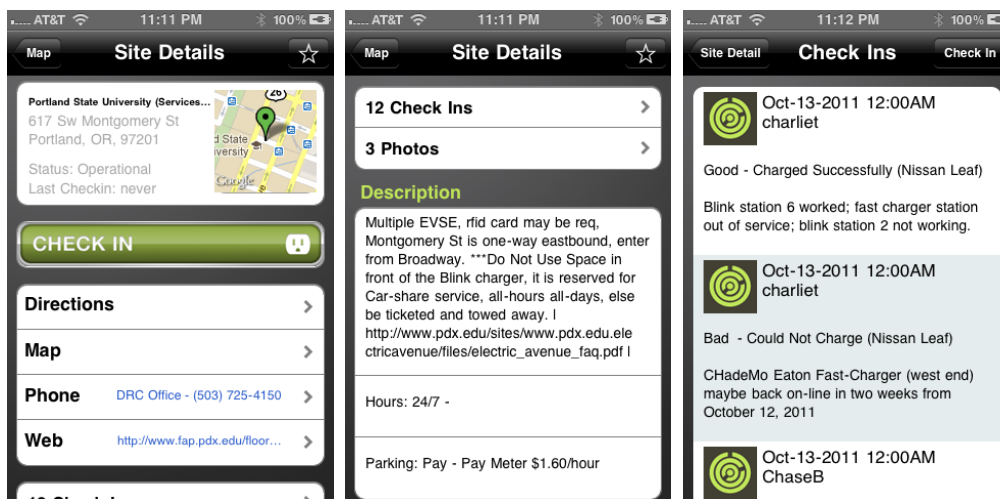


Figure 10. Recargo user interface⁶⁸

On the Web, charging station locator tools are a common element for websites devoted to PEVs. One of the most detailed tools is from the U.S. DOE (Figure 11).⁶⁹ The site allows the user to search by ZIP code for the closest stations. The DOE tool excels over other sites' tools because of the level of detail it provides on each station. Most other sites lack information including the types of payment accepted, a detailed description of charger location, a phone number, hours of use, and the date the information was last updated. The DOE site provides all of this information.

⁶⁷ Accessed October 21, 2011.

⁶⁸ Accessed October 21, 2011.

⁶⁹ "Alternative Fuels and Advanced Vehicles Data Center," U.S. Department of Energy, accessed October 14, 2011, <http://www.afdc.energy.gov/afdc/locator/stations/>.

Smart Park

FUEL TYPE CODE	Electric
STATION NAME	Smart Park
STREET ADDRESS	123 SW Jefferson
CITY	Portland
ST PRV CODE	OR
ZIP	97209
DIRECTIONS	Enter on Jefferson St. side. Located in short term area to the right.
STATION PHONE	503-823-2897
GROUPS WITH ACCESS CODE	Public - call ahead
ACCESS DAYS TIME	24 hours daily; pay lot
CARDS ACCEPTED	
# LEVEL 1 CHARGERS	1
# LEVEL 2 CHARGERS	1
# DC FAST CHARGERS	
OTHER CHARGERS	1 Conductive 120V/240V NEMA 14-50
DATE LAST CONFIRMED	08/25/0011

Figure 11. U.S. Department of Energy charging station locator⁷⁰

Given that early majority consumers are likely to want as much and as complete of information as possible, we recommend OTREC and TEEC model any tools they build after the above sites, or that they point users to the above resources if they do not have the resources to develop their own tools. If OTREC and TEEC choose to build their own tools, we recommend they either dedicate significant resources to making sure the information is up to date or embrace some form of crowd sourcing.⁷¹ As noted above, many other options exist (Appendix D), but the information holes and lags in these resources will only contribute to user frustration.

Website Review

We reviewed 30 websites to determine the type and quality of information currently available for those interested in PEVs. From our review it was evident that if consumers want basic information about electric vehicles, they will need to spend time sifting through different websites to find what they need. Facts about PEVs are fairly dispersed, including information on how electric cars function, home charging station installation, cost of ownership calculators, and current incentives. A one-stop-shop for Oregonians looking for PEV information would be a useful tool to potential early majority PEV buyers. To help build such a site, our review identified best practices in already extant websites that OTREC and TEEC could adopt.

- **Organization:** Plugincars.com has articles that are very similar to those on other sites, but how they present the information is very conducive for educating a consumer about electric vehicles. The guide's sections are not only

⁷⁰ "Alternative Fuels and Advanced Vehicles Data Center," (searched for electric chargers in ZIP code 97209); accessed October 14, 2011), <http://www.afdc.energy.gov/afdc/locator/stations/>.

⁷¹ Crowd sourcing has not only been successfully integrated into smart phone applications. OpenChargeMap is a web resource that relies on crowd sourcing for locating EVSEs. "OpenChargeMap," OpenChargeMap, accessed October 14, 2011, <http://openchargemap.org/>.

divided by topic such as charging, incentives, and technology, but it is also sorted for beginners and shoppers.⁷² Thus, unfamiliar early majority consumers can start from the very beginning in their search for information.

- **Incentives search tool:** While many people are unlikely to visit the Tesla website since the company's cars are out of the price range of average consumers, the incentives search tool on the website is one of the best we found.⁷³ It allows the user to search around the world for available incentives. The results include federal, state, and local incentives from tax credits, high-occupancy vehicle lane access, free parking, and other non-monetary benefits. While early majority consumers are generally willing to pay a premium for convenience, any resource that helps them reduce that premium can only help these buyers.
- **Buying guide:** The State of California's Drive Clean site, while not specific to electric vehicles, is designed in a particularly helpful way to lead a consumer through the PEV buying process.⁷⁴ Such a guide should help early majority consumers overcome the perceived complexity of buying a car with unfamiliar technology.
- **Links library:** A list of links to other websites that have accurate information can help show early majority consumers that a rich trove of information exists. Such resources are part of the fully developed infrastructure these buyers appreciate. The best links library we found belonged to the Electric Auto Association. Many sites we reviewed had sites had a list of links for users to follow, but without any organization to help the users along. In contrast, the Electric Auto Association site has the links separated by major topics including advocacy, research, batteries, PEV conversions, insurance, and laws.⁷⁵

Our website review also revealed common flaws, both visual and editorial, that TEEC and OTREC should avoid in the development of their own site:

- Several sites used light green as their main color to support their "green" theme. However, the light green on a white background does not provide enough contrast to make text easily readable on a computer screen.
- A cluttered home page was also a common problem. Instead of creating a home page that is easy to read and guides the user through the site, many sites put much of their content on the main page, making it difficult for the reader to prioritize the information.

⁷² "Plugincars," Plugincars, accessed September 30, 2011, <http://www.plugincars.com/>.

⁷³ "Go Electric/Incentives," Tesla Motors, accessed October 14, 2011, <http://www.teslamotors.com/goelectric/incentives>.

⁷⁴ "Drive Clean," California Air Resources Board.

⁷⁵ "PEV Links," Electric Auto Association, accessed September 30, 2011, <http://www.electrcauto.org/?page=PEVLinks>.

- Many sites have been created for an electric car enthusiast instead of the average consumer (more like the early majority buyer). For example, Pluginamerica.org provides good information about purchasing an electric car, such as summary of all electric vehicles (Figure 12).⁷⁶ However, all of the advocacy information on the site could turn away the early majority consumer. While some cheerleading is appropriate and expected from a PEV-centered site, as objective of a tone as possible will help readers trust the information provided.



Make / Model	Drivetrain	Description	Range	Top Speed	Price (USD)	Target	Image
Aptera Motors 2e	EV	Designed for efficiency, the aircraft-like 2e is a 3-wheeled, 2-passenger vehicle with a lightweight composite body. The 2e's aircraft-like shape gives it an ultra low drag coefficient...	100 mi	90 mph	TBA	2011	
Arcimoto Pulse	EV	The Arcimoto Pulse is a 3-wheel tandem 2-seater with AGM lead-acid batteries that recharge from a standard 120V outlet in 6 hours. It is powered by a 96-volt DC motor with...	100 mi	65 mph	\$17,500	TBA	

Figure 12. Plug In America’s overview of electric vehicles⁷⁷

Each section above highlights components from the various websites that stand out for their above- or below-average quality. In our campaign outline, we discuss how these components should influence the framework of a website specific to the Oregon market. However, if designing a site is prohibitive due to resource constraints, then the best overall website to direct consumers to would be goelectricdrive.com.⁷⁸ The site provides a five-step road map to lead a consumer through the research process. There are also videos throughout the site by industry leaders like Brian Wynne, president of Electric Drive Transportation Association, and Scott Becker, senior vice president of administration and finance for Nissan North America. The videos help answer common questions in a way that is more engaging than just reading the information. The site also provides information on charging stations, incentives, and FAQs. The site’s only weak spot is its cost calculator. The calculator is very basic. It allows only two inputs (MPG of a person’s current car and the state where that person lives). It also provides just two results: fuel and CO2 savings. Therefore, we instead recommend the vehicle

⁷⁶ “Plug-in Vehicle Tracker: What’s Coming, When,” Plug In America, accessed October 14, 2011, <http://www.pluginamerica.org/vehicles>.

⁷⁷ “Plug-in Vehicle Tracker: What’s Coming, When,” Plug In America, accessed October 14, 2011, <http://www.pluginamerica.org/vehicles>.

⁷⁸ “Go Electric Drive,” Electric Drive Transportation Association, accessed October 25, 2011, <http://goelectricdrive.com/>.

comparison tool found on ProjectGetReady.com as the best “off-the-shelf” cost calculator.⁷⁹

Review of PEV Trial Opportunities

Unlike hybrid vehicles, PEVs require consumers to evaluate not only the vehicle itself, but the battery pack, the charging technology at home, and the availability of charging infrastructure away from home. In order to better understand and meet consumer needs and expectations and to prepare for the first wave of electric vehicles on the market, utility companies, manufacturers, and local and regional governments have engaged in a variety of publicly and privately funded pilot projects. Pilot programs have been designed to track every aspect of PEV use from testing various technology components to electrical grid impact. Pilots that have focused on consumer behavior have and will continue to shed light on how to enable PEV adoption, including what information to offer potential consumers and how best to offer it.

Trialability

Research on consumer behavior has demonstrated that without some kind of cognitive link to an innovation, most consumers are not capable of considering its merits or imagining themselves using the product. Such links may develop from observing or hearing about the experiences of friends, family, or trusted “experts,” or from direct, hands-on experience with the innovation. The term “trialability” refers to the degree to which an innovation allows for experimentation and trial on a limited basis before a consumer actually buys a product.⁸⁰

Several market studies of PEVs have noted that the average car buyer does not fully understand how electric vehicles and their engines work; they have concluded that interest in PEVs will likely be greatly enhanced by giving consumers more information and the opportunity for individual experiences with the vehicles.⁸¹ A consumer survey conducted by Accenture concluded that PEV pilots and trials are “critical” to PEV adoption, noting that “drivers do change their prejudices and attitudes toward PEVs once they are given the keys to them.”⁸² The Accenture study was clear in its endorsement of pilots that offer consumers the opportunity to try PEVs: “A pilot’s primary focus should be to influence a consumer mind shift by exposing false assumptions, lowering psychological barriers to new behaviors, and introducing incentives that help manage demand.”⁸³

⁷⁹ Rocky Mountain Institute, “Total Cost of Ownership Calculator,” Project Get Ready, accessed October 25, 2011, <http://projectgetready.com/js/tco.html>.

⁸⁰ Rogers, *Diffusion of Innovations*.

⁸¹ California Plug-In Electric Vehicle Collaborative, *Taking Charge: Establishing California Leadership in the Plug-in Electric Vehicle Marketplace*, (California Plug-In Electric Vehicle Collaborative, 2010), 9, http://www.evcollaborative.org/evcpev123/wp-content/uploads/.2010/07/Taking_Charge_final2.pdf; Accenture, *Plug-in Electric Vehicles*, 30; The City of New York, *Exploring Electric Vehicle Adoption in New York City*.

⁸² Accenture, *Plug-in Electric Vehicles*, 30.

⁸³ Ibid.

Direct Consumer Trials

Data collected on consumer attitudes about PEVs after trial participation supports the Accenture endorsement. Researchers at the University of California, Davis, supplied plug-in hybrid electric vehicles to a cross section of Sacramento households for six weeks and discovered that while these households had little or no familiarity with electric vehicles before the trial, participants were two to three times more likely than the average new car buyer to purchase a PHEV after the trial period.⁸⁴ In another trial, 120 families in metropolitan New York City, Los Angeles, and parts of New Jersey drove an all-electric BMW Mini-E for a year. Following the trial, 100 percent of the participants reported that the PEV met all of their household driving needs, and 71 percent were more likely to buy a PEV than before the trial.⁸⁵ In a similar BMW trial in the U.K., 96 percent of participants indicated they would purchase a PEV after their hand-on experience with the vehicles. Furthermore, the vast majority of trial participants reported that they adapted to the characteristics and peculiarities of driving a PEV—such as charging, range, regenerative braking, and low noise—after only one week of driving.⁸⁶

The U.K. Mini trial was part of a larger government-backed project that allowed the public in eight locations around the country to take part in long-term trials of various brands of PEVs, including Smart Cars, sports cars, and electric vans. The trials represent a part of the government's strategy to accelerate the adoption of PEVs by changing consumer attitudes with hands-on experience.⁸⁷ Ninety-five percent of participants from these trials reported that using an electric vehicle was no more difficult than using an ICE vehicle, and concerns about range anxiety were eliminated for 50 percent of drivers after three months of participation in the trial.⁸⁸

Fleet and Motor Pool Trials

PEV industry leaders note that the availability of electric rental cars, taxis, and car-sharing programs represent three additional means for consumers to experience PEV technology. Kevin Czinger, CEO of CODA, predicts that “many customers will experience an EV for the first time with an extended test drive courtesy of a rental agency.”⁸⁹ Enterprise currently has PEVs available in 14 cities, and Hertz has them in

⁸⁴ Kenneth S. Kurani, Jonn Axsen, Nicolette Caperello, Jamie Davies-Shawhyde, Peter Dempster, Marilyn Kempster, Kevin A. Nesbitt, and Tai Stillwater, *Plug-in Hybrid Electric Vehicle (PHEV) Demonstration and Consumer Education, Outreach, and Market Research Program*, no. UCD-ITS-RR-09-21 (Davis, CA: Institute of Transportation Studies, University of California, Davis, 2010), 28, 31.

⁸⁵ Tom Turrentine, Dahlia Garas, Andy Lentz, and Justin Woodjack, *The UC Davis MINI E Consumer Study*, no. UCD-ITS-RR-11-05 (Davis, CA: Institute of Transportation Studies, University of California, Davis, 2011), 47.

⁸⁶ “BMW Group Releases Results of UK-Supported PEV Trial,” Green Car Congress, August 5, 2011, <http://www.greencarcongress.com/2011/08/minie-20110805.html>.

⁸⁷ Alok Jha, “UK Powers Up Plans for World's Largest Electric Car Trial,” *The Guardian*, June 22, 2009, <http://www.guardian.co.uk/environment/2009/jun/23/uk-electric-car-trial>.

⁸⁸ Faye Sunderland, “UK Trials of Electric cars Bust Range Anxiety,” The Green Car Website, September 7, 2011, <http://www.thegreencarwebsite.co.uk/blog/index.php/2011/09/07/uk-trials-of-electric-cars-bust-range-anxiety/>.

⁸⁹ Zpryme Research & Consulting, *The Electric Vehicle Study*, 33.

four, with plans to continue expanding its PEV fleet. San Francisco and San Jose are the first U.S. cities to boast PEV taxis, but the City of New York is working with Nissan to pilot Leaf taxis, toward the goal of someday replacing the city's fleet of more than 1,300 yellow taxis with electric vehicles. Mexico City rolled out its Zero Emission Taxi program in September 2011 with three electric vehicles and the city's first quick-charge stations.⁹⁰ Car sharing companies are a natural market for PEVs, as their client bases tend to be urban and environmentally conscious, typically using the vehicles to drive short distances with planned itineraries. Zipcar has launched pilot programs for PEVs in London and San Francisco using the all-electric Citroen C1 and the plug-in Toyota Prius hybrid.⁹¹

While direct consumer trials are the most powerful means of changing attitudes among participants and those in their extended social networks, the availability of PEVs in various kinds of fleets and motor pools achieves a similar objective. The U.K. plan for encouraging PEV adoption included making PEVs available to fleet managers on a trial basis, with very positive results. In one trial involving both public and private sector organizations, 58 percent of fleet users and 86 percent of fleet managers felt more positive about electric vehicles after taking part in the trial.⁹² Many local governments have ordered PEVs for municipal fleets in order to increase visibility and consumer experience with the vehicles. The City of London, in keeping with the U.K.'s commitment to enhancing consumers' PEV exposure, plans to procure 1,000 PEVs for its fleet by 2015.⁹³ The City of Houston is expanding its fleet of electric city vehicles, ordering 100 Nissan Leafs, partially funded with federal subsidies.⁹⁴ The City of Richmond's plan to promote PEV adoption includes a Create a Movement campaign, whereby 10 local governments, 10 corporate fleets, and 1,000 individuals pledged to purchase PEVs.⁹⁵ New York City, with 430 PEVs in service, has the largest municipal electric vehicle fleet in the country and has plans to add 70 more. When the mayor's office recently announced the addition, it noted that "research has shown most consumers are unaware of basic facts about electric vehicle, and the likelihood of a consumer purchasing an electric vehicle rather than an internal combustion vehicle increases dramatically" with exposure to PEVs.⁹⁶

⁹⁰ "Mexico City Inaugurates Electric-Taxi Program," *Fox News Latino*, September 29, 2011, <http://latino.foxnews.com/latino/money/2011/09/29/mexico-city-inaugurates-electric-taxi-program/>.

⁹¹ Zpryme Research & Consulting, *The Electric Vehicle Study*, 54.

⁹² Chris Walsh, "Real World Trials" (presentation at the Green Vehicle Congress in Gateshead and Newcastle, UK, March 23, 2010), <http://www.cenex.co.uk/events/green-vehicle-congress/gvc-2010-presentations>.

⁹³ Office of the Mayor of London, *An Electric Vehicle Delivery Plan for London* (London, UK: Office of the Mayor of London, 2009), <http://www.london.gov.uk/who-runs-london/mayor/publications/transport-and-streets/electric-vehicle-delivery-plan-london>.

⁹⁴ Kate Galbraith, "With Subsidies, Electric Cars Gaining Foothold in Texas," *The Texas Tribune*, July 23, 2010, <http://www.texastribune.org/texas-energy/energy/subsidies-electric-cars-gaining-foothold-texas/>.

⁹⁵ Sustainable Transportation Initiative of Richmond, *Moving People in a Greener Way* (Richmond, VA: City of Richmond, 2011), 4, <http://www.projectstir.org>.

⁹⁶ Stu Loeser and Marc La Vorgna, "Mayor Bloomberg Announces Addition of 70 New Electric Vehicles to City's Fleet and Launches New City Efforts to Inform the Public about Electric Vehicles," news release, July 12, 2011, <http://www.nyc.gov/html/om/html/2011b/pr248-11.html>.

Public Drive Events

Though not as dramatic in their conversion potential, the significance of public drive events should not be underestimated as an important means to offer the trialability consumers will need for widespread PEV adoption. In a recent survey of public drive participants in the U.K, for example, 72 percent of test drivers said they would use a PEV as their main vehicle after a brief test drive, as compared to 47 percent before the test drive, and the vehicles exceeded drivers' expectations on all monitored performance aspects.⁹⁷ The U.K. has staged hundreds of such events, allowing the public, or in the case of corporate events, employers and their employees, to experience driving an electric vehicle. Industry experts are usually present at these events to answer questions or offer advice. There are a handful of such events taking place in various U.S. cities every weekend. Many follow the model of one hosted in August 2011 by Clean Fuels Ohio, a nonprofit group based at Ohio State University, where 10 PEVs were available for test drives on a drop-in basis.⁹⁸ Small, local events that give early majority consumers the opportunity to actually try the vehicles themselves will be crucial for bringing the early majority PEV consumer on board.

Successful Social Marketing Campaigns in Oregon

Within Oregon, the success of several existing sustainability marketing and outreach programs offers proven strategies for a PEV outreach and education campaign. The Oregon Global Warming Commission (OGWC), for example, partnered with the Climate Leadership Initiative to educate residents and businesses across the state about ways to reduce greenhouse gas emissions. With "ambitious goals and limited resources," OGWC made use of existing mailing lists from local chambers of commerce and green nonprofit organizations to advertise their events.⁹⁹ A strategy of featuring local celebrities such as mayors or prominent business leaders at their events added influence to their message, increased attendance, and usually earned local media coverage.¹⁰⁰

Managers of Metro's successful "Drive Less. Save More." campaign to reduce single car trips and increase other transportation options in the greater Portland area recognized that their target market (which resembles the early majority PEV market) would be significantly more persuaded by news and social media than by more impersonal advertising.¹⁰¹ The campaign made extensive use of social media, cultivating early

⁹⁷Steve Carroll, *The Smart Move Trial: Description and Initial Results* (CENEX, 2010), 17, <http://www.cenex.co.uk/resources>.

⁹⁸Dan Gearino, "Showcase Sparks Interest in Electric Vehicles," *The Columbus Dispatch*, August 31, 2011, <http://www.dispatch.com/content/stories/business/2011/08/31/parking-interest.html>.

⁹⁹Oregon Global Warming Commission, *Roadmap to 2020: Phase 1 Summary Report*, (Oregon Global Warming Commission, 2011), 1, <http://www.keeporegoncool.org/content/roadmap-2020>.

¹⁰⁰Lisa Adatto (former Oregon Director of Climate Solutions), in discussion with the authors, October 14, 2011.

¹⁰¹Pam Peck (manager of communications at Metro), in discussion with the authors, September 2, 2011. METRO determined its primary audience from a survey and focus group conducted prior to the campaign. Their primary audience included adult drivers age 24-54, both genders, married, with household income

“influencers” who were willing to participate in online community groups and use other social media to promote campaign objectives. They were also proactive in generating earned media coverage of the campaign by local television, radio, and newspaper reporters, and in providing message training to better prepare participants for interviews with broadcast or print-media journalists. One especially successful earned media strategy was to ensure that prepared participants were visible and available at events where media was likely to be present. Message training to participants emphasized the importance of personal stories to impact social norms. Finally, the campaign partnered with the Oregon Automobile Dealers Association, AAA, Les Schwab Tires, the Jubitz Corporation, and many others to extend the campaign message and reach.

Solarize Portland, which began with a 2009 Mt. Tabor Neighborhood Association effort to achieve economies of scale with bulk purchases of solar panels, was so successful in solarizing 120 homes in six months with minimal marketing that the City of Portland helped to replicate the initiative in other neighborhoods.¹⁰² The Solarize Portland experience underscores the wisdom of looking for existing programs that can be expanded to a larger audience and the observation that low-cost grassroots efforts can be especially successful when they tie into community networks.¹⁰³ Lessons learned from all three of these social marketing campaigns have informed our specific recommendations for PEV outreach and education.

Campaign for Reaching Oregon's PEV Early Majority

Oregon's advanced infrastructure deployment and highly collaborative approach to aligning the many business, regulatory, and community interests involved in transportation electrification will not be enough to ensure the state's position as a leader in PEV adoption. To achieve the ultimate goal of widespread electric vehicle adoption in Oregon, TEEC and OTREC will also need to lead a campaign to promote sales of PEVs by increasing consumer awareness of and experience with electric vehicles.

Key Messages for Reaching Oregon's PEV Early Majority

Survey research suggests that Oregonians will respond to two kinds of key messages about PEVs: pro-societal messages that reinforce Oregonians' pride and identity as

greater than \$100,000. The program's success in the greater Portland metropolitan area led to its subsequent expansion to the Bend, Eugene/Springfield, Medford and Salem areas.

¹⁰² Linda Irvine, Alex Sawyer, and Jennifer Grove, *The Solarize Guidebook: A Community Guide to Collective Purchasing of Residential PV Systems* (Portland, OR: U.S. Department of Energy and City of Portland Bureau of Planning and Sustainability, 2011), 7, <http://www.portlandonline.com/bps/solarizeguide>.

¹⁰³ This conclusion from the Solarize Portland experience is similar to findings we have reported in Appendix A.

environmental mavericks and messages that directly address the concerns or misconceptions consumers have about the vehicles.¹⁰⁴

Three often cited characteristics of long-time Oregonians are independence, self-reliance, and environmental sensitivity. The Oregon state motto, “She Flies With Her Own Wings,” was adopted by the state legislature in 1987 and reflects this tradition of independence and innovation. These qualities are consistent with PEV ownership, and campaign messages that speak to values of independence and environmental stewardship will enhance the success of PEV adoption. Oregonians like to feel as though they are a “movement apart.” They will rally to the right statewide or bio-regional cause, such as a goal to become energy independent by converting to renewable sources of electricity and reducing our use of fossil fuels for transportation. We need to link PEVs to that movement and that cause.

We have developed many potential messages that both address barriers and encourage potential early majority buyers through pro-societal motivators. A full list of these messages is available in Appendix E. Of these messages, we recommend three that we believe will be particularly important to repeat:

1. **“It’s not just a car. It’s a movement.”** This slogan is intended to remind Oregonians that buying an electric car is more than another vehicle purchase; it is a way to join a movement for positive change, a movement that is not just about environmental benefits, but also about decreasing dependence on foreign oil and keeping money in the U.S. economy.
2. **Total cost of ownership makes PEVs competitive.** Oregonians should be encouraged to think not just about the up-front cost of purchasing a vehicle, but about factors like fuel and maintenance savings.
3. **“I plan.”** Current PEV owners who manage the vehicles’ current range limitations should be called on to share their experience. They can demonstrate that these are just mild challenges that can be dealt with by planning, trip chaining, and other practices that organizations like Metro have already encouraged drivers to adopt.

These three messages should be repeated throughout the campaign elements we have listed below wherever possible.

Campaign Actions for Reaching Oregon’s Early Majority

The following seven campaign actions are designed to work in concert to persuade early majority consumers. We have provided these elements in roughly in chronological order. That is, before the campaign begins, we believe a survey should be conducted to gauge the public’s current understanding of PEVs. Action 2 through Action 5 can be undertaken nearly simultaneously—though it may help to have some collateral

¹⁰⁴ Davis, Hibbitts, & Midghall, Inc., Fusion MR, LLC, and Portland Hatfield School of Government, “Electric Vehicle Survey,” 5, 6; Davis, Hibbitts, & Midghall, Inc., Fusion MR, LLC, and Portland Hatfield School of Government, “Electric Vehicle Survey,” 9.

materials first. Once these actions are well in hand, we believe it will be time to begin creating opportunities to help people try PEVs as well as help fleet buyers.

Action 1: Survey consumers about PEVs

Strategy 1.1: Conduct a survey to better understand the barriers to early majority adoption of PEVs.

We recommend that a statewide consumer survey be conducted prior to initiating the PEV consumer education and awareness campaign. The survey should test inferences about consumer segmentation, the early majority profile, and consumer knowledge about electric vehicles to ensure that campaign messaging and factual information are aligned with the most important needs and concerns of the target market segment.

Tactics

1. **Repeat the 2009 Davis, Hibbitts, & Midghall, Inc., survey.** A slightly modified version of the 2009 Multnomah County Electric Vehicle Survey conducted by the firm of Davis, Hibbitts, & Midghall, Inc., would provide TEEC and OTREC with robust and useful information.¹⁰⁵ As an added benefit, it would yield comparison data for Multnomah County regarding changes in perception about PEVs since the vehicles have been introduced. The survey should be extended to several counties to capture any significant geographic differences. If resources permit, we recommend including one or more counties with only small urban or rural population areas in order to gather comparison and baseline data from Oregon's rural residents.
2. **Create and administer a new survey.** A detailed framework for a survey is provided in Appendix F. At a broad level, if a survey is created, we recommend that it collect information in the following areas:
 - demographic attributes
 - knowledge about PEVs
 - consumer segmentation and profile
 - vehicle usage and fit with PEVs

Strategy 1.2: Conduct a post-campaign survey to measure changes in awareness and knowledge of PEVs in target Oregon counties.

Repeat the survey from Strategy 1.1 to measure the campaign's progress.

¹⁰⁵ Davis, Hibbitts, & Midghall, Inc., Fusion MR, LLC, and Portland Hatfield School of Government, "Electric Vehicle Survey."

Strategy 1.3: Measure the utility of different styles of PEV trials by conducting mini-surveys.

These mini-surveys will allow OTREC and TEEC to judge the efficacy of different styles of vehicle trials. For drive events, we recommend that participants take an initial survey online at the time of test-drive registration. The survey should then be administered again by drive-event staff or volunteers using an electronic medium such as an iPad or tablet PC immediately following the test drive.

Action 2: Develop educational and awareness-building materials

All potential PEV consumers will benefit from having accurate information about PEVs provided in a clear format. The strategies outlined below suggest both materials consumers can go to to retrieve the information they need and materials that can be put in front of consumers at events and other opportunities.

Strategy 2.1: Build an “EV Oregon” website to serve as a central information and resource clearinghouse for Oregonians interested in PEVs.

Consumers need a single place to visit to take them through the electric vehicle research and purchasing experience in Oregon. The site should include the following:

- basic information about how an electric vehicle operates
- a link to a charging station locator site¹⁰⁶
- a home charging station installation guide
- a list of available incentives
- a vehicle comparison tool and total cost of ownership calculator¹⁰⁷
- the PEV drive events schedule and test-drive registration (see Strategies 1.3 and 6.1)
- “Join the EV Movement”: links to social media accounts and other opportunities to show support for PEVs (see Strategies 2.3 and 3.2)
- fleet tools (see Strategies 7.1-7.3)
- a video library (see Strategy 2.5)

¹⁰⁶ See U.S. Department of Energy, “Alternative Fuels and Advanced Vehicles Data Center,” <http://www.afdc.energy.gov/afdc/locator/stations/>.

¹⁰⁷ The Total Cost of Ownership calculator developed by Project Get Ready is widely cited as the best PEV TCO tool on the web. Rocky Mountain Institute, “Total Cost of Ownership Calculator,” <http://projectgetready.com/js/tco.html>.

Rather than sending EV Oregon visitors to the PGR calculator, however, we recommend using the PGR assumptions to develop an Oregon-specific tool using electricity prices specific to our own state. PGR TCO calculator assumptions may be found online: Rocky Mountain Institute, “Total Cost of Ownership Calculator Assumptions,” *Project Get Ready*, accessed October 26, 2011, <http://projectgetready.com/resources/total-cost-of-ownership-assumptions>.

Strategy 2.2: Create informative materials to help people curious about PEVs quickly learn the vehicle basics.

Informational materials are needed for events, dealers, and charging stations in order to continue to build consumer knowledge and direct consumers to the EV Oregon website, where more detailed information about PEVs will be available.

Tactics

1. **Develop a simple brochure to make available at drive events.**
Information conveyed should be basic and address the key barriers of concern to the early majority (see the Adoption Barriers section of this report for a list).
2. **Develop brochures and signs to put on or near charging stations.** The copy should be similar to that in the brochure mentioned above.
3. **Create QR stickers for current PEV owners and charging stations** so that curious passer-bys can easily access the proposed EV Oregon website on their smart phones.
4. **Develop a map of the West Coast Electric Highway**, including all of Oregon and Washington, to highlight the infrastructure that will be in place soon and allow for PEVs to travel from Portland to Seattle with ease. Seek sponsorship for printing costs from businesses and vendors located near charging stations since the stations could drive customers to them.
5. **Create packets for dealers to distribute to potential customers**, including information about available incentives, home charging installation, and PEV groups and associations.

Strategy 2.3: Use electronic outreach methods, including social media, to promote electric vehicles and events.

The Web, e-mail, and social media offer cost-effective ways to educate consumers about upcoming events and to promote the three key messages for PEVs. Users will be able to easily share YouTube videos and Facebook pages with friends that have similar interests. For more ideas on how to build e-mail lists, see Action 5.

Tactics

1. **Create Twitter and Facebook accounts** to publicize drive events, testimonials, photos, and links to recent YouTube videos (see Strategy 2.5).
2. **Use the Oregon electric vehicle website** (Strategy 2.1) as well as sites like Craigslist or those run by Oregon electric vehicle influencers to disseminate the same messages.
3. **Use existing e-mail lists of local groups** (e.g., environmentally-focused nonprofit organizations or chambers of commerce) to notify the community of upcoming events in their areas.

Strategy 2.4: Make PEVs more visible by designing a specific license plate for electric vehicles.

A distinctive, readily identifiable license plate for PEV owners (such as in Figure 13) will provide early adopters with the vanguard recognition they may seek and early majority consumers with the pro-societal and environmentally sensitive identity they wish to reinforce. Special plates will also permit PEVs to be easily identifiable to parking enforcement officers if special parking privileges are granted for the vehicles.

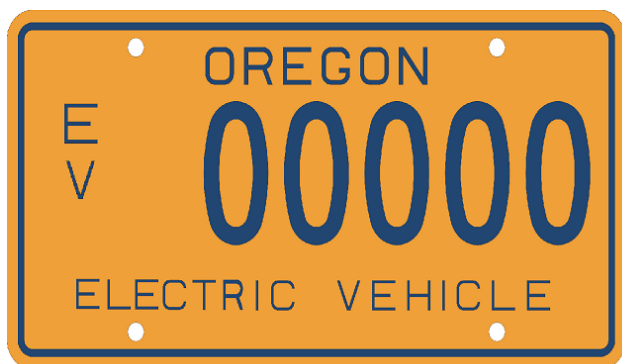


Figure 13. Potential design for a distinctive license plate for electric vehicles in Oregon

Strategy 2.5: Develop videos for the Internet or use existing videos to show the benefits of PEVs and educate consumers about them.

Videos on sites like YouTube or Vimeo, which can be disseminated or linked to on social media sites or through e-mail, allow for less expensive and more targeted distribution than television advertisements. Specific video ideas may change after surveys and focus groups. For some initial ideas, however, we recommend both videos that formally address our three key messages and less specific videos as described in the following tactics.

Tactics

1. **Create a brief PEV drive video against Oregon landmarks** such as Mt. Hood or the Oregon coast.
2. **Create videos of test-drive testimonials** shot at drive events (Strategy 6.1).
3. **Create a video highlighting the convenience of never having to visit a gas station again.** This is a practical benefit that could appeal to many early majority consumers. The video might show two coworkers who live in the same neighborhood going home at the end of the day. While the ICE vehicle driver waits in line for a free spot at the gas station and then for an attendant, the PEV driver could be shown arriving at home, plugging in his or her car, and then beginning a relaxing evening.
4. **Link to videos that already exist** from the EV Oregon website or embed them in the site (see Appendix G).

Action 3: Empower people to be PEV influencers

The earliest PEV buyers will include individuals who are so enthusiastic about PEVs that they might be considered “evangelists” for the electric vehicle movement. While valuable as spokespersons, these consumers are often not as convincing to the early majority as less strident consumers who speak directly to the practical needs and concerns of mainstream car buyers. OTREC and TEEC can make the outreach and awareness campaign more successful by employing tactics that engage all kinds of PEV consumers to promote PEVs via word of mouth and through print, broadcast, and social media.

Strategy 3.1: Spread information about PEVs through social networks by encouraging PEV owners to share their stories.

Given the importance of social networks on the PEV purchase decision (see Appendix A), current owners should be reminded to share their experiences and given helpful guidelines for tools they can use to promote PEVs

Tactics

1. **Inform consumers about the power of their personal recommendations and ask for their help in spreading the word** at events, through e-mail, and on both printed and electronic materials.
2. **Give consumers concrete, actionable steps they can take to promote electric vehicles**, such as discussing their driving experience with friends, family, and coworkers, posting Facebook or personal web page links, and encouraging friends to register for a test drive.

Strategy 3.2: Create opportunities for those interested to further engage with PEVs in Oregon by putting a link on the EV Oregon website to “Join the EV Movement.”

The website mentioned in Strategy 2.1 will be enhanced by creating interactive opportunities for those who want to help promote PEVs.

Tactics

1. **Link to existing EV social enterprise efforts**, such as Hello Electric, a project solely dedicated to promoting a global grassroots movement “to end the world’s addiction to oil by accelerating the revolutionary shift to electric cars.”¹⁰⁸ An option for low-commitment involvement such as the current “We Want Zero Emission 100 percent Electric Cars Now” petition on Change.org (addressed to the president of the United States, the U.S. Senate, and the U.S. House of Representatives) may be appropriate as well.¹⁰⁹ Opportunities to “sign

¹⁰⁸ “About Hello Electric,” Purpose, accessed October 26, 2011, <http://www.helloelectric.org/about>.

¹⁰⁹ “We Want Zero Emission 100% Electric Cars NOW!” accessed October 26, 2011, <http://www.change.org/petitions/we-want-zero-emission-100-electric-cars-now>.

on” to these national and global efforts serve to strengthen individual commitment to PEV promotion.

2. **Initiate a uniquely Oregon petition, pledge, or statement of support** for the electrification of transportation on the EV Oregon website, so that even those Oregonians who cannot purchase a PEV can show their support for the vehicles and identify with the values associated with them.

Strategy 3.3: Maximize the impact of drive events by identifying potential PEV influencers and preparing them to talk publicly about PEVs.

Drive events will provide an excellent opportunity to identify potential PEV buyers who can be trained to talk persuasively about PEVs.

Tactics

1. **Train event organizers to recognize PEV event participants who are good candidates** for describing their PEV experience.
2. **Help prepare selected participants for media interviews** to maximize the potential impact of media coverage. Encourage the articulation of personal experience and personal motivators for PEV interest or purchase.

Strategy 3.4: Use local “celebrities” such as mayors, state representatives, college or university presidents, or business owners to help promote local drive events.

Local celebrities are not only likely to have their own methods for reaching followers (such as Facebook, Twitter, and e-mail lists), but their participation at drive events can help draw attention from local media outlets.

Tactics

1. **Invite local celebrities to PEV kickoff drive events** with the request that they make brief remarks about the vehicles and participate in a test drive.
2. **Prepare and distribute electric vehicle talking points in advance of events** to better prepare speakers.
3. **Ask local celebrities or officials to consider making a personal commitment to buying a PEV** by a certain date, to add their signature to the EV Oregon online electrification pledge/petition, and to publicly encourage others to do so as well.

Action 4: Create and implement a cost-effective advertising campaign

A well-targeted advertising campaign can be an effective means for persuading potential early majority consumers to consider PEVs. Advertising should begin in the greater Portland metropolitan area, where demographics most closely match those of early majority PEV buyers (see Finding Oregon’s Early Majority). Because this area has a diverse media landscape, we have identified radio and print outlets that may be of

particular interest in Appendix H. Below, we discuss strategies that should be considered for the advertising portion of the PEV campaign, whatever outlets are used.

Strategy 4.1: Create advertisements to combat misconceptions of PEVs.

Based on our research findings, we recommend a mix of print and radio advertisements to reach early majority consumers and provide information that refutes the misconceptions and misinformation about PEVs.

Tactics

1. **Create and air a series of radio spots featuring two “neighbors” speaking to each other** across their driveways (one a PEV owner, the other not). Use their conversation to convey information about the environmental benefits of PEVs, the driving experience, total cost of ownership issues, and strategies for working with vehicle range.
2. **Convey more complicated (but practical) information with print advertisements** such as average PEV vs. ICE vehicle attributes.¹¹⁰

Strategy 4.2: Run targeted advertisements to make potential PEV buyers aware of events.

When advertising opportunities for people to observe or try PEVs, we recommend keeping the advertisements to as geographically precise an area as possible. We believe curiosity will only take early majority consumers so far out of their way since they are not likely to be as enthusiastic about the technology as early adopters.

Tactics

1. **Use zoned advertising opportunities** in the *Oregonian* or the Pamplin Media Group’s community newspapers. These outlets make segmenting the Portland market by location relatively simple.
2. **Use ads on social media** (Facebook, Twitter, YouTube) to disseminate the same message. Facebook in particular allows for highly targeted advertising.

Strategy 4.3: Create advertisements in different media to make people aware of infrastructure progress.

To raise awareness of growing infrastructure, we recommend using as many outlets as possible if advertising is economically feasible.

Tactics

1. **Create an advertisement as part of the series of radio spots noted in Strategy 4.1** in which a PEV owner discusses the increasing availability of infrastructure in Oregon and even up and down the West Coast.

¹¹⁰ Research has found that printed materials are better for communicating “detailed” messages than short radio or video spots. Andrew T. Kaczynski, Mark E. Havitz, and Ronald E. McCarville, “Altering Perceptions through Repositioning: An Exercise in Framing,” *Leisure Sciences* 27 (2005), 248.

2. **Once the EVSE infrastructure is robust, create print advertisements with maps of EVSE locations.** These could provide an effective way for potential early majority consumers to see that if they buy PEVs, they will not have to worry about finding charging stations. The information should be similar to that in the pamphlet recommended in Strategy 2.2, Tactic 4.

Action 5: Cultivate partnerships with organizations that can help promote PEVs

To raise awareness about PEVs, we believe any campaign should include partnerships with organizations that potential early majority PEV consumers interact with on a regular basis. The first two strategies below are intended to leverage partnerships so that OTREC and TEEC raise awareness about PEVs. They also provide avenues to capture contact information for Oregonians interested in PEVs and issues like conserving fuel and reducing greenhouse gas emissions.

A second set of critical partnerships includes businesses and organizations that might be considered stakeholders in transportation electrification and whose support and cooperation will promote PEV adoption. These relationships should involve a two-way exchange of information and benefits. OTREC and TEEC should apprise stakeholders of important events and emerging issues in PEV promotion, and stakeholders should assist with PEV campaign objectives.

Strategy 5.1: Partner with Whole Foods, Zupan's, New Seasons, Market of Choice, Trader Joe's, or other upscale stores to create incentive programs for consumers to track their weekly driving mileage.

We recommend partnering with one or more businesses with a customer base resembling the early majority profile, such as an upscale grocer. Create a program that will address range concerns by giving consumers accurate information about their personal range needs.

Tactics

1. **Enter people in a weekly drawing for a \$50 gift card** from a grocer in exchange for tracking their daily mileage. Staffing details will have to be worked out for monitoring the program, but it should show most consumers that their driving habits would be suitable for a PEV. Collect e-mail addresses as part of the program.
2. **Offer incentives to users from partner organizations for using a mileage tracker application for smart phones** and sharing their results over the course of a week.

Strategy 5.2: Partner with car dealers, rental agencies, or the OEVA to get PEVs (and their owners) at events and locations to give early majority buyers opportunities to observe PEVs up close.

In conjunction with or separate from events for consumers to try PEVs (Strategies 6.1-6.2), there should be occasions for consumers to observe the cars up close. While many opportunities already exist at electric and general car shows, we recommend creating more at places early majority consumers are likely to visit as part of their normal routine like malls, upscale grocers, or sporting events.

Tactics

1. **Find car dealers willing to lend PEVs for observation.** Giving consumers a chance to see and compare the appearance of a PEV to an ICE vehicle will do some good in increasing their awareness and knowledge of what a PEV is.
2. **Recruit OEVA members to be present at observation opportunities—** particularly those who own a mass-market vehicle like the Volt or Leaf. Their presence, with or without their personal car, would make such an event even more powerful. Having enthusiasts present would allow people with experience with PEVs to give testimonials to the cars' utility.
3. **Gather interested parties' contact information.** If necessary, the parties could be registered for a gift certificate or given a PEV-related takeaway in exchange for their contact information. Or, consumers potentially interested in PEVs with smart phones could be given the code to download an application that allows them to track their mileage in exchange for their contact information.

Strategy 5.3: Combat range concerns by creating a rental car voucher program for people who buy PEVs.

We recommend TEEC and OTREC work with both car dealers and rental car agencies to implement this program. When a PEV buyer purchases his or her car, the car dealer should distribute a gift card (paid for by the state) for use at the rental car agency or car sharing service of the buyer's choice. This incentive would provide PEV buyers with easy, prepaid access to ICE vehicles for longer trips that exceed the reasonable or convenient range of a PEV.

Strategy 5.4: Facilitate stakeholder meetings to exchange information and explore collaborative opportunities.

Organizations whose business success is linked to the electrification of transportation will naturally look to explore opportunities to cooperate and support PEV adoption. We recommend facilitating regular opportunities to gather stakeholders together to share information and brainstorm ways to cooperate. Examples of stakeholders include car dealers such as Nissan, rental car agencies, utilities, AAA, local and regional

governments, and secondary automotive suppliers like Les Schwab Tires, Napa Auto Parts, and Jubitz Truck Stops.

Action 6: Create opportunities for potential buyers to try PEVs

The importance of creating opportunities for PEV trials cannot be overstated, as most early majority consumers will need to have the experience of driving and charging a PEV before they will commit to buying one. They will need to test the complexity of the charging experience, with some consumers needing an extended trial—a week or more—to be convinced that the vehicle range will work for them. We underscore the previously cited Accenture survey and conclusion that “drivers do change their prejudices and attitudes toward PEVs once they are given the keys to them.”¹¹¹

Strategy 6.1: Increase exposure of PEVs to early majority consumers by supporting and facilitating public drive events at selected venues within the target urban and suburban areas.

Drive events offer an easy means for potential consumers to experience driving an electric vehicle firsthand, without cost or obligation. These events should follow a standard agenda/formula to make the planning process as efficient and predictable as possible. The formula should include the following in accordance with Strategy 1.3:

- Pre-registration including a brief survey for drive-event participants online on the Oregon electric vehicle website.
- A brief pre- and post-drive questionnaire about their experience.

Tactics

1. **Cultivate partnerships with dealers, automakers, and PEV associations to provide vehicles and professional drivers** to accompany members of the public on planned routes.
2. **Encourage rental car and car sharing agencies to showcase their green vehicle lines at these events** (Strategy 5.2).
3. **Leverage chamber of commerce and compatible nonprofit organization e-mail contact lists** to advertise drive events (Strategy 2.3).
4. **Enlist the support of sympathetic local business and government leaders** and other “celebrities” to add visibility and influence to the events (Strategy 3.4).¹¹²
5. **Identify and involve select community members to serve as influencers** by describing the test drive to online community groups and using other social media to promote PEVs and the test drive experience (Strategies 2.5 and 3.3). An excellent example can be found on the Sierra Club’s blog at

¹¹¹ Accenture, *Plug-in Electric Vehicles*, 30.

¹¹² See the Successful Social Marketing Campaigns in Oregon section of this paper..

sierraclub.typepad.com/compass/2011/08/finally-getting-to-test-drive-a-nissan-leaf.html.

6. **Schedule events frequently** enough that an interested consumer clicking on a “I want to test drive an electric vehicle!” link on the EV Oregon website would find an opportunity to schedule a geographically accessible drive event within one month.

Strategy 6.2: Support rental car companies (currently Hertz and Enterprise) and car sharing companies (Zipcar) to make PEV rental trials affordable to potential PEV customers.

Many consumers will have their first PEV experience by renting a vehicle. For others, renting a PEV or using Zipcar will be a necessary way to accomplish the longer trial they require in order to be convinced that electric vehicles will meet their daily driving needs. “Green” cars represent a premium product line for rental car agencies, with per-day charges usually twice that of a compact ICE vehicle. The number of consumers who will try PEVs will increase if the rental charge is more affordable.

Tactics

1. **Partner with dealers, rental car agencies, and car sharing companies to provide vouchers for reduced-rate PEV rentals** for individuals who complete a test drive at a dealership or public drive event showcasing PEVs.
2. **Encourage social media influencers to participate in the rental voucher program** and ask them to promote the vehicle rentals to online community groups and via other social media (Strategy 3.3).
3. **Ask voucher recipients to complete a brief pre- and post-rental questionnaire** about their vehicle experience (Strategy 1.3).

Action 7: Promote public and private fleet adoption

Our research shows that fleet buyers and managers evaluate vehicle purchases in a highly rational manner. We recommend, therefore, that rather than attempting to persuade these people to consider PEVs with a splashy advertising campaign, OTREC and TEEC should focus on building or finding tools to help these buyers in their evaluations.

Strategy 7.1: Create a total cost of vehicle ownership calculator for fleet managers and buyers to help them evaluate PEVs vs. ICE vehicles, or add PEV data into existing calculators.

These tools should help fleet buyers not just evaluate costs, but also estimate the amount of greenhouse gas reduction realized from adopting PEVs. Many corporations and governmental bodies have specific greenhouse gas emissions standards they are trying to meet and are looking to fleets to provide that reduction.

Tactics

1. **Create a tool that allows fleet managers to compare ICE vehicles vs. PEVs on a total cost of ownership level**, incorporating purchase price, operating costs, maintenance, greenhouse gas emissions, and resale value. Total cost of ownership is where PEVs shine compared to traditional options.
2. **Build PEV data, including emissions data, into existing calculators and databases** that are already widely used by fleet managers.

Strategy 7.2: Enable positive fleet PEV experiences by creating or locating a tool or other means for allowing fleet managers to evaluate routes and payloads for PEV suitability.

Our research found that fleets that carefully evaluate routes and payloads are the ones that have had the most positive experience with PEVs. Larger corporations have the resources to deeply analyze their needs, but small and medium-sized organizations would benefit from the additional resource. Ensuring a positive PEV experience in fleets is important because fleet managers and drivers will report their experiences to their peers and to their families, friends, and other individual consumers.

Tactics

1. **Create forums, online or in person, to help fleet buyers and managers share ideas and best practices** in regards to utilizing PEVs. Fleets that already use PEVs have experience and practical knowledge to offer to those companies that are looking into adopting PEV technology.
2. **Provide small and medium-sized businesses with tools to help them evaluate routes and payloads** for PEV suitability.

Strategy 7.3: Help fleet buyers evaluate the cost of PEVs by building or referring to a resource guide of federal, state, and regional incentives offered to companies to adopt PEV and EVSE technology.

The array of incentives offered to companies for PEV technology is confusing. Large companies have the resources to sort through the complexity, but smaller companies do not.

Tactics

1. **Create or locate a comprehensive resource guide for companies to reference when considering a PEV purchase** for the website mentioned in Strategy 2.1.
2. **Create a print version of this resource guide**, simplified if necessary, for use at events like the forums mentioned in Strategy 7.2, Tactic 1.

Conclusion

“Imagine your cities free from the strain of volatile gas prices, where quiet vehicles drive the street emitting zero air pollution.”—Project Get Ready¹¹³

Oregon faces an exciting challenge with the advent of mass-market PEVs from several manufacturers. To achieve widespread adoption of this technology, the vehicles must be able to meet the needs and expectations of early majority consumers. While OTREC and TEEC cannot shape the technology itself, they can at least help manage the expectations of potential PEV consumers in Oregon and illuminate the ways in which PEVs can meet consumers’ needs. In order to do this, we recommend three key messages to focus on in an education and awareness-building campaign:

1. “It’s not just a car. It’s a movement.” This slogan is intended to remind Oregonians that buying an electric car is more than another vehicle purchase; it is a way to join a movement for positive change.
2. Total cost of ownership makes PEVs competitive. Oregonians should be encouraged to think not just about the up-front cost of purchasing a vehicle, but about factors like fuel and maintenance savings.
3. “I plan.” It should be pointed out to Oregonians that in most scenarios, current range limitations can be dealt with by planning, trip chaining, and other practices that organizations like Metro have already encouraged drivers to adopt.

These three messages can be used throughout the seven-part campaign for PEVs that we have outlined above:

1. Survey consumers about PEVs.
2. Develop educational and awareness-building materials.
3. Empower people to be PEV influencers.
4. Create and implement a cost-effective advertising campaign.
5. Cultivate partnerships with organizations that can help promote PEVs.
6. Create opportunities for potential buyers to try PEVs.
7. Promote public and private fleet adoption.

Of course, beyond this campaign, much more work remains to be done. The messages and marketing plan outlined above to reach Oregon’s early majority consumers and achieve widespread adoption of PEVs must be just one part of a larger effort. Utilities, OEMs, EVSE manufacturers, local governments, and many other organizations have a part to play in enabling successful PEV adoption. As just one example, in informal

¹¹³Laura Schewel and Jenn Wilson, *Project Get Ready: The Menu* (Rocky Mountain Institute, 2009), 3, www.projectgetready.com/docs/Project_Get_Ready_Menu_Mar16.pdf.

interviews with PEV owners, we have found owners are currently burdened by the number and variety of EVSE providers, all of which have devised different ways for PEV drivers to access their EVSEs for a charge-up.¹¹⁴ There is the potential for EVSE vendors to team up and offer customers an easier, more consolidated manner in which to access charging stations, but Oregon and other states may need to step in to encourage the vendors to focus less on proprietary technology and more on creating an easy, standardized user experience.

In addition to the elements of a campaign outlined in this document, other initiatives are likely to be necessary. It is possible stakeholders in the ICE vehicle industry will lead a drive against PEVs in Oregon, and messages and strategies will be required to deal with that challenge. Similarly, special strategies will be necessary to lobby politicians for some form of PEV incentives. If Oregon wants to reap the potential economic benefits that will come from investment in PEVs and their infrastructure, it must prove its dedication to PEVs in many ways. The plan we have outlined must be just one part of a synchronized campaign if PEVs are to succeed in Oregon.

¹¹⁴ Interviews conducted by the authors on PSU's Electric Avenue and at other locations from June through October 2011.

Appendix A: Findings from Social Marketing and Consumer Learning Literature Review

Encouraging potential early majority consumers in Oregon to buy PEVs is a multifaceted challenge. First, potential consumers must be educated about a new product that shares many attributes with ICE vehicles but differs in important ways. Second, potential consumers must be convinced to embrace the behavior changes, major and minor, that will come with adopting a new technology (Table 6). Third, consumers must actually be convinced to buy a particular PEV. Leaving the third challenge up to the car manufacturers themselves, we focused on the first two of these issues in our literature review. We looked at how consumers learn about new products and how people can be effectively encouraged to embrace new behaviors.

Table 6. Expected behavior changes to accompany PEV use

Driving	<ul style="list-style-type: none"> ● Drivers will need to gain a different awareness of their range capability. ● Drivers may need to adjust routes to stay within their car's range capability. ● Drivers may need to plan for routes that go by EVSEs.¹¹⁵ ● Drivers may need to plan for breaks while cars recharge on long road trips and while running errands.¹¹⁶
Fueling	<ul style="list-style-type: none"> ● Drivers will need to change the habit of using gas stations, instead plugging in at home or when parked elsewhere.¹¹⁷ ● Drivers will need to learn to operate home charging devices if they wish to plug in immediately but charge at off-peak hours.¹¹⁸
Maintenance	<ul style="list-style-type: none"> ● Drivers will need to adjust to different maintenance needs of PEVs, including maintenance of the charge port.¹¹⁹

Consumer Learning and PEVs

Only a few studies have been done to date in a formal, academic setting to understand how consumers learn about electric vehicles. Researchers at the University of California, Davis, have noted that the learning process regarding PEVs is particularly complex for consumers because in addition to learning about the vehicles' "pro-social" or environmentally responsible attributes, they must also begin to understand the symbolic meaning the cars have in a societal context. These researchers challenge

¹¹⁵ Thomas A. Becker and Ikhtlaq Sidhu, *Electric Vehicles in the United States: A New Model with Forecasts to 2030* (Berkeley, CA: Center for Entrepreneurship & Technology, University of California, Berkeley, 2009), 14.

¹¹⁶ "Electric Vehicle Project Update," Horizon, host and managing editor Ted Simons, aired August 2, 2011 (Arizona State University), 1:40, <http://www.azpbs.org/video/vidlink.php?vidId=3526>.

¹¹⁷ Becker and Sidhu, *Electric Vehicles in the United States*, 14.

¹¹⁸ "Electric Vehicle Project Update," *Horizon*, 2:35.

¹¹⁹ "Zen and the Art of Nissan Leaf Maintenance," ConsumerReports.org, July 12, 2011, <http://news.consumerreports.org/cars/2011/07/zen-and-the-art-of-nissan-leaf-maintenance.html>.

the idea that consumers make their car purchasing decisions primarily based on expected value or other rational choice models.¹²⁰ Rather, their academic approach to explaining how consumers learn about PEVs offers five different ways we may target consumer learning:¹²¹

- Contagion, which is the effect of functional information flowing among groups of people.
- Conformity, which is the desire some groups have to mimic others.
- Dissemination, which is the intentional diffusion of information to a selected or target group.
- Translation, which is the tendency of some groups to interpret or assign value to the technology.
- Reflexivity, which is a theoretical framework that explains how people seek to establish lifestyle practices consistent with their self-concept.

The same authors examined the effect of information flow to and from the social networks of PHEV trial participants in an attempt to determine the “ripple” effect of the vehicle experience and to characterize the extent to which participants were influenced by functional versus other aspects of the vehicles. Again, their conclusions point to the complex array of variables associated with PEV diffusion, underscoring the fact that social influence is a potentially powerful lever in PEV consumer decision making. Ultimately the authors conclude that while policy makers may increase awareness and diffuse functional information about PEVs in their efforts to achieve societal goals, “diffusion alone does not necessarily impact consumer perceptions or mobility decisions.”¹²² The authors maintain that consumer decisions about electric vehicles are subject to a more sophisticated form of interpersonal influence where consumers develop a more refined and stable understanding of the technology, how it might benefit them personally, how it will benefit society, and “whether they should care if it benefits society.”¹²³

In another University of California, Davis, study, researchers documented the learning process they observed among participants in a PEV trial, noting three consecutive phases, which they labeled discovery, translation, and application, all of which assume

¹²⁰ A view that is supported by a previous article by one of the same researchers: Thomas S. Turrentine and Kenneth S. Kurani, “Car Buyers and Fuel Economy?” *Energy Policy* 35, no. 2 (2007): 1213-23. In a small survey (N=87) that included many business professionals, Turrentine and Kurani found no evidence of buyers using such models in choosing cars.

¹²¹ Jonn Axsen and Kenneth S. Kurani, “Interpersonal Influence in the Early Plug-in Hybrid Market: Observing Social Interactions with an Exploratory Multi-Method Approach,” *Transportation Research Part D* 16, no. 2 (2011): 150-59.

¹²² Jonn Axsen and Kenneth S. Kurani, “Interpersonal Influence Within Car Buyers’ Social Networks: Developing Pro-Societal Values Through Sustainable Mobility Policy” (paper, International Transport Forum, Leipzig, Germany, May 25-27, 2011),

21, <http://www.internationaltransportforum.org/2011/pdf/YRAAxsen.pdf>.

¹²³ Ibid.

that consumers will have an opportunity to try the vehicles. The phases break down as follows:¹²⁴

1. During the discovery phase, consumers are learning about the vehicles' unique attributes and coming to intellectually comprehend their benefits. They get a feel for how the PEV drives, its regenerative braking system, speed, and range. They also discover how others, including family, friends, and coworkers, feel about the vehicles.
2. The translation stage involves further evaluation of initial impressions, weighing the perceived and experienced benefits of PEVs against any disadvantages encountered, and deciding whether they have actually had a positive experience with the vehicles.
3. During the application stage, consumers may deepen their commitment to the vehicles, imagining ways to incorporate the advantages of PEVs into their lifestyles.

Another study of consumer learning and hybrid vehicle adoption concluded that when consumers are uncertain about the quality of their options, they rely greatly on publicly generated "signals" of quality—rumors, social networks, news, and consumer reports. Signals that a particular technology is of high quality lead to a higher probability consumers will choose that technology, whereas signals that the technology is low quality reduce the probability. This study demonstrated that high initial sales of a subsequently poorly rated and reviewed hybrid (the Honda Insight) had a negative overall effect on hybrid penetration in one area, whereas the penetration of the highly rated Prius in another area was associated with higher per-capita hybrid sales in general.¹²⁵ The implication of this research is that consumers will be highly influenced by initial word of mouth and other reports about PEV quality and suitability.

Finally, a relatively small survey conducted in Taiwan looked at consumer learning with regards to electric motorcycles in a controlled setting.¹²⁶ The study led 34 college students through a four-stage process in which they were first exposed to a verbal description of an electric motorcycle, then a color picture of one, and then background information and a more thorough discussion of the motorcycle's attributes. To finish, each respondent spent time riding an electric motorcycle. After each stage, the participants filled out a stated preference questionnaire to measure how much they had learned about the motorcycle and how willing they would be to buy one.

While the study covered just a small sample size in another country, interesting results prompting further thought nonetheless emerge from it. Most importantly, perhaps, the

¹²⁴ Turrentine et al., *The UC Davis MINI E Consumer Study*, 10-11.

¹²⁵ Garth Heutel and Erich Muehlegger, "Consumer Learning and Hybrid Vehicle Adoption," *HKS Faculty Research Working Paper Series*, no. RWP10-013 (Cambridge, MA: John F. Kennedy School of Government, Harvard University, 2010).

¹²⁶ Yen-Ching Sung, "Consumer Learning Behavior in Choosing Electric Motorcycles," *Transportation Planning and Technology* 33, no. 2 (2010): 139-55.

researcher, Yen-Ching Sung, found that different participants learned at different rates, and that some showed a willingness to consider buying an electric motorcycle earlier than others. For example, the study showed that respondents who were male and had a high household income level showed a willingness to buy earlier than other participants.¹²⁷ This prompts an interesting point to consider in the creation of a consumer education campaign in Oregon—that potential early majority buyers are unlikely to all need the same amount or kinds of education.

Consumer Learning and Other New Products

Expanding our search beyond the realm of electric vehicles into consumer learning about other new products uncovered more interesting findings. A meta-analysis by Chris Janiszewski, Hayden Noel, and Alan G. Sawyer, examined various hypotheses trying to explain why information repeated over a longer period of time tends to be better remembered than information repeated over a short period of time.¹²⁸ Their findings supported two particular theories—the retrieval and reconstruction hypotheses—and led to practical suggestions.¹²⁹ Their research suggests an effective repetition strategy “may include a combination of involving media (e.g., television commercials) and less involving media (e.g., bill-boards, product placements) or messages that vary in the level of involvement—for example, complex versus simple, long versus short, or hard sell versus soft sell.”¹³⁰

The field of consumer learning about really new products—products that defy preexisting categories—also leads to interesting possibilities for a consumer education campaign. By the definitions of the literature, the PEV is more of an incrementally new product than a “really new product.” For while PEVs push the automotive category significantly, they still belong within it. Nevertheless, the challenges PEVs face are more like those of really new products than incrementally new products. Consumers’ lack of knowledge and misconceptions with regard to PEVs create some similar challenges to what really new products face: consumers must overcome both a lack of knowledge and preexisting mental models to come to understand PEVs.¹³¹ The new products literature, both for really new products and incrementally new products, highlights three strategies for helping people understand PEVs:

¹²⁷ Sung, “Consumer Learning Behavior in Choosing Electric Motorcycles,” 150-151.

¹²⁸ Chris Janiszewski, Hayden Noel, and Alan G. Sawyer, “A Meta-Analysis of the Spacing Effect in Verbal Learning: Implications for Research on Advertising Repetition and Consumer Memory,” *Journal of Consumer Research* 30, no. 1 (2003): 138-149.

¹²⁹ The *retrieval hypothesis*, in the context of spacing literature, posits that the repetition of a piece of information serves as a cue for the brain to involuntarily retrieve the first time that information was heard. If the retrieval happens from long-term memory, a person has engaged in “retrieval practice,” which is supposed to enhance the probability that an item can be retrieved again. The *reconstruction hypothesis* proposes that when a person perceives something, he or she constructs a representation of it. When the person perceives the same thing a second time, it is then easier for the brain to retrieve the previous representation than to create a new one. However, if the initial representation has begun to fade, it must be reconstructed at the time the event repeats. The portion of the initial construction that still remains thus aids the brain in the retrieval process (Janiszewski Noel, and Sawyer, “A Meta-Analysis of the Spacing Effect in Verbal Learning” 139-40).

¹³⁰ Janiszewski, Noel, and Sawyer, “A Meta-Analysis of the Spacing Effect in Verbal Learning,” 146.

¹³¹ Amspacher, *Public Opinion of Electric Vehicles in Oregon*.

- Analogies, which compare “a known base item to an unknown target item with which it shares a relational structure among attributes, but not surface features.”¹³²
- Literal similarities, which compare a known item and a new item in terms of the items’ relational structure among attributes and their surface features. This is possible because the known and unknown items share both a relational structure and surface features.¹³³
- Self-visualization, which encourages potential buyers to visualize themselves using a new product.¹³⁴

In addition, recent research has suggested that these strategies may be more effective when words, rather than pictures, are used.¹³⁵ As one way to apply these findings to PEVs, we suggest comparing PEVs to luxury cars. PEVs share some, though not all, surface features with such cars (e.g., they share steering wheels but not a traditionally understood engine). Consumers can be encouraged to imagine the quiet, smooth driving experience of a luxury car as a way of understanding what it is like to drive a PEV.

Marketing Behavior Change

Much of the literature around social marketing is written to address how to shape people’s daily habits—for example, how to get people to recycle or conserve energy—not how to influence major buying decisions like the purchase of a car.¹³⁶ However, there are important insights into the current media landscape in this literature that can inform our efforts to design a consumer awareness and education campaign for PEVs.

Perhaps the most important conclusion from the social media literature is that an information-based mass media campaign is not the most effective way to get people to adopt new behavior. People do gather information through mass media channels, including direct mail and mass media outlets, but they do not necessarily interpret that information as personally relevant. Thus mass media campaigns act as an efficient way to reach a number of people, but not to sway a high percentage of those people.¹³⁷

¹³² Michelle L. Roehm and Brian Sternthal, “The Moderating Effect of Knowledge and Resources on the Persuasive Impact of Analogies,” *Journal of Consumer Research* 28, no. 2 (2001): 257.

¹³³ Ibid.

¹³⁴ Darren W. Dahl and Steve Hoeffler, “Visualizing the Self: Exploring the Potential Benefits and Drawbacks for New Product Evaluation,” *Journal of Product Innovation Management* 21, no. 4 (2004): 259.

¹³⁵ Stephanie Feiereisen, Veronica Wong, and Amanda J. Broderick, “Too Much to Take In? The Role of Advertising Variables, Emotions, and Visual Attention in Consumer Learning for Really New Products,” abstract, *Advances in Consumer Research* 36 (2009): 765.

¹³⁶ Stephanie Simon, “The Secret to Turning Consumers Green,” *Wall Street Journal*, October 18, 2010, <http://online.wsj.com/article/SB10001424052748704575304575296243891721972.html>; Carlson Communications, *Sustainable Behavior Change Marketing and Communications: Literature Review* (Northborough, MA: Carlson Communications, 2011).

¹³⁷ Carlson Communications, *Sustainable Behavior Change Marketing and Communications*, 5.

Furthermore, there is ample evidence that—no matter what the outlet is—simply providing people with information about a product or behavior is not a terribly effective way to convince them to adopt that product or behavior—especially something as expensive and complex as a PEV. An information or education campaign does help, at first, in persuading people about the merits of a product or behavior with which they are unfamiliar, such as PEVs.¹³⁸ However, providing people with information is not the same thing as motivating them. Thus, over time, any campaign must shift its focus to personal motivators, such as convenience, social pressures, social benefits, or financial factors.

As noted in the section above on consumer learning, interpersonal influence is expected to play a key role in the adoption of PEVs. This expectation is consistent with previous successful social marketing efforts. Interpersonal influences or social pressures have been proven to be a particularly effective means of influencing behavior change, at least for relatively quotidian activities. Such pressures work on the inherent tensions people feel between their need to differentiate themselves and to assimilate with groups they identify with.¹³⁹ For example, electric utilities in some parts of the United States have included a Home Energy Report with bills that compare a home's energy use not just to usage in previous months but to peers' usage rates. Homes that receive the report have shown a sustained reduction in energy use of about 2 percent on average.¹⁴⁰

Social pressures combined with personal outreach methods have also proven to be effective. For example, the United Nations' Project Porchlight (www.projectporchlight.com) has directed energy efficiency campaigns in 900 communities in North America. The primary method of outreach is neighbors going door-to-door, delivering compact fluorescent light bulbs (CFLs) or other small gifts, and then initiating conversations about energy use. The program is credited with increasing the percentage of people who would consider buying CFLs from 65 percent to 77 percent among those Puget Sound Energy (PSE) customers in Washington state who received a Project Porchlight bulb.¹⁴¹

¹³⁸ Jennifer J. Tabanico and P. Wesley Schultz, "Community-Based Social Marketing," *BioCycle*, August 2007, 42.

¹³⁹ Yaron Timmor and Tal Katz-Navon, "Being the Same and Different: A Model Explaining New Product Adoption," *Journal of Consumer Behavior* 7, no. 3 (2008): 249-62.

¹⁴⁰ Simon, "The Secret to Turning Consumers Green."

¹⁴¹ Jan Harris, Jane Hummer, Kevin Cooney, and Patricia Thompson, *Evaluation of Consumer Behavioral Research*, (Boulder, CO: Summit Blue Consulting, 2010), 22.

Appendix B: Comparison of Early Adopter and Early Majority PEV Buyers

Table 7. Characteristics of early adopter and potential early majority PEV buyers

Early Adopter PEV Consumer	Early Majority PEV Consumer
Household Income	
Average above \$200,000/year ¹⁴²	Average above \$114,000/year ¹⁴³
Significant segments in lower income ranges as well ¹⁴⁴	39% with incomes \$40,000-\$100,000/year ¹⁴⁵
Marriage	
Equally likely to be single vs. married ¹⁴⁶	Much more likely to be married (about 70%) ¹⁴⁷
Age	
Most likely (50%) under 44, ¹⁴⁸ but with a significant (19%) segment over 60 ¹⁴⁹	Most likely age 40-44, ¹⁵⁰ but 32% are age 45-54 ¹⁵¹
Education	
More than half (51%) have 4 year degree or higher ¹⁵²	Less than half (40%) have 4 year degree or higher ¹⁵³
Concerns/Risk Taking	
Pioneers—willing to take risks on the new technology	Not risk-takers—want others to work out the bugs
Fewer concerns (35%) about vehicle reliability or safety ¹⁵⁴	Concerned about the safety and reliability of PEVs (69%) ¹⁵⁵

¹⁴² Deloitte, *Gaining Traction*, 5.

¹⁴³ Deloitte, *Gaining Traction*, 6.

¹⁴⁴ Jeffrey Dubin et al., *Realizing the Potential of the Los Angeles Electric Vehicle Market* (Los Angeles: Luskin Center for Innovation, UCLA Luskin School of Public Affairs, 2011), 48, <http://luskin.ucla.edu/news/ucla-study-predicts-los-angeles-will-be-leader-us-market-electric-vehicles>.

¹⁴⁵ Ibid.

¹⁴⁶ Dubin et al., *Realizing the Potential of the Los Angeles Electric Vehicle Market*, 50.

¹⁴⁷ Ibid.

¹⁴⁸ Deloitte, *Gaining Traction*, 5.

¹⁴⁹ Dubin et al., *Realizing the Potential of the Los Angeles Electric Vehicle Market*, 48.

¹⁵⁰ Deloitte, *Gaining Traction*, 6.

¹⁵¹ Dubin et al., *Realizing the Potential of the Los Angeles Electric Vehicle Market*, 48.

¹⁵² Dubin et al., *Realizing the Potential of the Los Angeles Electric Vehicle Market*, 49.

¹⁵³ Ibid.

¹⁵⁴ Dubin et al., *Realizing the Potential of the Los Angeles Electric Vehicle Market*, 53.

¹⁵⁵ Ibid.

Early Adopter PEV Consumer	Early Majority PEV Consumer
Costs	
Cost is a secondary concern	Cost is a primary concern
Willing to pay a premium for new technology ¹⁵⁶	Willing to pay a premium for reliability and features
Not as sensitive to tax credits and financial incentives	Very responsive to tax credits and financial incentives
Motivators	
Value proposition = first to own PEV, perceived environmental benefits, image, exclusivity ¹⁵⁷	Value proposition = financial and life-style or pro-social benefits
Very concerned about foreign oil dependency (76%) ¹⁵⁸	Very concerned about foreign oil dependency (70%) ¹⁵⁹
Politically active	Politically active
Environmentally conscious	Environmentally conscious
Behavior	
Willing to change habits to accommodate PEV	Must be convinced of benefits before changing habits

¹⁵⁶ The City of New York, *Exploring Electric Vehicle Adoption in New York City*, 12.

¹⁵⁷ David P. Tuttle and Ross Baldick, *The Evolution of Plug-in Electric Vehicle-Grid Interactions* (Austin, TX: Department of Electrical and Computer Engineering, University of Texas at Austin, 2010), 6, <http://users.ece.utexas.edu/~baldick/papers/PEV-Grid.pdf>.

¹⁵⁸ Dubin et al., *Realizing the Potential of the Los Angeles Electric Vehicle Market*, 55.

¹⁵⁹ Ibid.

Appendix C: Citations for Nissan Leaf and Chevrolet Volt Sales Data

Voelcker, John. "Electric-Car Wars: Chevy Volt Still Outselling Nissan Leaf," Green Car Reports, March 3, 2011. http://www.greencarreports.com/news/1056265_electric-car-wars-chevy-volt-still-outselling-nissan-leaf.

Voelcker, John. "Chevy Volt Outsells Nissan Leaf Again: Electric Car Sales," Green Car Reports, April 4, 2011. http://www.greencarreports.com/news/1057795_chevy-volt-outsells-nissan-leaf-again-march-electric-car-sales.

Voelcker, John. "April Electric Car Sales: Chevy Volt, Nissan Leaf Steady," Green Car Reports, May 3, 2011. http://www.greencarreports.com/news/1059355_april-electric-car-sales-chevy-volt-nissan-leaf-steady.

Voelcker, John. "Nissan Doubles Leaf Sales, Volt Stays Steady: Some Perspective, Please," Green Car Reports, June 1, 2011. http://www.greencarreports.com/news/1060899_nissan-doubles-leaf-sales-volt-stays-steady-some-perspective-please.

Voelcker, John. "June Electric Car Sales Continue to Climb: Leaf Soars, Volt Steady," Green Car Reports, July 1, 2011. http://www.greencarreports.com/news/1062559_june-electric-car-sales-continue-to-climb-leaf-soars-volt-steady.

Voelcker, John. "Electric Car Sales: Leaf Trounces Volt, but Don't Take It Seriously," Green Car Reports, August 2, 2011. http://www.greencarreports.com/news/1064283_electric-car-sales-leaf-trounces-volt-but-dont-take-it-seriously.

Voelcker, John. "Aug Electric-Car Sales: Nissan Leaf Rises, Chevy Volt Creeps Back," Green Car Reports, September 1, 2011. http://www.greencarreports.com/news/1065722_aug-electric-car-sales-nissan-leaf-rises-chevy-volt-creeps-back.

Voelcker, John. "Electric-Car Sales: Does GM Have a Chevy Volt Sales Problem?" Green Car Reports, October 4, 2011. http://www.greencarreports.com/news/1066882_electric-car-sales-does-gm-have-a-chevy-volt-sales-problem.

Voelcker, John. "October Electric Car Sales: Chevy Volt Outsells Nissan Leaf," Green Car Reports, November 1, 2011. http://www.greencarreports.com/news/1068042_october-electric-car-sales-chevy-volt-outsells-nissan-leaf?fbfanpage.

Appendix D: Second-tier Charging Station Applications

A number of less-than-ideal charging station finders exist for smart phones. Some of them, however, still have features to recommend them. A review of several of the charging station finders we studied follows for readers who would like to delve more into the options available to smart phone users who drive PEVs.

- CarStations allows users to submit new charging locations, but the process is detailed and slow. Usability is also less robust than for Recargo and Plugshare, which are covered in this paper. The application does, however, allow comments and has basic data.
- PEV Charger Finder has basic information, but it does not allow users to submit new locations. As a result, it is missing the many new installations that become available week to week. The application does allow comments and has basic data.
- Other applications—such as goCharge and Place Your Charging Station—were much less useful from an interface and data standpoint.
- Charge Locator attempts to derive income from a premium version that charges for additional detail.
- The Nissan Leaf application is designed to allow a user to interact with their vehicle, not locate EVSEs.
- Some applications suffer from being too specific to be of much use: Plugsurfing is a plug-sharing application for people to share their home charging stations, while the ChargePoint, Blink, and OpConnect applications only show the locations of those brands of chargers, which is extremely limiting.

Each of these sites still has features to recommend it. The brand-specific applications, for example, show if a charger is in use or out of order, saving a trip to an EVSE only to find it is unavailable. Overall, however, we believe overly specific applications like these are not particularly friendly to the potential early majority PEV buyer. While OTREC or TEEC could recommend these applications as resources, the primary recommendations should be to more general sites like Recargo and Plugshare.

Appendix E: Full List of Potential Messages

A full list of potential messages for PEV education and awareness campaign follows. Some of these messages could only be implemented with new policies or incentives. Others could be used from the start of a campaign. Messages are divided into two genres: those designed to encourage PEV adoption by working with pro-societal motivators and those designed to address barriers to adoption.

Pro-Societal Motivators	Potential Messages
Environmental Responsibility	<ul style="list-style-type: none"> • Preserve our clean air, water, and natural beauty: keep Oregon pristine. • Climate change/global warming: be the solution
Political Responsibility	<ul style="list-style-type: none"> • Independence from foreign oil: “Powered by energy made in Oregon” (“She Flies With Her Own Wings”)
Support Community Norms	<ul style="list-style-type: none"> • It’s not just a car. It’s a movement. • Go electric: it’s the right thing to do.
Personal “Perks”	<ul style="list-style-type: none"> • Pay less for fuel: how much did YOUR last fill-up cost? • Free or preferred parking: life just got a little easier • Carpool lane access: get there a little faster (and quieter, too)
Barriers	Potential Messages
Cost	<ul style="list-style-type: none"> • Consider the total cost of ownership. • Tax credits or other incentives • No more gas/diesel price fluctuations
Range/EVSE/Charging Time	<ul style="list-style-type: none"> • Availability of charging stations is increasing • I Plan! (similar to the objectives of Drive Less. Save More.) • No waiting in line at the gas station: charge while you sleep/shop/work
Complexity	<ul style="list-style-type: none"> • It’s as easy as 1-2-3: here’s how!
How “green” are PEVs?	<ul style="list-style-type: none"> • My car runs on sun, wind, water, and recycled waste! • Address recyclability of batteries.
Lack of Familiarity	<ul style="list-style-type: none"> • PEVs are here, and you can try them. • They have all of the space, power, and amenities of traditional vehicles (without the exhaust, grease, noise, and expense of fuel). • How could a car this clean and quiet be so powerful and fun to drive?

Appendix F: Detailed Survey Framework

Demographic Attributes

- Gender
- Age
- Household income
- ZIP code
- Education
- Political orientation
- Smart phone use

Knowledge about PEVs (Questions to assess baseline knowledge)

- Basic description of PEVs and how they work
- Cost (initial purchase, knowledge about tax incentives, cost of charging)
- Safety
- Charging (time, charger availability)
- Range
- Emissions advantage

Consumer Segmentation and Profile

- Current vehicle type (hybrid, luxury, SUV, sports car, minivan truck, other)
- Priorities when purchasing a car (price, maintenance cost, mileage, performance, reliability, design, etc.)
- Likelihood of purchasing any vehicle (I am likely to buy a vehicle: in the next year, in the next 1-3 years, in the next 3-5 years, in the next 5-10 years; I can't see myself buying a vehicle.)
- PEV purchase likelihood (I am likely to buy an electric vehicle: in the next year, in the next 1-3 years, in the next 3-5 years, in the next 5-10 years; I can't see myself buying an electric vehicle.)
 - Willingness to pay for certain attributes
 - PEV purchase motivators (latest technology, green image, environmental preservation, global-warming, total cost of ownership)

Vehicle Usage and Fit with PEVs

- Purpose and average daily travel (< 25 miles, 25-50 miles, 50-75 miles, 75-100 miles, > 100 miles)
- Number of trips > 100 miles per year
- Parking location at work and home
- Lease vs. purchase preference
- How long do you typically own your vehicle?
- Housing type: single family or multifamily/apartment
- Garage?
- How many cars are in your household?

Appendix G: Examples of Videos to Include on EV Oregon Website

1. “Good Transparency: Electric Vehicles”:
http://www.youtube.com/watch?v=QVgbESEIP_I¹⁶⁰
 Basic PEV facts covering misconceptions, basics of charging, total cost of ownership, comparison of carbon footprint vs. ICE vehicles, in illustrated format (no talking heads).
2. “How Electric Cars Work”:
<http://www.youtube.com/watch?v=MCDPl6Woyfc>¹⁶¹
 An introduction to how electric cars work from the *How Stuff Works* series.
3. “Testing Electric Cars at Consumer Reports Test Track”:
<http://www.youtube.com/watch?v=wY-fQNuabnE>¹⁶²
 Testing the Nissan Leaf and the Chevy Volt at the official Consumer Reports test track and comparing the vehicles’ attributes.
4. “Nissan Leaf: Kevin’s Test Drive”:
<http://www.youtube.com/watch?v=ByrPTow3QJM&feature=related>¹⁶³
 One of more than 30 short, informative videos featuring ordinary people and the Nissan Leaf by Nissan USA.
5. “Drive Electric: Clothes”:
<http://www.youtube.com/watch?v=zGNU1rG68wk>¹⁶⁴
 Plug In America video comparing the high maintenance requirements of ICE vehicles compared to the tire change needed on the PEV.
6. “Drive Electric: Military”:
<http://youtu.be/BAX4UbQwoHs>¹⁶⁵
 Plug In America video promoting independence from foreign oil via electrification.

¹⁶⁰ Good Magazine and Chris Weller, “Good Transparency: Electric Vehicles,” Good Magazine, accessed October 26, 2011, http://www.youtube.com/watch?v=QVgbESEIP_I.

¹⁶¹ Marshall Brain, “How Electric Cars Work,” How Stuff Works, accessed October 26, 2011, <http://www.youtube.com/watch?v=MCDPl6Woyfc>.

¹⁶² “Testing Electric Cars at Consumer Reports Test Track,” Consumer Reports, accessed October 26, 2011, <http://www.youtube.com/watch?v=wY-fQNuabnE>.

¹⁶³ “Nissan Leaf: Kevin’s Test Drive,” Nissan USA, accessed October 26, 2011, <http://www.youtube.com/watch?v=ByrPTow3QJM&feature=related>.

¹⁶⁴ “Drive Electric: Clothes,” Plug In America, accessed October 26, 2011, <http://www.youtube.com/watch?v=zGNU1rG68wk>.

¹⁶⁵ “Drive Electric: Military,” Plug In America, accessed October 26, 2011, <http://www.youtube.com/watch?v=BAX4UbQwoHs>.

Appendix H: Portland Metro Area Media Outlets

The media outlets identified in this appendix have consumer profiles that in some way match the demographic profile of early majority buyers. If TEEC and OTREC wish to expand beyond the Portland metro area to pursue the strategies outlined below, we recommend the organizations look for outlets with similar consumer profiles.

Table 8. Portland metro area media outlets with potential for reaching early majority PEV adopters

Radio Outlet	Reach ¹⁶⁶	Demographic Profile ¹⁶⁷
KFXX (The Fan 1080 AM)	1.7% share	Assumed to be similar to KXTG
KINK (101.9 FM)	4.6% share	About 75% between ages 35-64, about 46% with HHI above \$75,000
KLTH (Oldies 106.7 FM)	5.7% share	30 to 60 year olds
KOPB (Oregon Public Broadcasting 91.5 FM)	4.9% share	69% aged 35-64; 41% with income above \$75,000
KPOJ (Portland's Progressive Talk 620 AM)	1.2% share	Progressive Portland-area residents interested in politics
KXTG (The Game 750 AM)	.9% share	74% male, 43% with income over \$75,000
KQAC (All Classical 89.9 FM)	2.4% share	Primarily 35-64 year olds, high income ¹⁶⁸

¹⁶⁶ Share of market for radio stations is a monthly figure. Shares cited are for September 2011. Stationratings.com (searched for Portland, OR.; accessed October 22, 2011), Arbitron, <http://www.stationratings.com>.

¹⁶⁷ Demographic information for radio stations comes from the following websites or media kits found on those websites. KINK and KXTG: "Media Kits: Alpha Broadcasting," Alpha Broadcasting, accessed October 22, 2011, <http://www.radioadvertisingportland.com/mediakits.html>; KLTH: "Advertise With Us," Clear Channel Communications, accessed October 22, 2011, <http://www.portlandoldies.com/cc-common/YourAdHere/>; KPOJ: "Advertise With Us," Clear Channel Communications, accessed October 22, 2011, <http://www.620kpoj.com/cc-common/YourAdHere/>. KOPB: "Support," Oregon Public Broadcasting, accessed September 19, 2011, <http://www.opb.org/support/partners/>.

¹⁶⁸ Eric Behny (Director of Corporate Sales, All Classical FM), in e-mails to the author, September 2011.

Radio Outlet	Reach ¹⁶⁶	Demographic Profile ¹⁶⁷
<i>The Oregonian</i> ¹⁶⁹	Varies: 561,600 read daily edition; 716,000 read Sunday edition	Reaches 83% of households with incomes over 100,000
Pamplin Media Group Papers ¹⁷⁰	Varies: <i>Beaverton Valley Times</i> reaches 15,600 readers weekly; <i>Boom! Boomers and Beyond</i> reaches 91,200 readers/month; <i>Sustainable Life</i> reaches 303,480 readers/month	Varies: <i>Portland Tribune</i> has 57% male readership; 38% of readers are ages 35-54
<i>Portland Monthly</i> ¹⁷¹	224,791 readers/month	Median reader age: 42; median household income: \$165,725
<i>Willamette Week</i> ¹⁷²	405,245 readers/month	63% of readers aged 25-44; 20% have HHI over \$100,000

As Table 7 indicates, no radio station in Portland generally sustains a market share of more than 10 percent. While this limits the audience any station can reach, that is not necessary a drawback for advertisers. The stations are already segmenting the Portland metro area audience fairly effectively along demographic lines. Thus, provided that the price is right, these stations could provide OTREC and TEEC with a useful way to reach early majority consumers without blanketing the entire metro area. The table also shows that Portland has a number of strong print media available for widespread and targeted advertisements.

The cost of any advertising will vary on the number of ads run, the size or length of the spot, and the organization buying the add. Nonprofits, for example, regularly receive discount rates, as do purchasers of advertisements in bulk. The details for any advertising campaign thus will need to be worked out by OTREC and TEEC as they decide which recommendations to adopt.

¹⁶⁹ "Readership Statistics," *The Oregonian*, accessed October 24, 2011, <http://biz.oregonian.com/adresources/?sec=16&tert=29>; "Higher Readership Among Higher Incomes," accessed October 24, 2011, *The Oregonian*, <http://biz.oregonian.com/adresources/?sec=16&tert=29>.

¹⁷⁰ "Pamplin Media Group Rate Card 2011," (Portland, OR: Pamplin Media Group, 2011). Received by e-mail from Irene Pettengill (display advertisement sales for Pamplin Media Group) in January 2011.

¹⁷¹ "Advertise," *Portland Monthly Magazine*, accessed October 24, 2011, <http://www.portlandmonthllymag.com/site/advertise/>.

¹⁷² "Media Kit," *Willamette Week* (Portland, OR: Willamette Week, 2011), <http://wweek.com/portland/flex-221-advertise-with-ww.html>.

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