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Realizing the Potential of the Los Angeles Electric Vehicle Market

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Abstract

The electric vehicle market is a rapidly increasing ecosystem, considered one of the fastest growing areas of green technology. Market research firms agree that the EV sector will gain market share from traditional and hybrid car sales in upcoming years. However, market share forecasts are scattered across a wide range, putting the share of EV sales between ~5% and ~50% by 2020.

The success of the EV market overall will depend on how well the market responds to incentives and whether it can overcome the barriers to adoption. The two main market enablers that will drive EV adoption are purchase subsidies and overwhelming consumer demand. The most significant barriers on the other hand are four-fold: (i) charging infrastructure (home and public), (ii) battery price and performance, (iii) range anxiety, and (iv) EV supply.

The Los Angeles market has several unique characteristics that will influence EV adoption. There are three key issues that differentiate Los Angeles' EV market: (i) high ratio of multifamily housing buildings and renters, (ii) high ratio of new and hybrid cars, and (iii) commuter market with high availability to multiple vehicles per household and limited public transit commuting. The Los Angeles market offers great potential, but public policy is essential to help consumers embrace EVs. Public policy can help reduce barriers and create an economic climate that encourages private investment and allows consumers to fully maximize the benefits of EV adoption.

Keywords: EV (electric vehicle), Charging, Incentive, Regulation

1 Executive Summary

1.1 Introduction

The electric vehicle market is a rapidly increasing ecosystem, considered one of the fastest growing areas of green technology. Market research firms agree that the EV sector will gain market share from traditional and hybrid car sales in upcoming

years. However, market share forecasts are scattered across a wide range, putting the share of EV sales between ~5% and ~50% by 2020.

The success of the EV market overall will depend on how well the market responds to incentives and whether it can overcome the barriers to adoption. The two main market enablers that will drive EV adoption are purchase subsidies and overwhelming consumer demand. The most significant barriers on the other hand are four-fold: (i) charging infrastructure (home and public), (ii) battery price and performance, (iii) range anxiety, and (iv) EV supply.

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1.2 L.A. EV Market Forecast

In order to assist the City of Los Angeles and the Department of Water and Power in its EV planning, a sales projection model was produced to predict the EV market share and adoption by zip code through the year 2020.

Key findings from the projection model include:

Electric vehicle sales are projected to compose 9% of total car sales in 2015 and 11.7% in 2020.

Sixty-five percent of prospective early EV adopters are multifamily residents and renters, but these groups face major challenges in accessing home charging.

EV home charging will be most concentrated in the west side, downtown, valley, and south bay regions, most of which show substantial multifamily residential populations.

EV charging will be concentrated in the daytime, mostly in downtown and along the Wilshire corridor.

The projection model also tested three policy and incentive scenarios to assess the impact on EV sales:

Incentives and policy options will have little effect until supply constraints on EV sales are removed, potentially several years in the future.

Increasing access to home charging will have a substantial impact on EV sales if implemented before EV supply constraints are lifted.

1.3 L.A. EV Market Survey Results & Analysis

The L.A. EV market survey includes responses from 2,043 participants in the L.A. Metro Area. The 50-question survey was conducted via Internet to query people’s general attitudes, preferences and behaviors that would influence their entrance into the EV market Based on the survey results; we segmented the population into three main categories: Early Adopters, Mid-Adopters, and Late Adopters. We further determined that Mid and Late Adopters had two sub-segments, which were distinguished along home ownership and income. This report analyzes the attitudes, behaviors, and preferences for each of the segments and identifies key barriers and obstacles for EV adoption in L.A.

Key findings from the survey include the following:

The City can help attract the majority EV with policies that lower Total Cost of Ownership

(TCO) and raise the perception of how much value EVs offer.

- Measures to **help lower the upfront cost of EVs will make a significant impact in EV adoption, particularly among Mid-Adopters.** Respondents perceive large gaps between EV price and the value they offer. Over 80% of respondents said price is an important factor in the decision to purchase an EV and 71% believe that "EVs cost too much for what they offer."
- **Enacting and communicating a competitive and easy-to-understand electricity rate plan for EV recharging will also incentivize greater EV adoption, particularly amongst Mid-Adopters.** Over 70% of Mid-Adopters consider current gas prices to be an important factor when buying an EV compared to only 54% for Early Adopters. Likewise, 85% of Mid-Adopters care about battery recharge cost, compared to 66% of Early Adopters. An $83 monthly savings in fuel costs may be enough to convince 40% of the population to purchase (or at least consider) an EV.
- **Greater public awareness about EVs and EV incentives would help elevate the perceived value of EVs, particularly amongst Mid-Adopters.** Only 37% of respondents had at least some knowledge about EVs and only 29% were aware of available EV incentives. Lack of knowledge about EVs and EV incentives could deter many would-be adopters. For example, over 50% of Mid-Adopters cited lack of knowledge about the product as a reason for not liking EVs.

Increasing access to recharging opportunities beyond single-family home garages will be vital for all segments.

- **Without policies to facilitate access to at-home charging** for 61% of L.A.'s population that are renters or residents of multifamily buildings, **25% of respondents would be prevented from buying an EV due to perceived difficulties with EV charger installation.**
- Access to **public charging options outside the home or building garage** will be important for the 25% of survey respondents who park on the street.
- **For over 70% of L.A. drivers** who commute less than 30 miles per day (round-trip), **there are multiple charging schedules to fit their charging preferences.** Six to eight hours of Level II recharge every two to three days or three to four hours of Level II recharge every day would also be enough for most L.A. drivers. Alternatively, six to eight hours of Level I recharge every day would also suffice.
- **Early to Mid-Adopters are particularly interested in incentives that facilitate home charger installation.** Expedited permitting was important to 75% of Early to Mid-Adopters consider expedited permitting to be important and over 80% of Early to Mid-Adopters consider the $2,000 rebate for charger installation to be important.
- **Level I charging may be a realistic option to support and incentivize widespread adoption amongst non-single family homeowners and Mid to Late Adopters.** Seventy-three percent of commutes are below 30 miles (round-trip) and 76% of total driving is below 50 miles per day. At least 30% of Mid-Adopters show an interest in Level I charging (and another 30% of the population remain neutral who might be convinced to try Level I).

Actual driving patterns and range needs of L.A. residents make EVs highly suitable for the majority of day to day commutes and urban travel. Specifically, the City can undertake three initiatives to mitigate range anxiety amongst prospective EV drivers:

- **Shape the perceived need and desire to own a vehicle with extended range.** Seventy-three percent of commutes are below 30 miles (round-trip). Even accounting for additional and non-commute driving, 76% of total driving is below 50 miles per day. A 100 mile-range is enough for typical driving needs.
- **Positioning the EV as a second-plus vehicle in a family's suite of cars may help families with multiple car ownership consider an EV.** Almost 60% of respondents own two or more cars.
- **Car share could be an economical option to provide greater range flexibility for L.A. EV drivers, especially in low-income communities.** Almost 70% of respondents with household income less than $25,000 per year stated some level of interest in car share.

HOV lane access and monetary incentives, such as the $2,000 charger installation rebate and the federal and state tax credits will help attract Mid-Adopters and should be continued into the medium term. However, free parking will fail to significantly influence EV purchases.

- **HOV lane access for EVs will be an attractive incentive for Mid-Adopters.** Over 60% of Early to Mid-Adopters say that HOV lane access would be important.
- **Early to Mid-Adopters are receptive to monetary incentives that lower TCO, while incentives are not enough to sway Late Adopters.** Only 28% of Late-Adopters consider the $2,000 rebate for charger installation important when buying an EV, compared with the sample average of 73%.
- **Free parking may not prove to be a good incentive to attract incremental EV demand, as 59% of respondents state they never use street metered parking.**

1.4 City Benchmarking

Concurrent to understanding what EV adoption may look like for the city of Los Angeles, we researched other cities to understand the public policy options that Los Angeles could consider. This work stream is a largely qualitative examination of the incentives that other major cities around the world are enacting or seriously considering to increase EV adoption.

Emerging Themes

- **Many cities consider EVs as one of many components of a sustainable mobility strategy**. Public transit, bicycling, and walking are alternative modes of transportation to private vehicles, and many cities such as Portland and Seattle will not support EVs to the point where it incentivizes a resident to move from an alternative mode into an electric vehicle.
- U.S. cities are still in **early stages of implementation**; published strategies are not necessarily indicative of implementation status. Cities are polarized between not over-committing (largely due to an unsuccessful EV roll-out twenty years ago) and supporting mass adoption.
- The **speed at which residents can permit and install chargers varies** across cities. Many cities (Seattle, Houston) have developed online portals where permits are approved the same day. Other cities have targets of five to seven business days for approval. Portland has developed a process of conducting spot inspections (via Oregon's Minor Label program) where one of ten installations is inspected.
- The planning for **multifamily housing charging constraints** varies across cities. From our research, San Diego is the farthest along in this process, with charger company ECOtality and SDG&E serving as central points of contact for coordinating installation. Many cities face significant challenges in

developing access to chargers for multifamily housing.

- Cities that are farther along in planning often have an enthusiastic private partner and **actively involved utilities**. SDG&E, PG&E, and Austin Energy have taken the initiative in getting heavily involved in planning for EV deployment.
- Cities are leveraging **car share programs** to promote EVs. Because of the public accessibility factor, car share programs are extremely popular with many cities. Some receive funding to assist with purchase of EV fleets and chargers (London, Chicago, Philadelphia), and others have partnerships where EV owners can charge their EV in ZipCar parking lots (Portland).
- **Direct Current (DC) fast charging** is a polarizing topic. Many are enthusiastic that fully charging a car in 20-30 minutes will satisfy customer needs and have plans to deploy infrastructure along freeways and high-traffic areas (Seattle, San Diego). Other cities believe that 20-30 minutes is unrealistic in satisfying customer demands for "fast" charging and are wary of investing in this technology (Austin).
- Currently there is **low consumer knowledge** and **little to no marketing**. Seattle's "Client Assistance Memos (CAMs)" are a unique feature that the city has undertaken in prior years to educate their public on various processes. SDG&E has posted high-level process flows on their website for EV buyers in search of installing a home charger.

1.5 Recommendations

Los Angeles is in a great position to become an EV city leader, with involvement of key stakeholders such as the Department of Water and Power. Federal and state subsidies for EV purchases and charging infrastructure will drive sales and EV demand will exceed supply for the next few years. In the study, we have explored EV policy options in cities worldwide, assessed consumer preferences, and projected EV supply and demand in the next ten years. Using this research, combined with an analysis of **applicability** and **feasibility** of implementation, we have developed the following policy recommendations for the City of Los Angeles.

Streamline permitting & installation process with an actively involved utility. Survey results indicate that expedited permitting is very important to Early and Mid-Adopters in Los Angeles. Permitting demands should be addressed within the same day. Los Angeles can look to Seattle and Houston for a model on turning around same-day requests. Charger installation is more difficult than permitting because more entities are involved, but exploring programs such as those in Portland, Austin, and San Diego may prove beneficial and relevant. Because Los Angeles owns the DWP, the city has additional policy and business opportunities to meet EV consumer demand than other cities.

Increase charging access in multifamily housing. Our market survey confirms that multifamily housing customers are a large part of the shapeable majority – namely, the Mid-Adopter market segment – and they could dramatically increase the adoption rate of EVs. The EV projection model currently has a significant demand constraint due to the lack of home charging availability for multifamily housing customers. By alleviating this constraint, the City could increase EV adoption to more than 13% of new car sales by 2020. The City should look toward San Diego and future UCLA Luskin Center projects to develop and implement charger access solutions for multifamily housing residents.

Increase consumer education and marketing. All customer segments revealed an overall lack of knowledge about electric vehicles and incentives, especially within the Mid-Adopters segment. Almost half of the respondents reported that this lack of knowledge is a barrier to purchasing an EV. Los Angeles should look to Seattle and San

Diego as benchmark cities in effectively developing EV awareness.

About the Study

The study sought to estimate the number of electric vehicles that would be purchased by City of Los Angeles residents over the next decade, and examine the effectiveness of policies to increase this number. The study was conducted using standard marketing analysis techniques to forecast new product adoption, including a conjoint survey and Bass diffusion model. The principal authors include a team of second year UCLA Anderson students, who completed the project with a Faculty advisor as part of their capstone requirement for the MBA program.

About the Authors

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