SMARTCOLUMBUS
Barriers to Electric Vehicle Adoption in Columbus, Ohio
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ABSTRACT
This market study was developed in response to Priority 3 of the Smart Columbus Project: “Priority 3: Consumer EV Adoption. Initiatives 6-8.” The primary task was electric vehicle (EV) market research, looking into available consumer options as well as supply- and demand-side barriers to adoption. The economic analysis used in this study sought to understand the current challenges within this market and develop recommendations for marketing strategies for the City.

RESEARCH OBJECTIVES
I. Research EV models at one original equipment manufacturer (OEM) to determine availability.
II. Survey local EV dealers to identify supply-side barriers to EV adoption in Columbus.
III. Review literature concerning any patterns of early adoption of EVs in U.S. cities.
IV. Determine where, within the Columbus area, early adopters likely reside.
V. Identify and catalogue motivations and barriers to EV adoption in Columbus.

METHODS
Objective I generated an inventory quantification to create baseline data regarding the availability of electric vehicles in Columbus. For Objective II, a number of Columbus dealerships belonging to various OEMs were surveyed. The results of this survey were quantified, and followed with in-depth interviews to gather qualitative opinions and experiences concerning challenges in electric vehicle sales. Objective III produced a literature review, and also created a profile of early adopters that might be extrapolated to the Columbus market. Policies that have effectively increased EV adoption in other cities, including midwestern cities similar to Columbus, were also studied. Literature was also integrated to develop Objective IV. Objectives IV and V synthesized the literature review, primary survey demographics, and Census data to produce and conduct a secondary survey of potential EV adopters. The resulting survey was used to assess demand for electric vehicles in Upper Arlington and feasible EV adoption policies that most resonated with potential consumers.

OBJECTIVE I
Objective I produced baseline data, which was used to develop a system for evaluating the feasibility of the Smart Columbus electric vehicle adoption goal. Inventories of several Ford dealerships (the targeted OEM) were quantified. Dealerships included in the study were within the 1-2700 loop.

Number of Available EVs by Type
Available EV Models
Ford Fusion Hybrid
Ford C-MAX Hybrid
Ford Fusion Energi
Ford C-MAX Energi
Toyota Prius 2

OBJECTIVE II
Objective II utilized surveys to gather information on dealership training, attitudes, and selling processes for EVs. Surveys were designed and then distributed to 58 contacts at 4 Columbus OEMs. Responding dealerships included:
- Germain Ford
- German Nissan
- Kelly BMW
- Maxton Chevrolet
- Ricart Ford

DEALERS’ PERCEIVED BARRIERS TO EV ADOPTION

80% of dealers surveyed responded that they “offered EV training” and had “EV experts” at their location.

OBJECTIVE III
Objective III developed a profile of early adopters of EVs. Using studies and surveys, a profile of early adopters was constructed to determine a specific location within the Columbus market where high concentrations of early adopters likely reside. Studies were developed by interest groups, governments, and academic groups. The literature also informed policy types used and their efficacy in other cities, including midwestern cities similar to Columbus.

COLUMBUS EARLY ADOPTER PROFILE

- Age: Young to middle-aged
- Sex: 93.5% of EV drivers are Male
- Income: 58% of EV drivers indicated an annual income of >$100,000 per year
- Type: 20-44 years old
- Education: 42% postgrads (JD Power)
- Household: 50% of households reported >$100,000 of income before taxes
- Race: 100% of current owners identified as white
- Housing: Detached
- Housing: 75% reported living in a house as opposed to an apartment, condo, or other

OBJECTIVE IV
Objective IV utilized data from the 2010 US Census, in GIS format, and the 2015 American Communities Survey to identify Zip Code Tabulation Areas (ZCTA) based on the demographic categories collected in Objective III. While there were many locations aligning with the results of the literature review, the highest-ranking ZCTA in this analysis was zip code 43221: the central and northern areas of Upper Arlington. This area was targeted for surveying in Objective V.

DISCUSSION & RECOMMENDATIONS
- The Midwest’s uptake in electric vehicles is 61% lower than the U.S. average
- Areas across the United States that have the highest electric vehicle uptake also have: (1) much greater model availability, (2) more extensive public charging networks, (3) more state and local policy actions to support the market
- State regulatory policy is a key driver of market availability & adoption for the early market
- Federal and state financial incentives such as tax breaks remain the greatest motivator for EV adoption
- Most region-leading electric vehicle markets benefited from state-level financial incentives
- Upper Arlington residents show alignment with successful EV adoption policies: (1) state/federal incentives, (2) public charging infrastructure, (3) greater model availability
- More comprehensive EV education is necessary: consumers do not fully understand model availability, charging requirements, affordability, etcetera
- Survey results indicated discrepancies between the extent of dealership EV training and what resources or education consumers felt were actually offered
- Upgrade Ohio’s 0% loan interest program in Athens, OH
- Demonstrate success in consumers’ response to EV marketing and adoption, while inviting additional sustainability initiatives
- EV inventory model used in this analysis can be adapted to further evaluate the feasibility of the Smart Columbus adoption goal using data from additional OEMs in a wider area.

REFEERENCES

TEAM INFORMATION
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