

## Research Article

## Community Attitude towards Electric Vehicle: A Pilot Study of Edmonton Heights Underserved Neighborhood in Huntsville, Alabama

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**Abstract:** Electric vehicles (EVs) are now being presented as a resolution for the problem of dependence of fossil fuels, increasing emissions, and other environmental issues. The study explores the neighborhood attitudes toward green mobility and the objective of this paper is to investigate and examine neighborhood perceptions and understand their knowledge towards the electric vehicle. The research paper goal necessitated the attitudes of the underserved community towards green mobility. Following the literature review research phase, the researcher conducted a number of semi-structured interviews survey with the Edmonton Height underserved community. In summary, the analysis examined residents perceptions and attitudes toward EVs and EV policy, in order to better understand perceived barriers to EV ownership and identify what sort of public policies would residents realize presumably to assist them to opt for electron volt for his or her next vehicle. The data analysis indicates the respondent's attitudes to EVS & EV policy to consider purchasing or leasing a plug-in electric vehicle shows that 50% of the respondents favored lower purchase price while 25% indicated that being able to drive 200 miles on a fully charged battery and 15% indicated that having access to plug in-vehicle charging stations of their workplace. The paper concludes that the respondents biggest concerns toward owning a plug-in electric vehicle is that there are too few if any, public charging stations where they travel, and also the issue of government policies should make it easier to own plug-in vehicles.

**Keywords:** Community attitudes, Electric Vehicles, Electric Vehicle Policy Neighborhood, Attitudes towards.

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### BACKGROUND

Edmonton Heights may be a historic, African-American neighborhood in Huntsville, Alabama, located adjacent to the Alabama A&M University campus. It's experienced tons of turnover from wealth to poverty over a span of 30 years. Once a promising neighborhood that wealthy, educated African-Americans resided in who taught at the university and worked a spread of occupations within the city has now been ravaged with violence, crime, drugs, and financial disparity. Property values of homes have decreased steadily and abandoned homes have grown to become a standard sight. Trash inhibits the natural great thing about this neighborhood, also as stray animals, roam the streets frequently. Additionally, the tutorial attainment of residents is extremely low. Many residents haven't attained a Bachelor's degree (B.S.) or H.S. diploma. Each of those factors has stagnated the progression of this neighborhood over an extended period of your time.

### STATE OF THE ART

Electric vehicles (EVs) are now being presented as a resolution for the matter of dependence of fossil fuels, increasing emissions, and other environmental issues. Road transport adds to just about one-fifth of the EU Commission's total emissions of CO<sub>2</sub>, the most greenhouse emission (European Commission, 2012). Furthermore, CO<sub>2</sub> emissions from road transport increased by 23% between 1990 and 2010 and are still rising within the EU. Also, transportation contributes to 35% of greenhouse emission house emissions taking up the electrical sector in 2016. Stating the importance of tackling global climate change, many governments have created policies for reducing CO<sub>2</sub> emissions by encouraging the development, introduction, and implementation of EVs (Brady and O'Mahony, 2011). In spite of the purported positive environmental consequences of electrifying the light-duty vehicle fleet the share of EVs within the total number of vehicles sold remains small. In 2011, the EV

market share was only 0.06% of the 51.1 million light-duty vehicles sold within the EU, U.S., and therefore the key Asian markets (European Commission, 2012). One perception of such modest adoption figures is that the mass acceptance of EVs is especially reliant on consumers' perception of them (Schuitema *et al.*, 2013). Therefore, so as to market EV adoption, it's important to know how buyers perceive EVs and what the possible drivers for and barriers against consumer EV adoption are.

In the consumer EV adoption research, environmental beliefs and consumer awareness of environmental issues and individual's effects are alleged to affect the aims to get EVs (Lane and Potter, 2007; Carley *et al.*, 2013; Egbue and Long, 2012; Skippon and Garwood, 2011). It's been debated that consumer concern for the environment won't necessarily end in pro-environmental behavior and there's a niche between the environmental attitude and behavior (Oliver and Rosen, 2010; Kollmuss and Agyeman, 2002; Stern, 2000). Symbolic meanings of products and their relationship with self-identity and purchases of products are described supported distinctive psychological and sociological theories within the consumer EV adoption literature. Saussure's (1965) model of sign, Sirgy's (1986) self-image congruency theory, Giddens' (1991) narratives of self and Miller's (2009) costly signaling theory are the theoretical basis within the literature which account for EV symbolism and consumer adoption. Saussure (1965) states that a product sort of a car may be a signifier or symbol of ideas and meanings. An example of signified meaning within the case of EVs may be a concern for the environment.

Miller's (2009) expensive signal theory emphasizes the actual fact that human unselfish behaviors, like the acquisition of EVs (Noppers *et al.*, 2014; Skippon and Garwood, 2011), express and signals the identity and standing stronger when the behavior costs (financial and non-financial like behavioral change, time and energy) are higher. Hence, symbols and lifestyles related to driving EVs play a crucial role in consumer adoption of EVs. Moreover, they're regarding consumer's attitudes towards different attributes of EVs like price, performance and elegance and also the environmental attributes like energy efficiency. Counsel suggests considering the role of consumers' emotions during this regard (Wood and Moreau, 2006; Watson and Spence, 2007; Shih and Schau, 2011). For instance, consumers' expectation of future events and consequent emotions as factors affecting the adoption behavior has been studied during a recent paper by Shih and Schau (2011). They find that the perceived rate of innovation, or the speed at which consumers perceive technological conditions are changing within the market place (Shih and Schau, 2011, p. 2), which might end in anticipating regret and consequently delay the acquisition of the technological

innovation. In another study, Wood and Moreau (2006) show that consumers' expectations of complexity from technological innovation may be a significant think about creating emotions, which consequently affect innovation evaluations and thus the acquisition decision. The studies by Schuitema *et al.*, (2013) and Axsen *et al.*, (2012) contemplate pro-environmental orientation as a self-identity or way. The second self-identity, car-authority identity (Schuitema *et al.*, 2013) are often thought of as a subclass of technology orientation (Axsen *et al.*, 2012) where individuals are experts on cars. However, car-authority consumers state neither positive nor negative perceptions of EV attributes and weren't convinced about the environmental impacts of EVs (Schuitema *et al.*, 2013), while non-greens with technology-oriented ways are doubtless to adopt EVs (Axsen *et al.*, 2012). For potential buyers of EVs, the perception of positive feelings from driving an EV was positively correlated with consumer attitudes and intentions to adopt EVs (Moons and De Pelsmacker, 2012). However, this study doesn't provide further information on the sort of positive feelings that buyers anticipated to experience with EVs.

#### **Purpose of the paper:**

The study explores the neighborhood attitudes toward the green mobility and the objective of this paper is to investigate and examine neighborhood perceptions and understand their knowledge towards electric vehicle.

## **METHODS:**

The research paper goal necessitated the attitudes of the underserved community towards green mobility. Following the literature review research phase, the researcher conducted a number of semi structured interviews with underserved community. To best augment the quantitative, data were gathered from underserved Edmonton Heights community, through the design of questionnaire survey. Data collection took place during the last two weeks of October 2018. Neighborhood households were approached during the day and evening in their residents using a structured questionnaire. Overall, 30 people were approached, 20 of which were qualified for sample inclusion in the time frame of the survey (66.7 percent).

### **Data Analysis and Results**

#### **Descriptive Statistics**

The household suitability for EVs is shown in Tables 1-3. The mean of each variable in Table 1a reveals respondents' attitudes towards EVs. The standard deviation shows the dimensions of the range of answers (fairly high in most cases supported these results). The relatively high standard deviation also reflects a divergence of opinion by respondents on most questions, with the possible exception of gender.

**Table 1: APOP**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	12	60.0	63.2	63.2
	No	7	35.0	36.8	100.0
	Total	19	95.0	100.0	
Missing	System	1	5.0		
Total		20	100.0		

From the above table 1, the author found that 60% of the respondents from Edmonton neighborhood indicated “Yes” best describes their current parking situation while 35% indicated “No” to their current parking situation in their neighborhood

**Table 2. HNO**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	4	20.0	20.0	20.0
	2.00	7	35.0	35.0	55.0
	3.00	7	35.0	35.0	90.0
	4.00	2	10.0	10.0	100.0
	Total	20	100.0	100.0	

The table 2 above shown the very best number of occupants within the vehicle drive. Notwithstanding, 85% of two occupants because the highest number slot in the vehicle they drove most frequently while 15% of 1 occupant within the vehicle they drove. Furthermore, table 3 below reveals that 85% of the respondents indicated negative to the vehicle they drove often does not need hauling or towing capacity while 15% indicated positive to the vehicle they drove need hauling or towing capacity.

**Table3. HOTC**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	3	15.0	15.0	15.0
	No	17	85.0	85.0	100.0
	Total	20	100.0	100.0	

**Respondents Attitudes towards EVs and EV Policy**

Table 4 below shows the respondents attitudes to EVS&EV policy that would make the respondents more likely to think about purchasing or leasing a plug-in electric vehicle reveals that 50% of the respondents favored lower price as their top attribute while 35% indicated that begin ready to pay less for electricity when charging a plug-in vehicle during certain times as second top attribute and therefore the third attribute 15% is having the ability to drive 200 miles on a totally charged battery.

**Table 4. The top Respondents 3 attributes that would make them more likely to consider purchasing or leasing a plug-in electric vehicle:**

	1	2	3
<b>Lower purchase price</b>	<b>50.0%</b>	<b>x</b>	<b>x</b>
Greater selection of plug-in vehicle models	x	x	x
Being able to drive 200 miles on a fully charged battery	x	x	15%
Having access to plug-in vehicle charging stations at my workplace	x	x	x
Seeing more plug-in vehicle charging stations in parking lots and shopping destinations.	x	x	x
Begin able to pay less for electricity when charging a plug-in vehicle during certain times	x	35%	x

Table 5 answered the question or issue of respondents BIGGEST concerns toward owning a plug-in electric vehicle and one can see that 80% of the respondents indicated their biggest concerns toward owning a plug-in electric vehicle is that there are too few if any, public charging stations where they travel, while 15% indicated that they don't know enough about plug-in electric vehicles to possess a priority and 3% indicated that plug-in electric vehicles are expensive.

**Table 5. BCTO**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	16	80.0	80.0	80.0
	2.00	3	15.0	15.0	95.0
	3.00	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

**Which of the following are your BIGGEST concerns toward owning a plug-in electric vehicle?**

1. There are too few, if any, public charging stations where I travel
2. I don't know enough about plug-in electric vehicles to have concerns
3. Plug-in electric vehicles are too expensive

Furthermore, table 6 below shows the response to the difficulty of plug-in electric vehicle may be a realistic choice for several American drivers today, one can see that 45% of respondents indicated that they strongly agree and somewhat agree while 20% indicated that they strongly disagree and somewhat disagree and 35% indicated that they don't know.

**Table 6. PERC**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	9	45.0	45.0	45.0
	2.00	4	20.0	20.0	65.0
	3.00	7	35.0	35.0	100.0
	Total	20	100.0	100.0	

**Plug-in electric vehicles are a realistic choice for many American drivers today.**

1. Strongly Agree & Somewhat Agree
2. Strongly Disagree & Somewhat Disagree
3. Don't Know

As one can see from table 7 responded to the issue of automaker SUV models that 70% of respondents strongly agree and somewhat agree, while 10% indicated that strongly disagree and 20% don't know.

**Table 7. ASUV**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	14	70.0	70.0	70.0
	2.00	2	10.0	10.0	80.0
	3.00	4	20.0	20.0	100.0
	Total	20	100.0	100.0	

**Automakers should make a variety of vehicle types (like SUVs, minivans, or sedans, for example) available as plug-in electric models.**

1. Strongly Agree & Somewhat Agree
2. Strongly Disagree & Somewhat Disagree
3. Don't Know

Notwithstanding, table 8 reveals the respondent's opinion to the issue of government policies should make it easier to have plug-in vehicles. 65% strongly agree and somewhat agree, 5% strongly disagree and somewhat disagree and 30% don't know.

**Table 8. GPO**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	13	65.0	65.0	65.0
	2.00	1	5.0	5.0	70.0
	3.00	6	30.0	30.0	100.0
	Total	20	100.0	100.0	

**Government policies should make it easier to own plug-in vehicles**

1. Strongly Agree & Somewhat Agree

2. Strongly Disagree & Somewhat Disagree
3. Don't Know

The issue of each automaker should offer a plug-in electric model purchasable, table 9 below reveals that 50% strongly and somewhat agree, while 15% strongly disagree and somewhat disagree and 35% don't know.

**Table 9. ASPS**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	10	50.0	50.0	50.0
	2.00	3	15.0	15.0	65.0
	3.00	7	35.0	35.0	100.0
	Total	20	100.0	100.0	

**Every automaker should offer a plug-in electric model for sale**

1. Strongly Agree & Somewhat Agree
2. Strongly Disagree & Somewhat Disagree
3. Don't Know

Furthermore, table 10 also reveals that 80% of the respondents strongly agree and strongly comply with the difficulty of electricity during certain times, while 10% strongly disagree and somewhat disagree and 10% don't know.

**Table 10. ESR**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	16	80.0	80.0	80.0
	2.00	2	10.0	10.0	90.0
	3.00	2	10.0	10.0	100.0
	Total	20	100.0	100.0	

**Electricity providers should offer special rates to make it cheaper to charge a plug-in vehicle during certain times**

1. Strongly Agree & Somewhat Agree
2. Strongly Disagree & Somewhat Disagree
3. Don't Know

Table 11 above reveals that 65% of the respondents "indicated provide a tax credit 58% while 60% of the respondents indicated "grant" plug-in vehicle drivers access to high occupancy (HOV) lanes and also 100% respondents indicated reduced or eliminated tolls on roads, bridges and tunnels for plug-in vehicle drivers.

**Table 11. FTP**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	13	65.0	65.0	65.0
	2.00	2	10.0	10.0	75.0
	3.00	2	10.0	10.0	85.0
	4.00	1	5.0	5.0	90.0
	6.00	1	5.0	5.0	95.0
	7.00	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

**From the list below, please indicate what you think are the top 3 public policies that would make it easier to own a plug-in electric vehicle.**

Provide a tax credit or rebate for part of the vehicle purchase price 57.01% 58.00%

1. Grant plug-in vehicle drivers access to high occupancy (HOV) lanes
2. Reduce or eliminate tolls on roads, bridges, and tunnels for plug-in vehicle drivers
3. Provide preferential parking spots for plug-in vehicle drivers in highly trafficked areas like sports arenas or universities
4. Make it easier to install plug-in vehicle charging stations in apartment buildings or other multifamily housing units
5. Provide incentives for businesses and workplaces to install plug-in vehicle charging stations
6. Provide more information about-in-vehicle
7. Encourage automakers to make some of their cars available as a plug-in model

## CONCLUSION

In conclusion, academic research has in large part focused on access to jobs because the biggest transportation issue facing low-income communities. Less research exists on low-income communities' got to access other essential services and goods that also are important to household well-being and should have long-term implications on moving out of poverty, including access to education, childcare, and healthcare. Until we tend to higher perceive the actual attitudes, access and mobility needs of those communities, we do not skills far shared mobility can enter improving their ability to access jobs, reasonable housing, health care, and other essential services. As reported within the literature review section, consumer EV adoption has been studied using several theoretical frameworks supported the published literature, we discover five main themes in consumer EV adoption behavior. Although treated individually here, these themes co-exist and square measure integrated into each other in several studies. The respondents indicated their biggest concerns toward owning a plug-in electric the vehicle is that there are too few if any, public charging stations where they travel, and also the difficulty of state policies should make it easier to have plug-in vehicles. Further analysis need to conjointly inform the event of pilot programs which can then be evaluated against a baseline understanding of low-income quality desires. It should be noted that identifying current rideshare service providers and comparing the sort of services and technologies they're using. Finally, while there exists relatively little quantitative, time-series data on ridesharing, statistics and trends are summarized to the degree possible. Testing different approaches and evaluating remains needs further research.

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