

ASSESSING THE PERCEPTIONS OF URBAN TRANSPORT STAKEHOLDERS IN NIGERIA FOR ELECTRIC VEHICLE ADOPTION.

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Abstract

This study assessed the readiness of urban transport systems in Nigeria for electric vehicle (EV) adoption, focusing on infrastructure, policy, perception, and behavioural intent. A mixed-method approach was adopted, involving a survey of 200 urban commuters across Lagos, Abuja, Port Harcourt, and Kano, along with five stakeholder interviews that included government officials, EV dealers, transport operators, energy providers, and civil society representatives. Quantitative analysis using SPSS showed low mean scores for charging station availability ($M = 2.31$), electricity reliability ($M = 2.22$), and policy awareness ($M = 2.39$), indicating poor infrastructural preparedness. Regression analysis revealed that neither infrastructure factors ($R^2 = 0.007$) nor perception-related variables ($R^2 = 0.005$) significantly predicted behavioural intention to adopt EVs ($p > 0.05$). Thematic analysis of interview data identified Grid Readiness, Public Awareness, Investment Needs, Infrastructure Deficit, and Policy Gaps as key barriers. These findings suggest that Nigeria's urban centres are still unprepared for a widespread EV rollout due to systemic and institutional constraints. The study recommends strategic investment in charging infrastructure, comprehensive policy development, public sensitization, and financial incentives to bridge existing gaps and enable a sustainable transition to electric mobility in Nigerian cities.

1.0 Introduction

Urban transport systems are increasingly at the center of the global push for sustainability and climate resilience. As cities grow denser and mobility demand rises, traditional fossil fuel-based transport modes exacerbate air pollution, greenhouse gas emissions, and energy insecurity. Electric vehicles (EVs) are therefore viewed as a pivotal solution for

advancing the clean mobility revolution, promising reductions in carbon intensity, improvements in urban air quality, and enhanced energy efficiency. In countries like Nigeria, where rapid urbanization collides with fuel dependency and volatile energy costs, transitioning toward EVs is not merely a desirable option but an essential step toward sustainable development (Ajao & Sadeeq, 2023).

Despite these potential benefits, the readiness of Nigeria's transport infrastructure and institutions for EV integration remains limited. Power grid instability, insufficient charging stations, high upfront vehicle costs, and weak regulatory support all pose significant hurdles (SIPA Capstone Team, 2024; Ekong, 2024). Similar patterns are evident across other emerging economies, where socio-economic constraints and policy gaps undermine adoption (Asadi et al., 2021; Coban et al., 2022). For example, studies in Turkey and Indonesia have shown that infrastructure reliability and multi-stakeholder coordination are decisive for consumer acceptance (Gunawan et al., 2022; Buranelli de Oliveira et al., 2022). These parallels suggest that Nigeria's challenges are not unique but part of a broader readiness deficit across the Global South.

Scholars have increasingly turned to behavioral and social frameworks to explain EV uptake. The Unified Theory of Acceptance and Use of Technology (UTAUT) has been expanded to capture factors such as trust, social influence, and network externalities, all of which strongly predict EV adoption in Sub-Saharan Africa (Ajao, Prio, & Sadeeq, 2025). Beyond Africa, evidence from China, India, and Denmark

indicates that attitudes, perceived risks, and social norms are just as critical as infrastructure in shaping adoption intentions (Huang & Ge, 2019; Jaiswal et al., 2021; Thøgersen & Ebsen, 2019). Classic theories of planned behavior and technology acceptance (Ajzen, 1991; Davis, 1989) further reinforce those perceptions of usefulness, control, and risk reduction mediate the link between consumer awareness and actual purchase decisions.

Nigeria, however, presents a unique policy and energy landscape. The removal of fuel subsidies in 2023 created cost pressures that could make EVs more competitive in terms of total ownership costs, but affordability remains a challenge given the dominance of imported, used internal combustion engine vehicles (Ekong, 2024). At the same time, Nigeria's abundant solar resources create opportunities for decentralized, off-grid EV charging through solar mini-grids—solutions that have shown promise in pilot projects (SIPA Capstone Team, 2024; Maghfiroh, Pandyaswargo, & Onoda, 2021). International comparisons suggest that targeted incentives, coherent national policy, and visible early adopters are crucial for accelerating market readiness (Xue et al., 2021; Zhang et al., 2022).

Social influence and cultural perceptions also play an outsized role in Nigeria's urban transport future. Studies across Asia and Africa demonstrate that peer networks, social media, and community-based sensitization campaigns significantly shape adoption intentions (Ki & Kim, 2019; Sefora et al., 2019). Without public awareness and trust in EV technology, infrastructure investment alone is unlikely to deliver large-scale adoption.

Taken together, these insights suggest that assessing Nigeria's readiness for EV adoption requires more than a focus on technical capacity. A multi-dimensional approach that integrates infrastructure, energy reliability, consumer behavior, financial incentives, and socio-cultural dynamics is essential. Only through such a holistic lens can policymakers and stakeholders design strategies to enable Nigeria's urban transport systems to transition toward a cleaner, smarter, and more resilient mobility future.

1.1 Need for the Research

Electric vehicles (EVs) are central to global efforts to cut emissions, improve air quality, and modernize transport systems, with many developed nations already making rapid progress. Their role in advancing climate

resilience underscores the urgency for countries like Nigeria to prepare for this mobility shift. However, Nigeria's urban transport systems remain largely unready, hindered by unreliable electricity, poor charging infrastructure, high upfront costs, weak policies, and low public awareness. These challenges are most pressing in cities, where traffic density and vehicular emissions impose significant social, environmental, and economic costs. Current research has focused more on rural or national contexts, leaving a gap in understanding the specific readiness of Nigerian cities. This study therefore seeks to provide evidence-based insights that can guide policymakers, energy planners, and investors in enabling a sustainable EV transition in Nigeria's urban landscape.

2.0 Literature Review

2.1 Theoretical Framework

This study is anchored on the **Unified Theory of Acceptance and Use of Technology (UTAUT)**, originally developed by Venkatesh et al. (2003), and adapted to fit the context of electric vehicle adoption in Sub-Saharan Africa (Ajao et al., 2025). The UTAUT model posits that four core constructs influence behavioral intention and use behavior:

Performance Expectancy – the belief that using EVs will enhance commuting efficiency and reduce long-term costs.

Effort Expectancy – the perceived ease associated with learning to use and maintain an EV.

Social Influence – the extent to which peers, media, and institutions affect an individual's decision to adopt EVs.

Facilitating Conditions – the degree to which infrastructure (charging stations, electricity supply), policy incentives, and support systems are available to enable EV usage.

2.2 Empirical Review

Research on EV adoption across Africa and other emerging markets consistently highlights infrastructure, policy, perception, and socio-cultural factors as central determinants of consumer intention. Ajao, Prio, and Sadeeq (2025) emphasized that facilitating conditions and network externalities are the strongest predictors of EV adoption in Sub-Saharan Africa, a finding that aligns with evidence from Indonesia (Gunawan et al., 2022) and Brazil (Buranelli de Oliveira et al., 2022), where infrastructure

availability and service reliability were decisive for uptake.

Ekong (2024) similarly highlighted Nigeria's electricity deficit, high EV costs, and limited consumer knowledge as major barriers, echoing insights from Turkey (Coban et al., 2022) and Malaysia (Asadi et al., 2021), where socio-economic factors and policy gaps undermined consumer readiness. Studies in Ghana (Ackaah, Kanton, & Osei, 2022) and South Africa (Sefora et al., 2019) reinforce this, showing that while environmental concern is rising, affordability and infrastructure access remain critical bottlenecks.

Policy interventions have also proven central. Panel analyses from 20 countries revealed that incentives—such as subsidies, tax breaks, and rebates—significantly improve EV market share (Xue et al., 2021). In China, subsidies and local city-level regulations directly shaped consumer purchase decisions (Huang & Ge, 2019; Zhang et al., 2022; Liao, 2022). However, when subsidies were reduced, adoption slowed unless complemented by alternative supportive measures (Zhang, Bai, & Shang, 2018). These findings underline the importance of phased and coherent policies, a recommendation consistent with Ajao and Sadeeq's (2023) call

for structured national rollout strategies in Africa.

Beyond structural and policy enablers, psychological and social factors also matter. Perceived risk has been shown to dampen EV adoption in India, Malaysia, and Thailand (Wang et al., 2018; Thananusak et al., 2017; Thilina & Gunawardane, 2019). Similarly, consumer innovativeness and ethnocentrism affect local brand acceptance in Turkey (Yıldırım & Özdemir, 2021; Bawa & Nwohu, 2023; Yılmaz, Ulaş, & Yeşil, 2022). Broader behavioral theories—such as Ajzen’s (1991) Theory of Planned Behavior, Davis’ (1989) Technology Acceptance Model, and Fishbein and Ajzen’s (1977) foundational belief–attitude–intention framework—support these findings, showing that attitudes, perceived control, and usefulness strongly predict adoption intention.

Social influence and co-creation dynamics further expand adoption pathways. Peer effects, early adopters, and social media persuasion have been found to significantly shape consumer attitudes toward EVs (Ki & Kim, 2019; Nosi et al., 2017). Studies of shared mobility also suggest that carsharing and battery swapping reduce adoption barriers by increasing visibility and convenience (Adu-Gyamfi et al., 2022; Schlüter & Weyer,

2019). These trends align with Ajao et al. (2025), who stressed that social and network effects should be central to EV adoption models in Africa.

In sum, empirical evidence across contexts shows that EV adoption is not driven by infrastructure or perception alone, but by a combination of enabling conditions, coherent policy frameworks, socio-cultural attitudes, and visible peer influence. For Nigeria, this suggests that readiness must be approached as a multi-dimensional challenge—requiring grid and infrastructure upgrades, policy incentives, public sensitization, and social proof mechanisms to foster behavioral intent.

2.3 Summary of Empirical Insights

The reviewed studies collectively emphasize that EV adoption in Nigeria and Sub-Saharan Africa is influenced by a combination of infrastructural readiness, user perception, trust, and supportive policy frameworks. While infrastructural and energy challenges persist, behavioral and economic incentives play an equally critical role. However, few studies combine these dimensions in a single empirical model focused on **urban Nigeria**, which this study aims to address. The current study, therefore, fills a gap by offering a mixed-method, context-specific investigation

into both infrastructural and perceptual readiness for EV adoption in selected Nigerian cities.

3.0 Study Area & Methodology

The study focused on major urban centers in Nigeria with varying levels of transport infrastructure and policy engagement such as Lagos, Abuja, Port Harcourt, and Kano to reflect a diverse range of readiness levels across geopolitical zones. This study adopted a mixed-methods approach combining quantitative and qualitative techniques to provide a comprehensive assessment of the readiness of urban transport systems in Nigeria for electric vehicle (EV) adoption. A cross-sectional survey was used to capture data at a single point in time, supplemented by key informant interviews for deeper contextual insights.

The target population includes: Urban commuters and private car owners, Commercial drivers (e.g., taxi and ride-

hailing services), Government officials in transport and energy ministries, EV dealers and charging station operators. A multistage sampling technique was employed: Purposive sampling to select key cities, Stratified sampling to categorize respondents into user groups & Systematic random sampling to select participants from each stratum with a sample size of 200 respondents, complemented by 5 key informant interviews. Structured questionnaire based on the UTAUT model (effort expectancy, performance expectancy, social influence, trust, facilitating conditions, network externalities) adapted to the Nigerian context. SPSS was used to analyze Quantitative data: Descriptive statistics (mean, frequency, percentages), Inferential statistics (regression analysis) to determine relationships between constructs and readiness levels. Thematic analysis using manual coding techniques to identify key themes was used to analyze Qualitative data.

4.0 Results

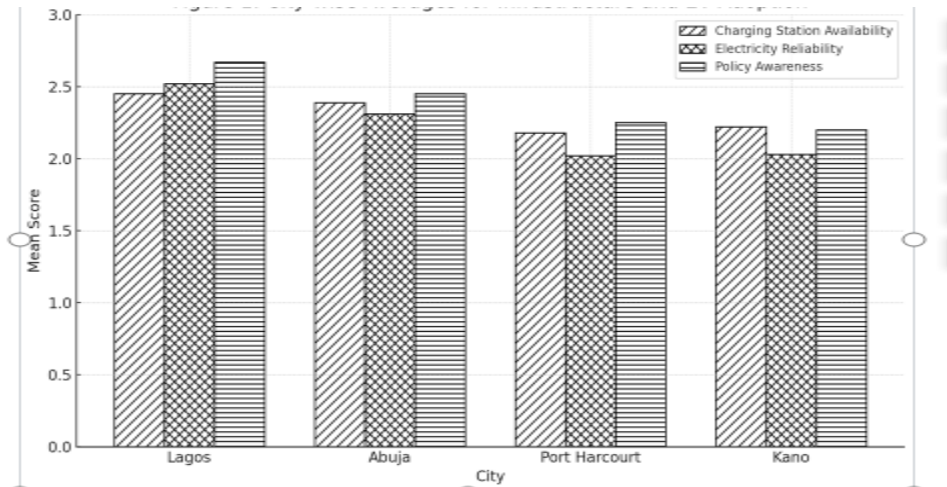


Figure 1: City-wise Averages for Infrastructure and EV Adoption

Table 1: Regression Results - Infrastructure Factors

Variable	Coefficient	Std. Error	t-Statistic	P-Value
Constant	2.56	0.28	9.26	0.00
Charging Stations Availability	0.02	0.06	0.39	0.70
Electricity Reliability	0.07	0.07	1.02	0.31
EV Policy Awareness	0.03	0.07	0.41	0.68

Table 2: Regression Results - Perception Factors

Variable	Coefficient	Std. Error	t-Statistic	P-Value
Constant	3.02	0.34	8.82	0.00
Perceived Ease of Use	-0.07	0.07	-0.90	0.37
Cost Concern	-0.03	0.07	-0.40	0.69
Environmental Concern	0.02	0.08	0.27	0.79

4.1 Discussion

Hypothesis 1:

Infrastructure readiness significantly influences behavioral intention to adopt EVs in Nigeria.

Variables tested: Charging Stations Availability, Electricity Reliability, & EV Policy Awareness. As shown in Table 1: Regression Results Infrastructure Factors, all three predictors had positive but statistically insignificant coefficients. Charging Stations Availability ($\beta = 0.024$, $p = 0.700$), Electricity Reliability ($\beta = 0.067$, $p = 0.310$), and EV Policy Awareness ($\beta = 0.027$, $p = 0.683$) were not strong determinants of behavioral intention. The model's R^2 value was **0.007**, indicating that only 0.7% of the variance in EV adoption intention is explained by these infrastructural factors. This suggests that while infrastructure is crucial, it alone may not yet be motivating urban residents to adopt EVs—perhaps due to limited exposure or the novelty of the technology in Nigeria.

Hypothesis 2:

Perception-related variables significantly influence behavioral intention to adopt EVs in Nigeria.

Variables tested: Perceived Ease of Use, Cost Concern, & Environmental Concern. According to Table 2: Regression Results – Perception Factors, none of these variables significantly predicted behavioral intention. Perceived Ease of Use ($\beta = -0.066$, $p = 0.367$), Cost Concern ($\beta = -0.027$, $p = 0.686$), and Environmental Concern ($\beta = 0.021$, $p = 0.788$) yielded weak explanatory power. The R^2 value was **0.005**, suggesting a very small contribution of these perception factors to EV adoption decisions. The lack of statistical significance may be attributed to low awareness levels or the influence of overriding economic and infrastructural barriers in the Nigerian context.

Similarly, Figure 1 comparing city-wise averages showed slight variations in readiness indicators across cities. Lagos and Abuja displayed relatively higher average scores in Charging Stations Availability and Behavioral Intention, while Kano and Port Harcourt lagged slightly. However, the differences were marginal

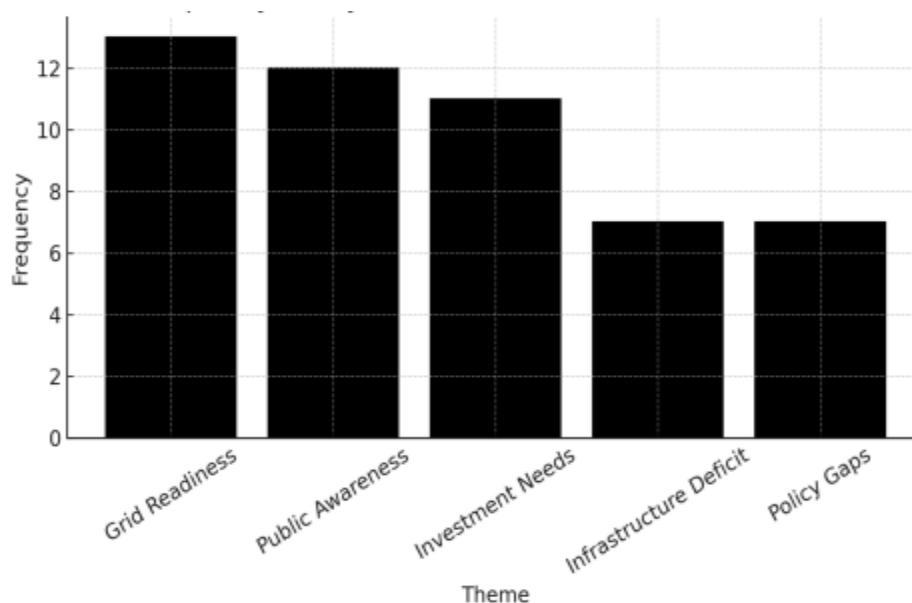


Figure 2: Frequency of Key Themes from Stakeholder Interview

Thematic analysis of stakeholder interview responses revealed that Grid Readiness was the most frequently mentioned theme, highlighting widespread concern about Nigeria's electricity infrastructure being unprepared for EV adoption (See figure 1). Public Awareness was the second most cited theme, reflecting the need for better education and sensitization on EV benefits and usage. Investment Needs ranked third, emphasizing the requirement for financial input into EV infrastructure and market incentives. Infrastructure Deficit and Policy Gaps were also commonly mentioned, suggesting critical shortcomings in physical transport systems and regulatory frameworks.

4.2 Qualitative Findings and Thematic Analysis

Hypothesis 1: Infrastructure Readiness and Behavioural Intention

According to the regression results in Table 1, the desire to use electric vehicles (EVs) was positively but statistically insignificantly impacted by infrastructure factors such as the availability of charging stations, the dependability of energy, and knowledge of EV policies. Infrastructure explained less than 1% of the variation in adoption behavior, with an R^2 of 0.007. The concerns expressed by stakeholders are reflected in these findings, especially with regard to Grid Readiness, which was the most commonly mentioned issue in the interviews. For instance: *"We are lacking in Grid Readiness, especially for consistent charging."* — Energy Commission Officer

This is consistent with the regression model's limited predictive power of electrical reliability ($\beta = 0.07$, $p = 0.31$), indicating that respondents are aware of the grid's subpar performance but do not yet consider it a deal-breaker. This mirrors findings from Brazil and Indonesia, where infrastructure quality had to reach a threshold before influencing behavioral intent (Buranelli de Oliveira et al., 2022; Gunawan et al., 2022). It could also be that Nigerian respondents currently have low expectations or limited familiarity with EVs, as seen in similar contexts where perceived infrastructural barriers initially appear irrelevant (Huang & Ge, 2019).

Similarly, EV Policy Awareness had a negligible impact ($\beta = 0.03$, $p = 0.68$) when assessed as a predictor. This aligns with qualitative worries regarding Policy Gaps: *“There is a major need for Policy Gaps to be addressed no clear framework yet.”* Transport Ministry Official

The public's trust in EV initiatives may be weakened by these policy gaps at the federal level, which would further reduce the behavioral impact of whatever infrastructure is already in place. This is consistent with panel data findings showing that effective incentive and policy bundles are central to EV uptake (Xue et al., 2021). Concerning

physical facilities, stakeholders bemoaned a lack of infrastructure: *“Currently, we need better Infrastructure Deficit solutions including road charging lanes.”* — Transport Policy Analyst

This concern is consistent with the statistically insignificant result for Charging Stations Availability ($\beta = 0.02$, $p = 0.70$), as presented in Table 1. The lack of significance may be attributed to the perceived invisibility or practical inaccessibility of such infrastructure, which renders it irrelevant in the minds of potential users. This quantitative result aligns with qualitative responses from key informants, where “Infrastructure Deficit” was repeatedly emphasized as a critical barrier to EV adoption. As one stakeholder noted, *“We are lacking in infrastructure — roads and traffic systems are outdated,”* reinforcing the argument that mere presence or planning of charging stations is insufficient without adequate integration into functional, visible, and user-friendly urban transport networks (Coban et al., 2022; Ajayi, 2022).

Hypothesis 2: Perception Factors and EV Adoption

Additionally, none of the perception-based predictors ($R^2 = 0.005$) were statistically

significant, including perceived ease of use, cost concern, and environmental concern. This suggests that there is not yet strong behavioral momentum in favor of EVs. Stakeholder interviews provided insightful background information for these conclusions. For instance, there was a heavy emphasis on the issue of public awareness: *“There is a major need for Public Awareness so people know EVs exist.” — Environmental NGO Representative*

Perceived ease of use or environmental concern may be abstract or poorly understood if the general public is largely unaware of EV technology, which would explain their low influence in the quantitative model. Similar patterns have been observed in Denmark and Malaysia, where perception factors were weak without widespread awareness and sensitization campaigns (Thøgersen & Ebsen, 2019; Asadi et al., 2021). People in Nigeria may simply lack the knowledge needed to form strong attitudes about EVs that would influence adoption behavior.

Another limiting factor was Investment Needs, repeatedly cited by stakeholders: *“Currently, we need better Investment Needs handling private funding is key.” Charging Station Operator*

This concern mirrors the negative but non-significant relationship between cost concern and behavioral intention ($\beta = -0.03$, $p = 0.69$). Financial uncertainty and lack of supportive incentives may prevent cost sensitivity from translating into meaningful behavioral patterns. This finding is consistent with evidence from India and Ghana, where affordability constraints and lack of incentives remain critical barriers (Jaiswal et al., 2021; Ackaah, Kanton, & Osei, 2022).

4.3 City-Level Variations and National Readiness Interpretation

The city-wise averages presented in Figure 1 reveal only marginal differences in infrastructure readiness and behavioral intention across the four urban centers studied—Lagos and Abuja scored slightly higher compared to Port Harcourt and Kano. While this might reflect disparities in economic development, policy attention, or infrastructure investment across regions, the minimal nature of the differences suggests that the core barriers to EV adoption are not confined to specific cities but are indicative of systemic national-level challenges. These include uniform issues such as grid instability, policy fragmentation, and low public awareness, as highlighted by both the quantitative regression models and the

qualitative stakeholder interviews. Thus, addressing EV adoption readiness in Nigeria requires broad, cross-cutting interventions rather than city-specific solutions.

This view is consistent with stakeholder concerns that span all cities, such as: *“We are lacking in Public Awareness, particularly among drivers and fleet owners.” Ride-Hailing Executive* and *“We are lacking in Policy Gaps fixes that make EV importation and local assembly viable.” EV Dealer* Such perspectives reinforce the idea that structural limitations are nationwide, cutting across urban centers regardless of size or economic status. This aligns with comparative studies from other emerging economies, where systemic rather than city-specific interventions proved most effective (Sun, He, & Thøgersen, 2022; Liao, 2022).

5.0 Conclusion

This study explored the readiness of urban transport systems in Nigeria for the adoption of electric vehicles (EVs), focusing on infrastructural availability, energy reliability, policy awareness, public perception, and behavioral intention. Findings from both quantitative and qualitative analyses reveal that key infrastructural and policy components necessary for large-scale EV

integration remain underdeveloped. Additionally, public understanding and trust in EVs are still emerging, with socio-economic realities and energy limitations acting as major constraints.

Regression analysis showed that neither infrastructure nor perception variables significantly predicted EV adoption intentions, highlighting the complexity of EV readiness in Nigeria. Stakeholder interviews reinforced this by identifying critical themes such as grid readiness, public awareness, investment needs, infrastructure deficits, **and** policy gaps. These findings demonstrate that Nigeria’s urban centers are not yet fully prepared for EV adoption, but they also illuminate pathways for improvement.

6.0 Recommendations

1. Government and private sector actors should prioritize the development of reliable EV charging stations, backed by both grid and renewable energy sources (e.g., solar mini-grids) to ensure energy accessibility and reduce range anxiety.
2. The Federal Government should enact a comprehensive EV policy framework outlining incentives, standards, targets, and roadmaps for integration, including local manufacturing and assembly incentives.

3. Launch targeted education campaigns to raise awareness about the economic, environmental, and practical benefits of EVs. This should include community engagement, media outreach, and EV demonstration programs.

4. Encourage PPPs for the development of EV infrastructure, including leasing models, battery-swapping programs, and fleet electrification for public transport and ride-hailing services.

5. Establish urban EV readiness indices and encourage more granular, city-level data collection on transportation habits, energy use, and consumer preferences to inform context-specific interventions.

6. Provide tax incentives, import duty exemptions, and financing options to reduce the upfront cost of EVs. Also, support local research and innovation in battery systems, retrofitting, and micro-mobility solutions.

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