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IS UGANDA READY FOR LARGE-SCALE ADOPTION OF ELECTRIC MOBILITY VEHICLES?

December, 2025

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The Economic Policy Research Centre (EPRC) is an autonomous not-for-profit organization established in 1993 with a mission to foster sustainable growth and development in Uganda through advancement of research –based knowledge and policy analysis. Since its inception, the EPRC has made significant contributions to national and regional policy formulation and implementation in the Republic of Uganda and throughout East Africa. The Centre has also contributed to national and international development processes through intellectual policy discourse and capacity strengthening for policy analysis, design and management. The EPRC envisions itself as a Centre of excellence that is capable of maintaining a competitive edge in providing national leadership in intellectual economic policy discourse, through timely research-based contribution to policy processes.

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ABSTRACT

This study examines Uganda's readiness for a large-scale transition to electric mobility (E-mobility), driven by the urgent need to decarbonise the transport sector and combat severe air pollution. The study leverages quantitative data from surveys and perceptions from Key Informant Interviews and Focus Group Discussions. The findings reveal that Uganda has a moderate level of EV adoption readiness (0.67), performing slightly above the African average (0.58) but still behind its East African peers, such as Rwanda (0.74) and Kenya (0.7). While there is growing consumer interest, abundant renewable energy potential, and the availability of strategic natural resources for EV manufacture, as well as supportive policies for the expansion of Uganda's E-mobility sector, significant challenges remain. Challenges include underdeveloped charging infrastructure, high initial cost of EVs, inadequate repair and maintenance services, and concerns over electricity reliability and battery replacement/disposal. Regulatory inconsistencies (and lags), skill gaps, insufficient financing, and overreliance on imported components further complicate efforts by the E-mobility actors. This study recommends accelerating the development of EV charging infrastructure, establishing robust EV battery recycling systems and facilities, launching targeted public awareness campaigns, and introducing demand-side incentives to reduce EV costs. Finally, the government should expedite the enactment of key EV legislation.

1.0 INTRODUCTION

Over the last three decades, the Earth's average temperature has steadily increased due to human activities such as burning fossil fuels (Nadeau et al., 2022; Samimi and Zarinabadi, 2011). This phenomenon, also known as global warming, poses significant adverse effects on the environment, threatening livelihoods, particularly in developing economies (Gissi et al., 2021; Thakur and Bajagain, 2019).

Globally, the transport sector is significantly responsible for climate change (UNEP, 2022) and a major contributor towards global warming, emitting nearly 25 percent of the global greenhouse gas (GHG) emissions (UN, 2021). Approximately 95 percent of the world's transport energy solely depends on fossil fuels, consuming 57 percent of global oil and 28 percent of total global energy (UN, 2021). Similarly, in the past two decades, deaths attributed to pollution have risen by 66 percent due to various factors (including combustion of fossil fuels), with pollution responsible for nearly nine million deaths per annum worldwide (Fuller et. al., 2022). Moreover, approximately 90 percent of the pollution-related deaths happen in low- and middle-income economies (ibid).

To keep global warming below 2°C by 2030, the United Nations Environment Programme (UNEP) estimates that at least 20 percent of all road transport vehicles (nearly 300 million vehicles) need to be electrically powered . Notably, countries have made commitments and are striving to achieve the global targets of reducing GHG emissions, mainly the Paris Climate Agreement (2016) and other air quality agreements, through prioritising a shift towards a healthier and low-to-no emissions transport sector.

The E-mobility or Electric Vehicle (EV) industry has emerged as a vital component in decarbonising the transport sector and promoting a sustainable transport ecosystem, with the potential to reduce reliance on fossil fuels and GHG emissions significantly (Pamidimukkala et. al., 2023). According to the United Nations, having 60 percent of all vehicles on the road be electric will save nearly 60 billion tonnes of GHG emissions between 2021 and 2050 worldwide (UN, 2021). The term E-Mobility is a multifaceted concept denoting clean and efficient transportation EVs, propelled by either batteries or hydrogen fuel cells. According to Rommel and Sagebiel (2021), EVs are differentiated in the following categories: Battery Electric Vehicles (BEV), Hybrid Electric Vehicles (HEV), Plug-in Hybrid Electric Vehicles (PHEV), and Fuel Cell Electric Vehicles, as shown in Figure A.1 in the Appendix.

In 2021, the E-mobility industry was valued at USD 280 billion and is predicted to increase to USD 1.5 trillion by 2028, reflecting a global clean transport transition and widespread adoption of EVs (STI-OP, 2023). In Africa, the transport sector accounts for more than 10 percent of the continent's total GHG emissions and is expected to rise (business as usual scenario), as Sub-Saharan Africa's vehicle stock is projected to surge from 25 million vehicles in 2021 to nearly 58 million by 2040 in Ethiopia, Kenya, Nigeria, South Africa, and Uganda combined. Therefore, this underscores the urgent need to accelerate the shift towards sustainable mobility that can meet the increasing vehicle demand whilst minimising their environmental impact.

Uganda, like other African countries, recognises these global trends and is at a crossroads where it must re-examine its mobility strategies to ensure a clean and sustainable transport sector. In Uganda, road transport contributes over 10 percent of GHG emissions annually, consisting of an inefficient public transport sector characterised by mainly imported end-of-life Internal Combustion Engine (ICE) vehicles, with an average age above 16 years from their first registration (STI-OP, 2023).

The prevalence of these old vehicles not only exacerbates air pollution, but also imposes substantial health risks on the population, by increasing the rates of Chronic Obstructive Pulmonary Disease (COPD), heart disease, asthma, lung disease, and premature births (ibid). More succinctly, the Health Effects Institute (2025) estimates that Uganda experiences nearly 30,000 air pollution-related[1] deaths annually. The 2023 Global Burden of Disease Study reveals that air pollution contributes over 74 percent of COPD deaths in Uganda, followed by ischemic stroke deaths (42 percent), ischemic heart disease deaths (42 percent) and lung cancer deaths (39 percent) [see Figure A.2]. Considering ambient particulate matter pollution ($PM_{2.5}$), tiny solid and liquid particles suspended in the outdoor air, the number of deaths

1 According to the State of Global Air 2025 (Health Effects Institute, 2025), ambient particulate matter pollution, ambient ozone pollution, household air pollution, and nitrogen dioxide (NO_2) pollution are all classified as forms of air pollution contributing to the total air pollution–attributable disease burden.

increased by over 28.3 percent between 2010 and 2023 (Health Effects Institute, 2025).

Notably, the World Air Quality Report (2024) reveals that Uganda is the eighth(8th) most polluted country globally, with an average annual $PM_{2.5}$ concentration of 41.0 micrograms per cubic meter ($\mu g/m^3$), exceeding World Health Organization (WHO) annual $PM_{2.5}$ air quality guidelines by 8.2 times. Worse still, Kampala ranked as the fifth (5th) most polluted city on the continent in 2024. Therefore, adopting E-mobility offers a promising solution by providing cleaner and more efficient transportation alternatives that can significantly reduce emissions, improve public health, and enhance economic productivity.

Considering the above, the Government of Uganda (GoU) has formulated ambitious goals for E-mobility within its Vision 2040 and more specifically under the National Development Plans (NDPIII and NDPIV), both of which emphasise sustainable industrialisation; establishment of clean, inclusive and efficient sustainable mobility systems; and the adoption of an eco-friendly transport sector. The recently developed National E-mobility Strategy (2023) by the Science, Technology, and Innovation Office of the President (STI-OP) Secretariat marks a significant milestone in achieving these goals. This strategy seeks to "fully transition Uganda's public transport system and motorcycles to E-mobility by 2030, and passenger vehicle sales by 2040". It strives to create a robust E-mobility ecosystem that will not only reduce transport-related GHG emissions by 25 percent by 2040 but also spur local manufacturing by generating over 500,000 green jobs and increasing the E-mobility sector's contribution to the national GDP to 12.5 percent.

Uganda's E-mobility ecosystem is gradually evolving. GoU is one of the largest and most significant contributors towards the country's E-mobility growth and has invested nearly USD 100 million between FY2018/19 and FY2023/24 towards research, development and manufacturing (STI-OP, 2023). Notably, Kiira Motors Corporation (KMC), a state-owned enterprise, is championing value addition in Uganda's nascent automotive industry and is currently manufacturing electric buses (ibid). Additionally, the 3rd and 4th Bi-annual retreat resolutions of the Presidential CEO Forum (PCF) highlight Government's commitment to promote the use of clean energy through E-mobility, develop Human Capital and Institutional Capacity for E-mobility, establish an E-mobility tariff through the Ministry of Energy and Mineral Development (MEMD), and put in place a comprehensive facilitative fiscal package to promote value addition in the nascent E-mobility Industry. Similarly, private sector actors such as Zembo, Watu, Tugende and Asaak, among others, offer end-user financing for electric motorcycles (E-motorcycles). Similarly, the Uganda Development Bank (UDB) provides affordable funding to boost the E-mobility value chain, majorly in the manufacturing of electric buses (E-buses).

Beyond the environment, the shift to E-mobility presents Uganda with several economic benefits, including minimising dependence on imported fossil fuels and obsolete vehicles, which tend to drain the country's foreign exchange reserves and significantly widen the trade deficit. Additionally, prioritising the domestic E-mobility value chain can stimulate innovation and create green jobs in manufacturing, maintenance, and infrastructure development. Furthermore, reducing air pollution will significantly improve public health, lower healthcare costs, and decrease the prevalence of diseases associated with air pollution.

However, despite the potential benefits of adopting EVs, there is limited information regarding the readiness for large-scale adoption of E-mobility vehicles in Uganda. Therefore, this scoping study seeks to bridge this gap by providing evidence of the country's level of readiness to adopt EVs, and highlight demand-side and supply-side issues that pose a threat to the effective formulation and implementation of transportation and energy policies.

1.1 Study objectives

The overall objective of this study is to examine the readiness for large-scale adoption of E-mobility vehicles in Uganda. Specifically, this scoping study seeks to:

i) Assess the current state of EV infrastructure, logistics, and enabling environment supporting E-mobility sector growth in Uganda.
ii) Evaluate the level of public awareness, perceptions, and willingness to adopt EVs.
iii) Analyse the barriers, enablers, and potential risks associated with large-scale EV adoption.
iv) Synthesise lessons and best practices from countries that have successfully scaled up EV adoption and recommend strategies suitable for Uganda.

The rest of the paper is organised as follows: Section 2 provides the theoretical and empirical underpinnings of the research. Section 3 discusses the conceptual framework, data and methodology employed by the study. Section 4 presents the empirical findings and lastly, section 5 discusses the conclusions and provides actionable policy recommendations.

2.0 REVIEW OF RELATED LITERATURE

This section provides a review of both theoretical and empirical literature encompassing the adoption of EVs from a myriad of sources, including scholarly papers and policy documents. The review begins by discussing the theoretical foundations that provide insights into the determinants of large-scale adoption of EVs. It proceeds to synthesise findings from several empirical studies highlighting the factors affecting EV adoption across different contexts, ranging from a global perspective to the Ugandan context, while highlighting the research and knowledge gap that this study intends to fill.

2.1 Theoretical literature

This study is grounded in three theoretical underpinnings: the Theory of Planned Behaviour, the Value-Belief-Norm theory, and the Non-Cooperative Game theory. Each theory provides a unique lens through which EV adoption can be examined, emphasizing behavioural, value-driven, and strategic decision-making dimensions.

The Theory of Planned Behaviour (TPB), developed by Icek Ajzen (1985), posits that an individual's behaviour is primarily shaped by behavioural intentions, which are influenced by three factors: subjective norms (perceptions of social approval from family, friends, or peers), attitudes toward the behaviour (positive or negative evaluations), and perceived behavioural control (the perceived ease or difficulty of performing the behaviour). The TPB has been widely applied across fields such as health, education, and agriculture (Paul et al., 2022; Taylor, 2015; Tama et al., 2021). In relation to eco-friendly transport and EV adoption, the TPB has been used to explain how these psychological factors shape consumer decisions (Moons and De Pelsmacker, 2012; Schmalfuß et al., 2017; Wang et al., 2016). Researchers have further enhanced TPB's predictive power by incorporating variables such as demographic characteristics, perceived purchasing power, operational costs, driving range, and charging time (Franke and Krems, 2013; Jensen et al., 2013; Egbue and Long, 2012).

The Value-Belief-Norm (VBN) theory, developed by Stern et al. (1999), argues that individuals' pro-environmental actions are rooted in their underlying value orientations, which influence beliefs and personal norms. The theory distinguishes among egoistic, altruistic, and biospheric values (Hiratsuka et al., 2018). Egoistic individuals prioritise self-interest, while altruistic and biospheric individuals are motivated by concern for others and the environment, respectively. These values shape environmental beliefs, perceptions about environmental conditions and human impact, and personal norms, which are internal moral obligations to act responsibly. Empirical evidence supports the VBN theory in explaining pro-environmental behaviour, including willingness to pay higher taxes, energy conservation, and transport-related behavioural change (Ibtissem, 2010; Sahin, 2013; De Groot et al., 2008; Jakovcevic and Steg, 2013). In EV studies, VBN theory effectively explains motivations for EV adoption driven by environmental concern and moral responsibility (Lane and Potter, 2007; Egbue and Long, 2012).

Finally, the Non-Cooperative Game (NCG) theory, developed by John Nash, examines decision-making in situations where agents act independently without cooperation (Fujiwara-Greve, 2015). In the EV industry, this framework captures the dynamics among various stakeholders, manufacturers, battery suppliers, charging infrastructure providers, and consumers, each making strategic choices about pricing, technology, and production independently (Qiao, 2023). For instance, EV manufacturers compete for market share through pricing and innovation, while suppliers and charging operators pursue their interests without coordination, collectively shaping the market environment. The NCG theory has been applied to analyse decentralised electricity demand for EV charging (Ma et al., 2011), profit maximisation strategies for EV producers (Li et al., 2023), and pricing mechanisms (Zhao et al., 2020).

2.2 Empirical literature

The potential for EVs to contribute to countries' emission reduction targets has attracted considerable research attention, focusing on contextual, economic, technical, and socio-demographic factors influencing EV adoption. Egbue and Long (2012) examined barriers to EV adoption among students and workers in U.S technological universities, identifying perceived financial cost and performance as key factors affecting adoption. Similarly, Sang and Bekhet (2015) highlighted financial cost, social influences, environmental concerns, EV performance, government policy, and supporting infrastructure as significant determinants of EV adoption intentions among Malaysian private vehicle owners.

Sobiegalla et al. (2018) analysed a cross-country dataset of 2,806 respondents from Brazil, China, and Russia to explore macro and micro factors affecting EV purchase intentions. Their study revealed that the effects of age and education varied by country, while social networks emerged as a consistent and significant determinant of adoption across all three nations. Government policy initiatives had limited influence, implying that micro-level factors were more critical in shaping adoption intentions.

Considering India, Irfan and Ahmad (2021) examined the role of personality traits in predicting the intention to adopt EVs. Using a structural equation model on data from 624 respondents across seven major cities, the study found that consumer innovation in electric vehicles directly influenced willingness to buy EVs. Personality traits, specifically openness, conscientiousness, extraversion, and agreeableness, positively moderated this relationship, whereas neuroticism had a negative moderating effect.

Focusing on Indonesia, Maghfiroh et al., (2021) employed a multistakeholder perceptions approach using the Japanese technology readiness assessment to evaluate EV readiness following a 2019 presidential regulation on EV acceleration. Interviews with EV end-users, experts, start-up companies, and government officials indicated that stakeholders perceived EV technology as highly ready but identified bottlenecks in safety, commercialisation, and integration.

In Jordan, Hamed and Al-Eideh (2018) investigated technological barriers to EV adoption using an Electric Vehicle Demand Information Index (EVDII) and Poisson regression. Their findings showed that limited driving range, a shortage of charging stations, and inadequate EV repair facilities significantly reduced consumer demand. Likewise, studies by Kresnawan et al., (2022), Sylvia et al., (2022), Pamidimukkala et al., (2023), and Bankole et al., (2023) highlighted charging accessibility, driving range, environmental consciousness, and prior EV experience as critical determinants of EV adoption, while high purchase costs, insufficient charging infrastructure, range anxiety, and consumer resistance remained persistent obstacles.

Within the Africa continent, limited research has explored readiness and adoption intentions. Ackaah et al., (2022) applied an expanded version of the theory of planned behaviour to examine consumer intentions to purchase EVs in Ghana, finding that environmental concerns, societal norms, ease of use, and government awareness initiatives influenced adoption attitudes. Similarly, Yakeen et al., (2024) investigated motorists' readiness to adopt EVs in Lagos, Nigeria, revealing barriers such as limited access to charging infrastructure, high purchase prices, low awareness of EV benefits, and socio-cultural constraints.

In Uganda, only a few studies have attempted to address the issue of EV adoption readiness. Ssekakubo and Namukasa (2024), drawing on Ajzen's (2020) theory of planned behaviour, assessed how motorists' attitudes and cultural orientation influenced adoption decisions. Using data from 384 motorists, they found that individuals with positive environmental attitudes and collectivistic cultural values were more likely to adopt EVs. They recommended further investigation into factors beyond attitudes and culture, as well as an assessment of the technical readiness of Uganda's motor industry.

CISL (2022) reported that E-mobility offers Uganda a promising path to reducing greenhouse gas emissions, air pollution, and health risks, while also creating green jobs and reducing dependence on fossil fuels. However, major barriers remain, including inadequate charging infrastructure, high upfront costs, and weak policy frameworks. The study proposed that electric motorcycles could offer a cost-effective entry point due to their lower operational and maintenance expenses. CISL (2022) further recommended policies to accelerate the E-mobility transition, integration of E-mobility training into educational curricula, and coordination with other sustainable transport modes.

Overall, the reviewed literature highlights several knowledge gaps in Uganda's E-mobility landscape. There is limited understanding of how policy, legal, institutional, and regulatory frameworks interact to support EV uptake. Evidence on public awareness, perceptions, and willingness to adopt EVs remains scarce, as does information on potential risks associated with large-scale adoption. Additionally, there is a need to identify best practices and lessons from other developing countries that have successfully implemented large-scale EV programs. Consequently, this study aims to expand existing knowledge on Uganda's readiness to adopt EVs, considering both demand- and supply-side dimensions of the E-mobility ecosystem.

3.0 DATA AND METHODOLOGY

3.1 Conceptual framework

The study adopts a conceptual framework which illustrates how Uganda's readiness for large-scale adoption of EVs is determined by interlinked infrastructure, technological, socio-cultural, and economic factors operating within a wider policy, legal, and regulatory environment (See Figure 1). This framework is based on the scholarly writings of Hamed and Al-Eideh (2018); Clinton and Steinberg (2019); Pamidimukkala et al. (2023); Rapson and Muehlegger (2023); Higueras-Castillo et al., (2024); Burra et al., (2024).

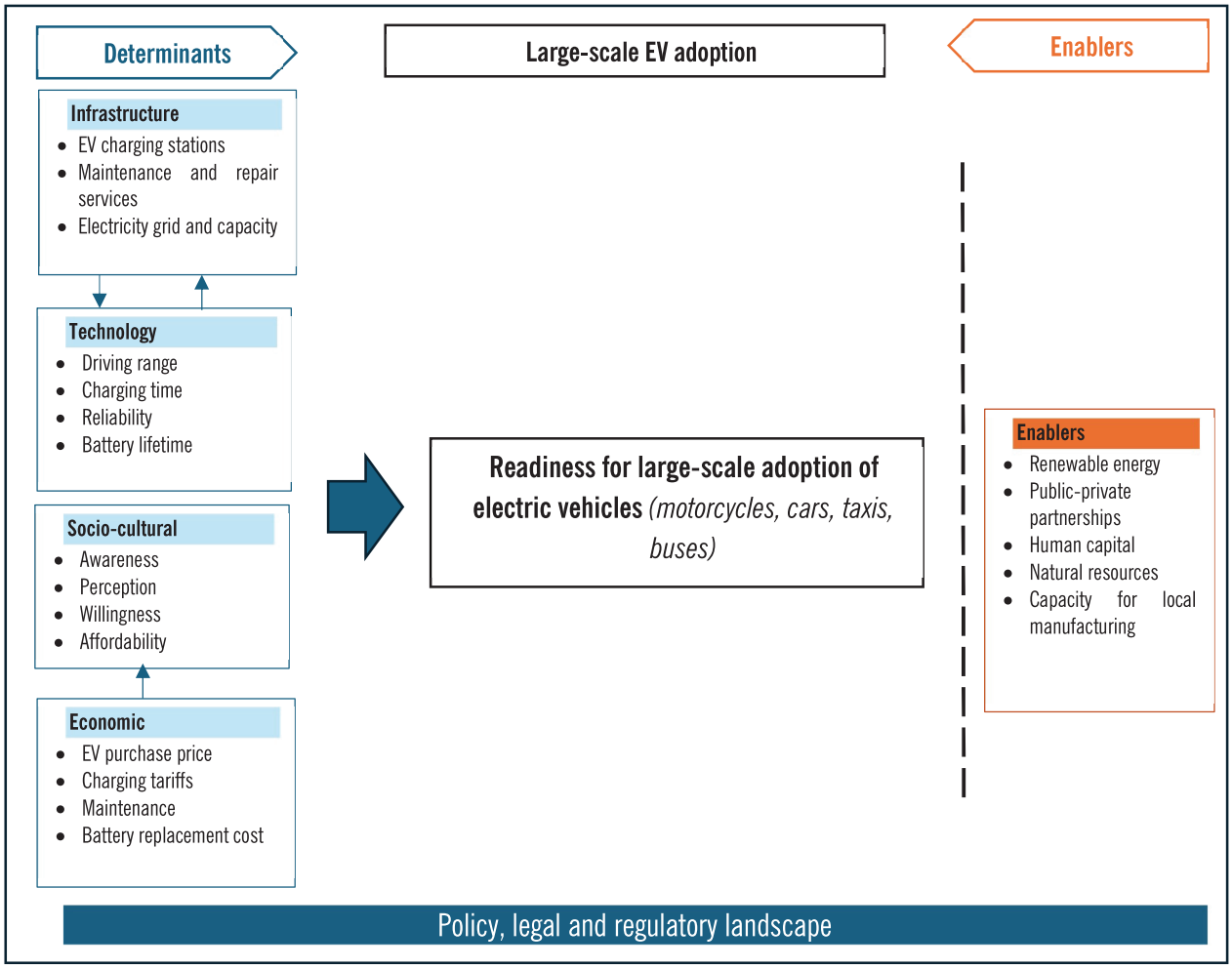
Considering the Infrastructure dimension, EV adoption readiness hinges significantly on the presence of a robust EV charging infrastructure, which is intrinsically linked to the reliability and accessibility of the electricity grid. The presence of readily available, easily accessible, and consistently reliable charging stations plays a pivotal role in shaping consumer confidence and influencing perceptions toward EVs, ultimately fostering increased EV ownership (Burra et al., 2024). Relatedly, whereas EVs have fewer moving parts than ICE vehicles, they still require regular maintenance and repairs for major components, including the battery, charging system, electric motor, and other electrical parts (Alanazi, 2023). Hence, EV maintenance and repair services are crucial for the readiness of large-scale EV adoption (Colella and Pons, 2024).

Technology-wise, EV adoption readiness is significantly influenced by several factors, including driving range, charging time, reliability, and battery lifetime (Egbue and Long, 2012; Hamed and Al-Eideh, 2018). More succinctly, a more extended driving range and battery lifespan are crucial factors in alleviating range anxiety and increasing EV adoption (Loengbudnark et al., 2022). Similarly, charging time is often cited as an influential factor affecting EV adoption readiness, with consumers favouring faster charging solutions to minimize downtime (Halbey et al., 2018). Safety concerns also play a role, as consumers are more likely to adopt EVs perceived as safe and reliable (Loengbudnark et al., 2022).

Focusing on the socio-cultural dimension, consumers' awareness, perceptions, and social norms play an essential role in enhancing the readiness to adopt EVs (Ackaah et al., 2022; Higueras-Castillo et al., 2024; Ssekakubo and Namukasa, 2024). In addition, economic determinants, including EV upfront purchase costs, charging tariffs, maintenance and battery replacement costs, significantly influence EV adoption (for a review, see: Kresnawan et al., 2022; Bankole et al., 2023; Yakeen et al., 2024).

Notably, these factors operate within the broader policy, legal, and regulatory framework landscape, which underpins and can either constrain or facilitate the large-scale transition to E-mobility. For instance, a policy framework that not only incentivises EV adoption, but also orchestrates the interplay between the EV adoption readiness dimensions. Relatedly, several factors may be leveraged upon as enhancers for EV adoption readiness in the context of Uganda. These include renewable energy, public-private partnerships, human capital, natural resources and capacity for local manufacturing.

Figure 1: Conceptual framework of EV adoption readiness



Source: Author's construction

3.2 Study methodology

To achieve the above-stated objectives, this study employed both quantitative and qualitative techniques as shown below:

i. The study commenced with an in-depth desk review of policy documents and related literature on the mobility sector in Uganda and other developing economies. The desk review aimed to provide insights into Uganda's e-mobility landscape and ecosystem, with a primary focus on EV infrastructure, logistics, and the enabling environment **(objective 1)**. Additionally, the existing plans, policies, strategies and regulatory frameworks were reviewed to assess how they enhance or impede the large-scale adoption of EVs in Uganda. Relatedly, a case study approach was adopted to identify the best practices and lessons from countries that have significantly increased the adoption of EVs (**objective 4**).

ii. To answer **objectives 2 and 3**, the study adopted a qualitative multi-stakeholder approach by consulting both demand-side actors (mainly motorists) and supply-side actors (including EV manufacturers, importers and E-mobility facility providers, among others). A qualitative mini survey, mostly consultations in the form of Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs), aimed at examining the levels of consumer awareness, perceptions, affordability and willingness to adopt EVs in Uganda. Additionally, the survey aimed to identify existing gaps, barriers and opportunities for large-scale adoption of EVs, as well as the potential risks that may arise.

Similarly, the study engaged with various stakeholders in the institutional, legislative, and regulatory environments that directly interface with and influence the E-mobility sector in Uganda. Qualitative data transcription and thematic analysis were employed as analytical techniques to provide insights into the country's level of readiness for a large-scale EV adoption.

iii. Quantitatively, the study adopted a three-fold quantitative approach to answer objectives **2 and 3**. Firstly, the study employed a descriptive and trend analytical approach to explore data on Uganda's mobility and renewable energy sectors, providing insights into the country's E-mobility landscape. The study used secondary data from several sources, including the Africa Energy Portal, Electricity Regulatory Authority (ERA), Energy for Growth Hub, Global EV Data Explorer, MoWT, URA, STI-OP, Uganda Electric Mobility Association (UEMA) and the Global Burden of Disease Database.

Secondly, following Egbue and Long (2012); Hamed and Al-Eideh (2018); Michael et al., (2022); and Pamidimukkala et al., (2023), the study administered three (3) surveys, including a ICE motorcyclists (motorcycle taxi–boda-boda) survey, E-motorcyclists survey and a general consumer survey (self-administered online). These surveys sought to obtain the consumer's level of awareness, perceptions, affordability and willingness to adopt EVs in Uganda. Lastly, the study used the Africa EV Readiness and Impact Index[2] Data on 48 African countries to analyse the preparedness to adopt EVs at scale (Mutiso, 2024). The study employed descriptive and dominance analysis of relative importance (Budescu, 1993), as analytical techniques to explore the Africa EV Readiness data (See appendix B.2 for a detailed methodology description).

3.3 Survey and sampling

The study employed both quantitative and qualitative approaches in its sampling, targeting different stakeholder groups relevant to E-mobility. The strategy was purposive and designed to gather a comprehensive understanding of the EV ecosystem from both the demand and supply sides. Overall, the sampling strategy was designed to investigate Uganda's readiness for EV adoption by engaging those most likely to influence, experience, or be affected by the transition to E-mobility.

3.3.1 Quantitative approach

This approach included three (3) surveys: ICE motorcyclists (motorcycle taxi), E-motorcyclists and a General Consumer Survey (See Figure A.3 for a detailed map). The respondents' selection and administration of the survey tools are detailed below:

ICE motorcyclists

For the ICE motorcyclists, the study involved 90 male participants. This all-male sample reflects the current gender dynamics within the two-wheeler motorcycle subsector in Uganda, which is heavily male dominated. Notably, as shown in Table 1, most participants were in the 25–29 age bracket (26.67 percent), followed by the 30–34 age bracket (22.22 percent). The ICE motorcyclists were purposively recruited through *"boda-boda"* stage chairpersons in locations across Kampala, Wakiso, and Jinja. A quantitative survey tool was administered to the ICE motorcyclists at their respective operational *"boda-boda"* stages, given the mobile nature of their work. This survey gathered information on awareness, perceptions, willingness to adopt EVs, and barriers to adoption, among others.

E-motorcyclists

The E-motorcycle respondents comprised a smaller group of 42 individuals, 98 percent of whom were male, with only one female respondent. Their age distribution followed a similar pattern to that of the ICE group, with most falling in the 25–29 age range (31 percent), followed by the 30–34 age range (24 percent) as shown in Table 1. These participants were primarily accessed through EV battery swap stations in Kampala and Wakiso, such as Kamwokya, Ntinda, Nansana, and Kyengera. Overall, the E-motorcycle respondents are largely urban-based, reflecting the current EV rollout patterns and the availability of infrastructure. The survey tool, specifically developed for this segment, covered perceptions, EV driving experience and challenges experienced, among others.

2 The Africa EV Readiness and Impact Index is the first comprehensive assessment of the drivers and benefits of EV adoption across the African continent. This index excludes 6 African countries - Djibouti, Equatorial Guinea, Eritrea, Libya, Somalia, and South Sudan - due to data limitations. Link to dataset: https://energyforgrowth.org/article/africa-ev-readiness-and-impact-index-2024-desktop/

General consumer survey

Under this category, a broader and more diverse group of 346 respondents was reached through an online questionnaire, targeting the public participants aged 18 and above in Uganda. The respondents self-selected to participate in the online survey, from whom perspectives on awareness, perceptions, EV adoption willingness and barriers to adoption data were collected. Table 1 shows the gender split of the respondents, that is, 60.4 percent were male, and 39.6 percent were female, and a significant majority (83.82 percent) living in urban areas. Geographically, the online survey sample was heavily skewed to the Central region, which accounted for 73.7 percent of all respondents. Notably, Kampala alone contributed 184 respondents (53.18 percent), followed by Wakiso with 53 respondents (15.32 percent). This strong representation from urban and central districts reflects areas where awareness, infrastructure, and activity around E-mobility are most developed.

3.3.2 Qualitative approach

Additionally, the study incorporated FGDs and KIIs to gather deeper insights (see Table A.4 and A.5 in the appendix). FGDs were conducted with motorcycle operators (both ICE and E-motorcycles), as well as taxi drivers, across Kampala, Wakiso, and Jinja. A total of 24 KIIs were held with stakeholders knowledgeable about the EV sector. These included officials from government agencies (including KMC, PCF, MEMD, MoWT, NEMA, ERA, STI - OP and URA), civil society and private sector actors (including EV garage owners, mobility solution providers like Zembo, Freedom EV and GOGO Electric). These qualitative engagements complemented the survey data and contextualised the challenges, opportunities, and stakeholder readiness.

Table 1: Socio-demographic characteristics of the survey respondents

	Demographic attribute	Count	Percent
General Survey *(N = 346)*			
Gender	Female	137	39.6
	Male	209	60.4
Age	18 - 24	31	9.0
	25 - 29	96	27.8
	30 - 34	104	30.1
	35 - 39	59	17.1
	40 - 44	30	8.7
	45 - 49	15	4.3
	50 +	11	3.2
Region	Central	255	73.7
	Eastern	36	10.4
	Northern	31	9.0
	Western	24	6.9
Residence	Urban	290	83.8
	Rural	56	16.2
Vehicle ownership	No	158	45.7
	Yes	188	54.3
Driving License ownership	No	105	30.4
	Yes	241	69.7
ICE Motorcyclists *(N = 90)*			
Gender	Male	90	100
	Female	0	0
Age	18 - 24	16	17.8
	25 - 29	24	26.7
	30 - 34	20	22.2
	35 - 39	10	11.1
	40 - 44	11	12.2
	45 - 49	7	7.8
	50 +	2	2.2
EV Motorcyclists *(N = 42)*			
Gender	Male	41	98
	Female	1	2
Age	18 - 24	8	19
	25 - 29	13	31
	30 - 34	10	24
	35 - 39	4	10
	40 - 44	5	12
	45 - 49	1	2
	50 +	1	2

Source: EPRC EV Survey (2025)

4.0 STUDY FINDINGS

This section presents and discusses the study's findings. The study commences by providing an overview of Uganda's E-mobility landscape and broader ecosystem. Secondly, this section examines the policy, legal, institutional and regulatory frameworks that support large-scale EV adoption. Thirdly, it offers insights into awareness levels, perceptions, and willingness to adopt EVs, and examines the barriers, opportunities, and potential risks of large-scale EV adoption. Lastly, it provides insight into the readiness to adopt EVs (and key determinants) within the African continent, while presenting case studies of EV adoption in other countries within Africa.

4.1 Uganda's E-mobility landscape

This subsection gives an overview of Uganda's E-mobility landscape, specifically the E-mobility ecosystem, National E-Mobility Strategy, E-mobility uptake and imports. This overview provides insight into the collaborative framework driving the country's sustainable transport future through E-mobility.

4.1.1 Uganda's E-mobility ecosystem

Uganda's E-mobility ecosystem is a collaborative network of over 80 players working across the E-mobility value chain, coordinated by the STI Secretariat. This comprehensive ecosystem is structured into six (6) key stakeholder clusters: i) research and development, engineering and manufacturing; ii) energy; iii) transport planning, management, operations, distribution and support; iv) value chain financing; v) policy, regulations and standards; and vi) digital infrastructure. Figure 2 provides an overview of the dimensions in Uganda's E-Mobility ecosystem, highlighting the various sectors, stakeholders, and service providers critical to transitioning the country's transport system to E-mobility. Together, these actors form an integrated framework that is steadily shaping a more sustainable, efficient, and inclusive transport future for Uganda.

4.1.2 What is Uganda's E-Mobility strategy?

In 2023, Uganda adopted a National E-mobility Strategy, which aims to fully transition Uganda's public transport and motorcycle sectors to E-mobility by 2030, with a complete transition for passenger vehicle sales by 2040 STI-OP, 2023. It seeks to establish a strong, self-sustaining and competitive E-mobility ecosystem that will not only reduce transport-related GHG emissions by 25 percent by 2040 but also spur local manufacturing and domestication of the E-mobility value chain (65 percent local inputs). In addition, the strategy strives to generate over 500,000 green jobs, lower transport-based emissions by over 25 percent, and increase the E-mobility sector's contribution to the national GDP to 12.5 percent by 2040 (ibid). More specifically, it aims to:

i) Increase local manufacturing and supply of electric buses, motorcycles and vehicles with associated parts, components and systems.
ii) Promote local manufacturing of EV batteries and battery energy storage systems for domestic, commercial, and industrial applications.
iii) Electrify public transport systems based on electric buses, motorcycles and trains.
iv) Establish EV Charging Infrastructure supporting battery swapping, contact charging, wireless charging, e-Trams, and any other emerging charging technologies.
v) Develop domestic skills and capabilities for the E-mobility value chain.
vi) Increase EV uptake, including electrification of the Government Fleet.
vii) Develop standards, regulations, guidelines, and a code of practice for the E-mobility industry.

Figure 2: Dimensions of Uganda's E-mobility ecosystem

Source: National E-Mobility Strategy (2023)

The successful implementation of this strategy hinges on strong collaboration and partnership between the government and other E-mobility actors. However, more importantly, the role of financing in supporting investments should not be underestimated. For instance, the strategy estimates that a total investment of approximately USD 1.74 billion between FY2023/24 and FY2027/28 is required to achieve the bold move towards a complete transition to E-mobility by 2040 (ibid).

4.1.3 E-Mobility manufacturing, charging infrastructure and market uptake

Manufacturing

Uganda's EV manufacturing sector has expanded significantly in recent years. Uganda's combined EV production capacity increased from approximately 20,000 units annually in 2024 to about 79,000 units annually in 2025, largely driven by the rapid scale-up of E-motorcycle production facilities (STI-OP, 2026). In 2025 alone, 20,032 EV units were produced, up from 3,283 units in 2024, representing a six-fold increase. This brought the cumulative number of EVs produced between 2021 and 2025 to 25,464 units (with 0.1 percent are electric buses, 94 percent E-motorcycles, and 5.9 percent E-bicycles), and local content reaching 40 percent (ibid). During the same period, Uganda's combined installed production capacity for Lithium-Ion battery packs increased from 20 MWh to 55 MWh, largely for micromobility use cases.

The Uganda E-mobility Outlook Report (2025) highlights that following the ramp-up of operations at the Kiira Vehicle Plant (KVP) in 2020, KMC installed a production capacity of 2,500 vehicles annually, making it the largest and most capable

bus manufacturing facility on the African continent. In 2025 alone, KMC produced 10 additional E-buses, bringing the total number of E-buses manufactured in the country to 37 units (ibid). In addition, Uganda was assigned the World Manufacturer Identifier, with KMC accredited as the first manufacturer to issue Vehicle Identification Numbers (VIN).

E-motorcycle production experienced remarkable growth, increasing seven-fold from 2,770 units in 2024 to 19,451 units in 2025. This growth occurred alongside an increase in the combined installed production capacity for E-motorcycles from approximately 25,000 units annually in 2024 to 70,000 units annually in 2025 (STI-OP, 2026). Manufacturers supporting this growth include Spiro, Zembo, Gogo Electric, Mocco, and Redvers. Similarly, E-bicycle production continued its rapid growth trajectory, rising from 490 units in 2024 to 571 units in 2025, with the overall production capacity for E-bicycles increasing from 3,320 units to 5,160 units annually, in the same period (ibid). This growth was mainly driven by companies such as Karaa, eBee, Africrooze, and Harakka.

Charging infrastructure

According to the Uganda E-mobility Outlook Report (2025), Uganda's charging infrastructure has continued to expand in recent years, supported by both public and private sector actors, including KMC, MEMD, Judiciary, TotalEnergies, and City Oil, among others. Uganda's DC fast charging network increased from 14 chargers in 2024 to 18 DC fast chargers in 2025 (STI-OP, 2026). These charging stations are located across key urban and transport corridors, including GKMA, Iganga, Jinja, and Nakasongola, with new installations established in Mbarara, Butebo, and at Entebbe International Airport.

Similarly, Uganda's battery swapping infrastructure for E-motorcycles experienced substantial growth, increasing four-fold from 134 to 541 stations between 2024 and 2025 (STI-OP, 2026). The geographic reach of this network expansion was equally significant, spreading to over 108 districts representing a national coverage ratio of nearly 80 percent in 2025 (ibid). This expansion has continued to improve uptime and operational flexibility for electric two-wheeler operators (boda-bodas) across urban and peri-urban areas.

Market uptake

In the recent years, Uganda's E-mobility market has expanded significantly. Uganda's stock of fully electric and hybrid EVs (excluding two and three-wheelers) surged from 1,127 units (2024) to 2,343 units (2025). Between 2024 and 2025, the number of registered FEVs grew from 93 units to 173 units, while PHEVs increased from 16 to 28 units. Notably, HEVs remained the dominant category, accounting for 91.2 percent of the total country's EV stock and more than doubling from 1,018 units (2024) to 2,140 units (2025).

Regarding E-motorcycles and three-wheelers EVs, the electric fleet continued to expand rapidly, building on the strong growth recorded in recent years. Overall, when including two and three-wheelers, FEVs, PHEVs, and HEVs represented 1.7 percent of the total vehicles registered in 2025, up from 0.93 percent in 2024. These trends underscore the continued growth of Uganda's E-mobility sector and highlight the significant opportunities for further expansion towards a cleaner and more sustainable transport system.

4.1.4 E-mobility and savings

At the country level, E-mobility presents the opportunity to save on foreign currency which would otherwise be spent on importing fossil fuels and other oil products required to power ICE vehicles. Uganda's Energy Transition Plan (2023) not only reveals that all oil products used in Uganda are imported, but it also stresses that fuel dependence has significantly increased, with per capita imports surging from 145,000 barrels per million people in 2000 to nearly 320,000 barrels per million people in 2021. This highlights the country's increasing dependency on fossil fuels (mainly petrol and diesel) and other oil products, thus reinforcing the need to transition to E-mobility. Similarly, UEMA (2024) suggests that E-motorcycles reduced petrol consumption in Uganda by over three (3) million Liters, saving nearly USD 3.9 million in 2024 alone.

Using the micro-perspective, the National E-mobility strategy (2023) posits that on average, an ICE vehicle consumes nearly 10 Liters per 100 km, burning fuel worth USD 2,400 annually. On the other hand, EVs on average consume electricity worth USD 400 every year, coupled with lower maintenance costs due to fewer moving parts in comparison to an ICE vehicle (with over 2,000 moving parts and components). Considering buses, the overall

Table 2: Comparison between ICE (diesel) and electric buses

Indicator	ICE Bus	E-Bus
Purchase Price (USD)	160,000	360,000
Maintenance Costs (USD per annum)	10,186	5,785
Average Cost of Fuel/Electricity Unit (UGX)	5,100	386.3
Fuel/Electricity Consumption per 100 km	45 Liters	100 kWh
Consumption Cost per 100 km (UGX)	229,500	38,630

Source: STI-OP (2023)

cost of ownership of an E-bus (including the purchasing price, operation and maintenance costs) is 60 percent of its counterpart diesel-powered bus (STI-OP, 2023).

For a closer look, Table 2 highlights the cost comparison between diesel-powered buses and E-buses. Despite the high upfront acquisition cost, E-buses have on average lower maintenance costs (USD 5,785 per annum) in comparison to their diesel equivalent (USD 10,186 per annum). In terms of consumption cost for every 100 km covered, E-buses consume on average a significantly low cost (UGX 38,630 per 100 km covered) relative to its diesel-combustion counterpart (UGX 229,500 per 100 km covered).

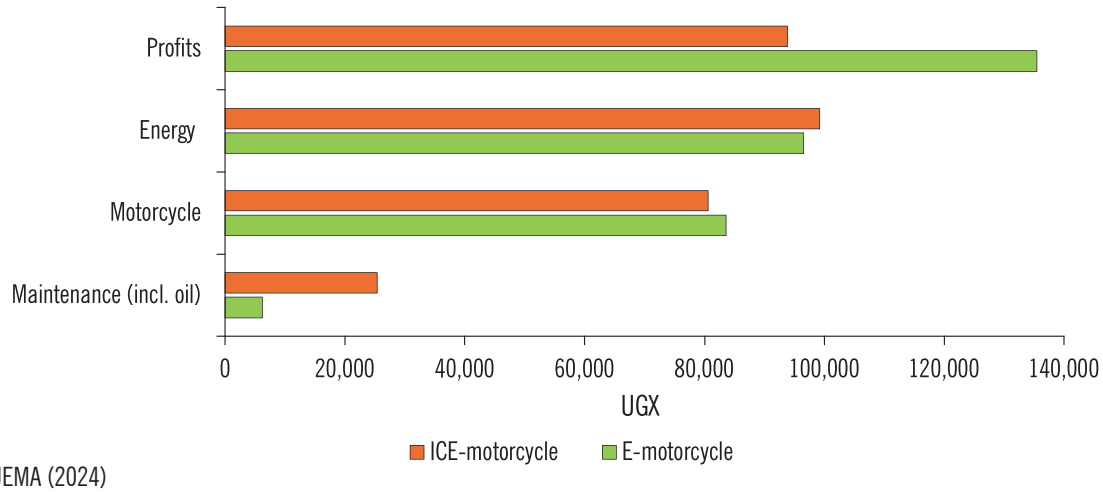
Similarly, E-motorcycles presents motorists an opportunity to save on operating and maintenance costs. Figure 3 reveals that on a weekly basis, E-motorcyclists earn higher profits (UGX 135,445) in comparison to ICE motorcyclists (UGX 93,855) on average. In addition, E-motorcyclists on average incur minimal maintenance costs (UGX 6,182) relative to their petrol-powered counterparts (UGX 25,329) weekly.

4.2 Policy, legal, institutional and regulatory frameworks supporting EV adoption

The existing legal, institutional, and regulatory framework is sufficiently robust to support Uganda's E-mobility trajectory. As shown in Figure 4, Uganda has a comprehensive and multifaceted framework of policies, laws, strategies, guidelines and implementation plans that directly or indirectly contribute to the growth of the E-mobility sector. This framework is based on the broader Africa Agenda (2063), the EAC Vision (2050), and Uganda's commitments under the Nationally Determined Contribution (NDC) (2022), which altogether provide a basis for adopting forward-looking policies, supportive laws, institutional initiatives, and environmental regulations within the mobility sector.

From the onset, the 1995 Constitution of Uganda, Vision 2040 (and its subsequent development plans, mainly NDPIII and NDPIV), and the National Climate Change Policy (2015), outline the foundational vision and guiding principles for sustainable transport and low-carbon development in

Figure 3: Average weekly earnings and expenses of ICE and E-motorcycles

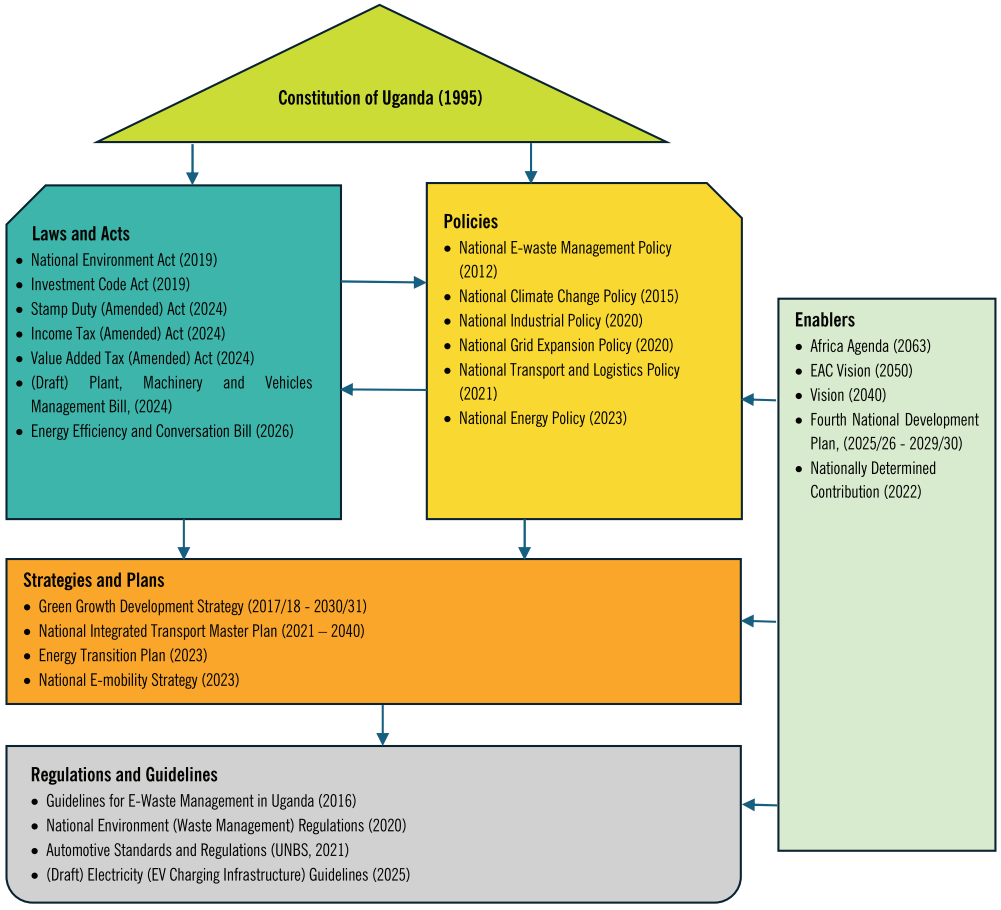


Source: UEMA (2024)

Uganda. For instance, Vision 2040 lays the groundwork for the establishment of clean, inclusive, and efficient sustainable mobility systems and the adoption of an eco-friendly transport sector. Notably, the government of Uganda (through KMC) established the Mobility Industrial and Technology Park (MITP) as one of the strategic programme projects in the NDPIII to support a wide range of investments in motor vehicle parts manufacturing, vehicle testing and automotive technology innovation enterprises.

Similarly, the NDPIV reaffirms the government's commitment to establishing a clean, inclusive, and efficient sustainable mobility system, with a strong focus on introducing E-mobility incentives, expanding reliable power infrastructure, integrating EV charging stations into multimodal transport networks, and aligning transport decarbonisation with climate targets. In addition, NDPIV prioritises local EV manufacturing capacity through developing an automotive industrial park development, scaling up pilot projects, modernising the grid for EV services, streamlining regulations, and mobilising innovative financing and public-private partnerships to promote a nationwide transition to E-mobility. Complementary strategies such as the National E-mobility Strategy (2023), the National Transport and Logistics Policy (2021), the National Integrated Transport Master Plan (2021 – 2040) and the Green Growth Development Strategy (2017/18–2030/31) have progressively translated these high-level policy aspirations into focused, actionable EV goals, incentives, and infrastructure development plans. Together, this progression reflects an evolving EV policy landscape that increasingly appreciates the complexities of the E-mobility sector.

Figure 4: Policies, laws, plans and strategies supporting the E-mobility in Uganda



Source: Author's own construction

Most recently, Uganda has adopted several fiscal incentives and investment facilitation measures to accelerate E-mobility growth. Key among which include the Stamp Duty (Amendment) Act 2024, Income Tax (Amendment) Act 2024 and Value Added Tax (Amendment) Act, 2024 (GoU, 2023). They mainly zero-rate VAT, import duty, and withholding tax on; i) original equipment manufacturer vehicle parts, components (production parts), EV chargers, EV batteries, and materials imported for motor vehicle production by registered mobility value chain actors; and ii) plant machinery, tools and equipment and all industrial replacement spare parts imported by registered E-mobility value chain actors. Additionally, the provisions grant income tax holidays to registered mobility industry value chain actors. While customs tariff amendments in FY 2023/24 initially signaled reduced import duties for EVs, most of these broad exemptions expired, with the government reinstating a 25 percent import duty on EVs imported beyond the FY 2024/25.

Additionally, a policy and regulatory framework to establish a robust charging and energy infrastructure in Uganda is in place. Key provisions include the National Grid Expansion Policy (2020), Energy Transition Plan (2023), and the National Energy Policy (2023), which lay a foundation for scaling up reliable, accessible, and sustainable energy to support E-mobility, expand the national grid network, and guide the establishment of EV charging infrastructure across the country. In addition, the Energy Efficiency and Conservation Bill (2026) and draft Electricity (EV Charging Infrastructure) Guidelines (2025) provide strong backing and incentives for EV adoption and the development of charging infrastructure. Relatedly, the UNBS Automotive Standards and Regulations (2021) and draft Plant, Machinery and Vehicles Management Bill (2024) seek to provide a coordinated framework for undertaking inspections, issuing worthiness certificates, enforcing safety standards, and implementing emissions and pollution control measures, with provisions covering the inspection and safety of EVs as well.

Notably, Uganda has established multiple frameworks to guide electronic waste (E-waste) management, including the National E-waste Management Policy (2012), Guidelines for E-waste Management in Uganda (2016) and the National Environment (Waste Management) Regulations (2020). The 2020 Regulations explicitly restrict E-waste dumping, impose Extended Producer Responsibility (EPR) obligations for EV batteries, and empower local governments to oversee E-waste collection. These provisions led to the commissioning of the national E-waste management facility in 2021. Additionally, the National E-Mobility Strategy (2023) promotes the development of local capacity for battery assembly recycling and responsible disposal to manage the growing volume of EV-related waste efficiently.

In summary, the current legal, institutional, and regulatory framework is substantially sufficient to facilitate Uganda's E-mobility transition. However, despite these provisions, a major concern remains regarding how the policies are being implemented and coordinated to support the expansion of the E-mobility sector. Additionally, it is essential to conduct an assessment on the actual costs and benefits of the transition and the feasibility of the incentives before they are implemented (CISL, 2022). In addition, several key legal instruments, including the Plant, Machinery and Vehicles Management Bill, (2024), and EV Charging Infrastructure Guidelines (2025), are still in draft form, delaying regulatory certainty. Also, the incentives primarily focus on supply-side actors, with minimal demand-side measures to make EVs affordable for average consumers, who continue to face high upfront costs in the absence of substantial import duty waivers, VAT exemptions, or financing schemes. Moreover, while E-waste management protocols and regulations such as EPR and anti-dumping are in place, public awareness, adherence, and compliance remain limited. It is important to increase the capacity for re-use and recycling of E-waste, set up E-waste collection centers, and raise awareness on E-waste management (CISL, 2022). Addressing these gaps is crucial to ensure the safe, equitable, and sustainable development of Uganda's E-mobility sector.

4.2.1 Fourth National Development Plan (NDPIV) and E-mobility

Uganda's NDP IV sets out an ambitious roadmap for sustainable socio-economic transformation, driven by sustainable industrialization, inclusive growth, employment creation and strategic infrastructure development. Although the plan itself is broad in scope, the goals of modernizing transport, deepening industrialization, expanding energy access and strengthening technological innovation create fertile ground for embedding E-mobility as a key pillar of Uganda's transition to cleaner, more efficient and globally competitive mobility solutions. Notably, NDP IV's Innovation, Technology Development, and Transfer (ITDT) programme highlights several interventions that GoU is prioritizing to

boost E-mobility readiness and growth in Uganda as shown in Table 3 below:

Table 3: NDP IV (ITDT Programme) interventions relevant for E-Mobility growth

Objective	E-mobility Specific Interventions
1. Increase the requisite STI Infrastructure.	• Establish and operationalise the Eco-automotive industrial and technology park in Kayunga. • Establish materials research facilities, including packaging, semiconductor and microelectronics facilities. • Establish and provide STI specialized common user facilities. • Expand the capacity of STI incubation on E-mobility. • Establish mobility infrastructure, including EV charging infrastructure, E-Bus transit hubs, and distribution centres.
2. Increase the stock of specialized STI human capital.	• Accelerate conversion of Ugandan workforce through specialized industrial STI capacity development programs in E-mobility. • Update the curriculum and support STI Industrial human capital development in E-mobility.
3. Develop an STI ecosystem for technology development, transfer, industrialization, and commercialization.	• Support technology development, transfer, industrialization and commercialization in the prioritized industrial value chains within the mobility industry. • Provide incubation services for STI enterprises across the E-mobility eco-system. • Secure offtake for locally developed STI E-mobility products. • Strengthen the intellectual property value chain management. • Mobilise innovative financing for the idea-to-market journey.
4. Strengthen the policy, legal, institutional, and coordination framework facilitative of the STI idea-to-market journey.	• Develop and enforce policies, laws, and regulations that govern and facilitate the national STI system. • Develop and enforce standards and guidelines for the E-mobility industrial value chains. • Strengthen the STI fund management system for enhanced transparency and accountability. • Improve the planning, supervision, monitoring, evaluation, coordination and human resource capacity of the ITDT Programme.

Source: Author's compilation using NDP IV (2025/26 - 2029/30)

4.3 Awareness, perceptions and willingness to adopt EVs in Uganda

4.3.1 Level of awareness regarding EVs

The level of consumer awareness is crucial for the adoption of EVs, particularly in emerging markets like Uganda. According to Egbue and Long (2012), failing to recognise and address consumer-related issues (including EV awareness and perception) may lead to persistently low acceptance of EVs, even once technical barriers are overcome. This is especially important in contexts where EV technology remains seen as unfamiliar or untested, as consumers often resist adopting innovations they do not fully understand or trust. Information asymmetry continues to be a significant issue, as one KII expressed:

> *"There's a lot of misinformation. People think different things about E-mobility, so you want to really raise awareness, especially about the benefits of E-mobility, not just on the environmental side of things." (KII, UEMA 2025)*

Figure 5 illustrates respondents' awareness levels of EVs, broken down by residence, gender, region, age, and vehicle ownership. Overall, the results reveal that 42 percent of respondents reported being fully aware of EVs, while 50.3 percent were somewhat aware and only 7.7 percent were not aware. Amongst urban respondents, the majority were somewhat aware (48.2 percent) compared to 43.6 percent, who were fully aware. Regarding rural respondents, the majority were somewhat aware (60.7 percent), compared to 33.9 percent who were fully aware. Urban respondents

exhibit a higher level of awareness which is expected given the higher visibility of EVs and EV infrastructure in urban centres, as corroborated by a KII:

> *"In the city, there's more awareness of EVs, and people are more familiar with the technology since they see it in action. In rural areas, where awareness is much lower, many people don't know about EVs because companies haven't expanded to those regions." (KII, STRATs 2025)*

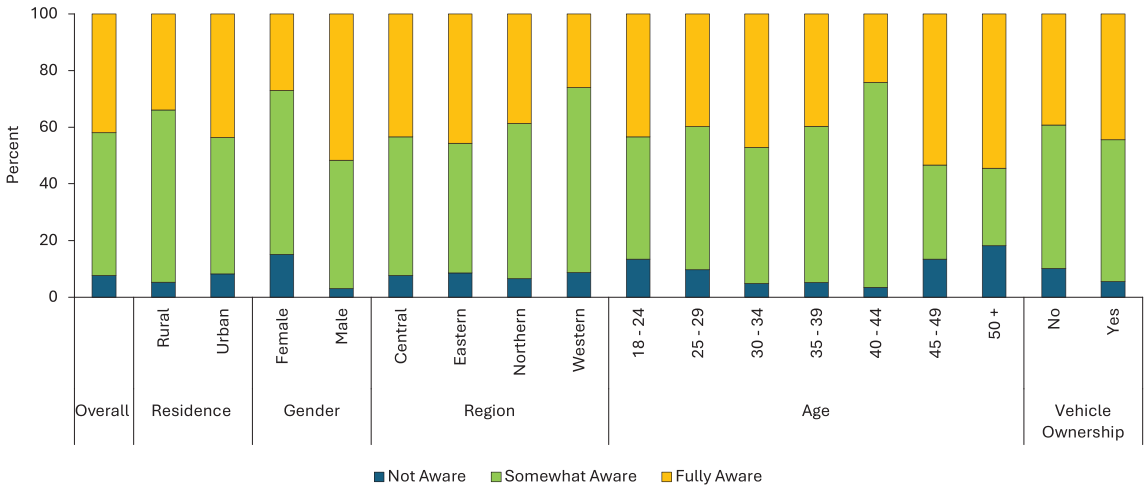
Gender wise, most of the male respondents (51.7 percent) were fully aware, while most of the female respondents (57.9 percent) were somewhat aware. Regionally, more respondents from the Eastern and Central regions reported full awareness (45.7 percent and 43.4 percent, respectively). However, across all regions, the number of individuals who are somewhat aware is generally significant, especially in the Northern (54.8 percent) and Western (65.2 percent) regions. At least 40 percent of respondents aged between 18 and 34 are fully aware of EVs. Among those aged 45 and above, over 50 percent are fully aware. Lastly, among respondents who owned a vehicle, 50 percent are somewhat aware compared to 44.4 percent who were fully aware. Similarly, among non-vehicle owners, 50.6 percent were somewhat aware. Across all clusters, respondents who reported unawareness account for a small proportion.

These findings emphasise the need for targeted information campaigns to raise EV awareness, especially in rural areas, among women, younger age groups, and in the Northern and Western regions. These are the clusters that show the highest levels of information asymmetry regarding EVs. Consequently, tailoring awareness campaigns to different linguistic contexts and communication channels will ensure that EV-related information reaches diverse community segments (Kumar and Sinha, 2023; AfEMA and UNEP, 2024). Overall, increasing awareness through customised, inclusive, and region-specific strategies will be essential for supporting large-scale EV adoption.

Key informants highlighted the vital importance of public awareness and consumer acceptance in advancing E-mobility. They called for a structured public education programme to emphasise the benefits of electric vehicles (EVs) and encourage their adoption. To tackle low uptake, especially in rural areas, they suggested targeted sensitisation campaigns and partnerships with local leaders and influencers to build trust and promote the integration of EVs into daily life.

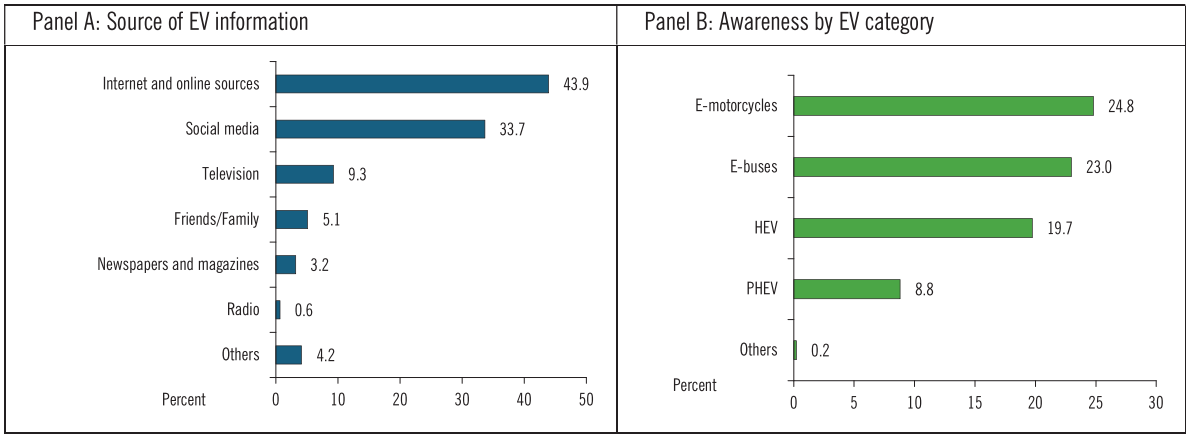
Regarding primary sources through which respondents obtained information about EVs, Figure 6 Panel A shows that the most frequently cited sources were internet and online sources (43.9 percent) and social media (33.7 percent).

Figure 5: Respondent's level of EV awareness



Source: EPRC EV general survey (2025)

Figure 6: EV awareness category and information source



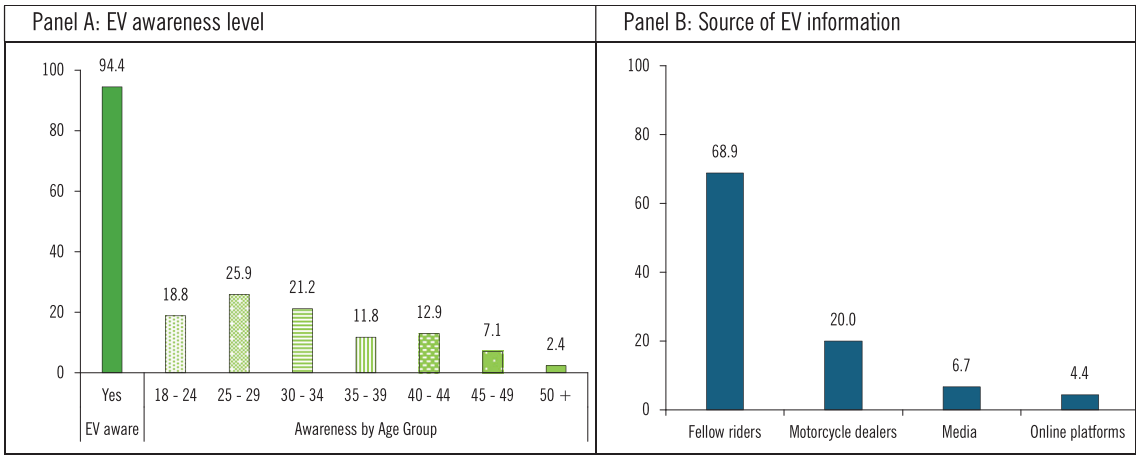
This result indicates a strong reliance on digital channels for EV-related information. Traditional media played a much smaller role, with only 9.3 percent of respondents mentioning television, 3.2 percent citing newspapers and magazines, and just 0.6 percent referring to radio. These findings emphasise the importance of digital platforms in shaping public awareness about EVs and suggest that education and awareness campaigns should prioritise online and social media strategies for a more effective and broader reach.

Relatedly, Figure 6 Panel B highlights the type of EVs that respondents were most aware of. E-motorcycles ranked highest, with 24.8 percent of respondents indicating awareness, followed closely by E-buses at 23 percent. These findings reveal that public awareness is concentrated around more common and visible EV types on the roads, mainly E-motorcycles and E-buses. Therefore, there is a need for more public displays and demonstrations in areas where public awareness of EVs is low, including the Northern and Western regions.

Awareness among ICE motorcyclists

Focusing on ICE motorcyclists, Figure 7 Panel A shows that a vast majority of respondents (94.4 percent) reported being aware of E-motorcycles, with the highest awareness among the 25–29 age group (25.9 percent), followed by the 30–34 age group (21.2 percent) and 18–24 age group (18.8 percent). This implies that younger ICE riders are significantly more familiar with E-motorcycles, pointing to a generational gap in EV awareness and knowledge. Future education and awareness initiatives may benefit from targeting older age groups to promote broader acceptance and potential adoption of E-motorcycles across all demographics. Notably,

Figure 7: Level of awareness on E-motorcycles by ICE riders



Source: EPRC ICE motorcyclist survey (2025)

awareness does not seem to be the issue but rather the perceived risks of adoption among ICE riders. Respondents in FGD highlighted that:

> *"We do not have an E-motorcycle at this stage yet, so we don't know much about them firsthand. We only hear about them, but we don't understand them as well as ICE motorcycles. With traditional motorcycles, if there's a problem, we know how to fix it immediately. But with EVs, we are unsure how to handle issues when they arise." (FGD, Materwood Stage – Kira, 2025)*

Similarly, Figure 7 Panel B reveals that primary sources of information on E-motorcycles among ICE riders are fellow riders (68.9 percent), followed by motorcycle dealers (20 percent). This result suggests that peer networks and motorcycle dealers play a critical role in increasing awareness of E-motorcycles within the rider community. Focus group participants shared limited knowledge about electric motorcycles but noted perceived advantages such as higher carrying capacity and lower maintenance costs, which contribute to savings. In some areas like Jinja, awareness campaigns by EV dealers, including hands-on demonstrations and test rides, have helped increase understanding and interest in adopting electric motorcycles.

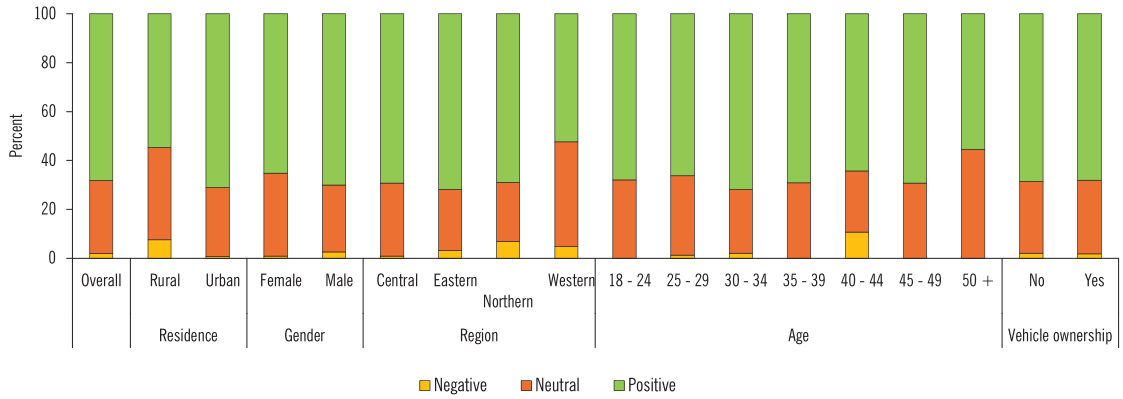
4.3.2 Perception on EVs

Figure 8 illustrates public sentiment towards EV adoption across various demographic and socio-economic groups. Overall, a large majority (68.3 percent) of respondents expressed a positive view on EV adoption. Additionally, 29.8 percent reported a neutral perception, while 2 percent held a negative perception. Across all categories (age group, residence, region, vehicle ownership, gender), attitudes towards EVs are mostly positive. However, respondents from rural areas, Western Uganda, and those aged over 50 tend to have a neutral outlook (37.7 percent, 42.9 percent, and 44.4 percent respectively). A key informant confirms that:

> *"While the perception is positive in urban centres, rural areas still require more education, infrastructure improvements, and incentives to encourage adoption. Power outages, limited grid access, inadequate charging and swapping services often lead to a negative perception in rural areas." (KII, STRATs 2025)*

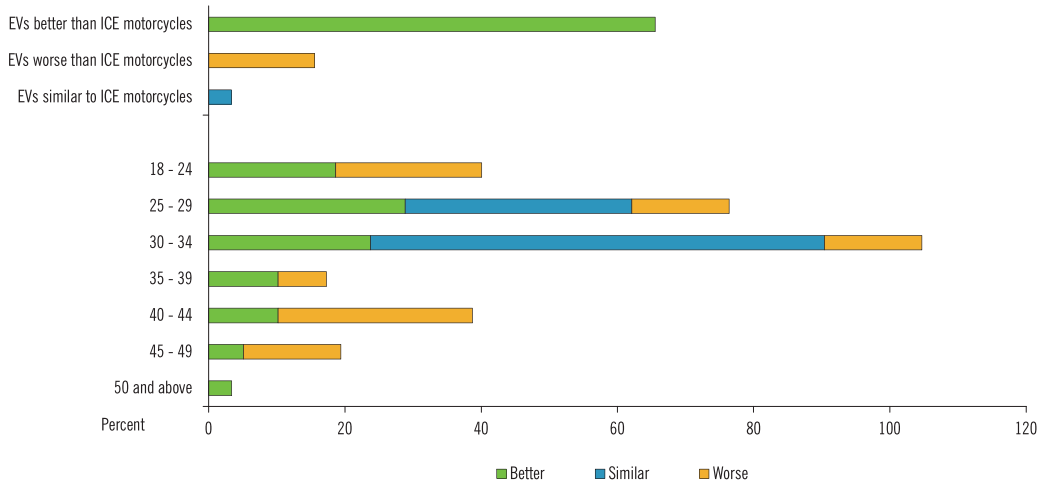
From a policy perspective, these findings underscore the necessity for targeted awareness campaigns and infrastructure development, particularly in rural areas and the Western region. The lower positivity among older adults (50+) and non-vehicle owners, groups likely to encounter substantial barriers to adoption, highlights the importance of inclusive financing options such as subsidies or EV leasing schemes, along with programmes that demystify EV technology. The nearly identical positivity rates between vehicle owners (68.0 percent) and non-owners (68.6 percent) suggest a latent interest in EVs among non-owners. The government could capitalise on this potential through education and demonstration initiatives. Furthermore, addressing regional disparities will be crucial in promoting equitable and widespread EV adoption. Although public perception of EVs is generally positive and many are

Figure 8: Respondent's perceptions on EVs



Source: EPRC general survey (2025)

Figure 9: ICE rider's perceptions on fuel-powered motorcycles



Source: EPRC ICE motorcyclist survey (2025)

receptive to adopting them, a significant challenge remains, limited driving range. Interviewed users expressed concerns about long-distance travel, such as journeys to rural villages, which often exceed the 80 to 150 km range of most EVs and lack nearby charging infrastructure. Regarding perceptions about Uganda's full transition to EVs, the survey data shows that nearly 57 percent of the respondents think that it is very important.

Figure 9 illustrates how ICE motorcyclists view electric motorcycles across different age groups. Overall, 65.6 percent believe EVs are better than ICE motorcycles, while only 15.6 percent consider them worse. Among younger respondents, especially those aged 30–34, a striking 66.7 percent think EVs are similar to ICE motorcycles, and 23.7 percent see them as better. This suggests that, while awareness is high, the perceived advantage may not be overwhelming for some users. In contrast, older age groups (40+) are more sceptical, with very low proportions rating EVs as better. Respondents from FGDs highlighted key advantages of electric motorcycles over internal combustion engine models, including greater speed, improved efficiency, and reduced mechanical issues like engine overheating. They also emphasised lower maintenance costs, noting that E-motorcycles eliminate the need for frequent oil changes, which can be costly and potentially damage ICE engines when low-quality oil is used.

However, some ICE riders raised concerns about E-motorcycles while making comparisons. One ICE rider mentioned worries about the durability of electric motorcycles, stating they are easily damaged in accidents. They also highlighted the high cost and limited availability of spare parts as key challenges.

Notably, the survey data shows that 77.78 percent of the respondents think that E-motorcycles are more affordable (repair and costs) in the long-run in comparison to ICE motorcycles. Nearly 90 percent of the ICE motorcyclist respondents suggest that E-motorcycles are a better option for the boda-boda industry in Uganda. These insights align with the general opinion that E-motorcycles are much superior.

4.3.3 EV adoption willingness and affordability

Similarly, Figure 10 below provides a general overview of how willing Ugandans are to adopt electric vehicles from the respondents. The data reveal that most respondents (69.2 percent) express a high level of willingness compared to those who were unwilling (30.8 percent). This indicates a generally positive attitude towards EVs among respondents, consistent with the previously mentioned widespread favourable perception of EVs. Overall, the willingness to adopt EVs remains relatively high across all categories. Key statistics reveal high willingness in urban areas (70.3 percent), men (72.4 percent), Eastern regions (81.3 percent), car owners (70 percent), and the 18-24 age group (84.6 percent).

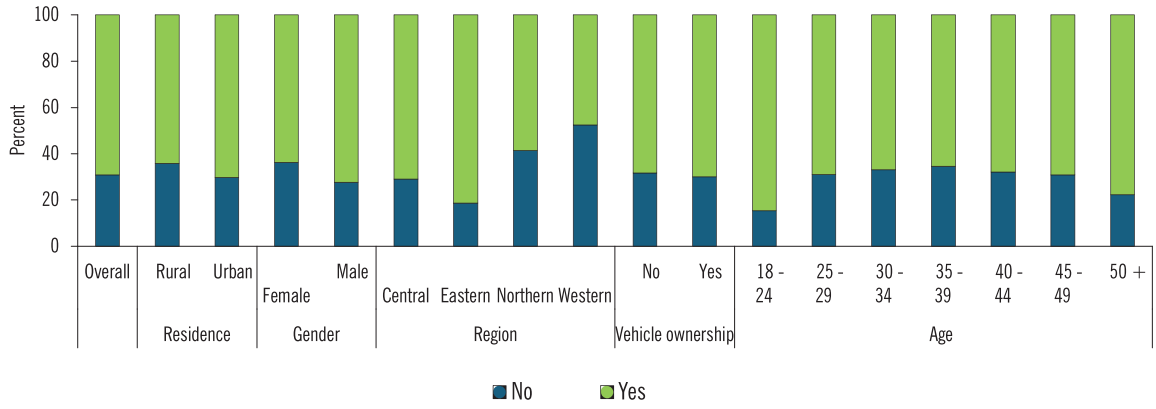
Regionally, the Central region shows a high adoption rate, demonstrating a strong willingness and benefiting from early EV initiatives in Kampala, Wakiso, and Mukono. Respondents from the Eastern region also exhibited a high willingness to adopt EVs due to a positive perception and awareness, as previously mentioned. In contrast, as previously observed, respondents from the Western region had lower awareness and more negative perceptions of EVs, resulting in the lowest willingness to adopt. Vehicle ownership also plays a role; current owners are more willing to adopt than non-owners. A respondent revealed that:

> *"Consumers are excited about the new technology and the shift to electric vehicles. Seeing electric vehicles in the country excites them, they're happy and curious, asking, "Does it really not consume fuel?" or "What kind of technology is this?" There's a lot of enthusiasm around EVs." (KII, Freedom EV 2025)*

Age-wise, the 25–39 group shows the highest willingness, driven by openness to new technology. Older respondents are less enthusiastic, while younger ones (18–24) are promising adopters, especially for E-motorcycles. Overall, willingness is high across groups, however, scaling adoption will depend on tailored financing, awareness, and infrastructure expansion.

Furthermore, the study explores how awareness levels and perceptions of EVs influence the likelihood of EV adoption. Among respondents with a positive perception of EVs, 84 percent expressed willingness to adopt EVs. In contrast, among individuals with uncertain perceptions, willingness drops to 42 percent. These findings emphasise how favourable beliefs about cost savings, environmental impact, and reliability significantly increase the likelihood of EV adoption. Perception, therefore, emerges as a major driver of consumer behaviour in Uganda's evolving mobility landscape. Furthermore, EV awareness also plays an equally critical role. Among respondents who reported being fully knowledgeable about EVs, 75.4 per cent expressed willingness to adopt. Conversely, among those with low awareness, willingness stood at 64.1 per cent. Overall, these results confirm that high awareness and positive perception are strong predictors of willingness to adopt EVs in Uganda. This highlights the urgent need for targeted public awareness campaigns, community engagement, and visible pilot projects. Educating consumers, especially in regions with lower awareness, can unlock demand and promote widespread EV adoption across the country.

Figure 10: Respondent's willingness to adopt EVs



Source: EPRC EV general survey (2025)

Figure 11 presents respondents' insights on the affordability and purchasing mode preferences for EVs. Regarding affordability, 62.4 percent of respondents find EVs unaffordable, citing high upfront costs as a major barrier. This perception reflects the current pricing mismatch between electric vehicles and consumers' income levels in Uganda. Only 7.5 percent of respondents believe EVs are affordable, suggesting that a minority see EVs as within reach without financial support, while 30.1 percent, would require financial assistance. These findings emphasise that perceived initial cost remains one of the most immediate constraints to adoption. A key informant reported that:

> *"Many consumers compare the costs and opt for cheaper alternatives. Instead of spending UGX 200 million on an EV, they'd rather import a fuel-powered Harrier for UGX 40-60 million and be good to go." (KII, Freedom EV 2025)*

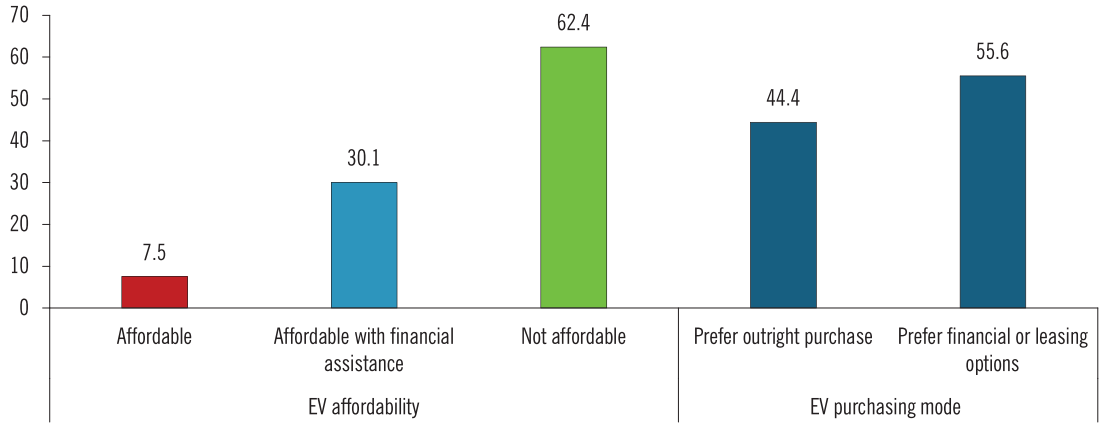
Regarding preferred purchasing methods, a majority (55.6 percent) favour financial or leasing options, compared to 44.4 percent of respondents who prefer full upfront payment. This indicates a clear preference for financing solutions that lessen the burden of an initial payment. These findings highlight a strong need for flexible, consumer-friendly payment structures and innovative financing mechanisms to broaden access to EVs. Both key informants and focus group members identified high costs and limited infrastructure as significant barriers to EV ownership. They called for government action through reduced import duties, subsidies, and financing options to make EVs more affordable. A FGD respondent stated that:

> *"The government should establish financing options or subsidize EV prices. For example, I can't afford to buy an EV for UGX 7 million when an ICE motorcycle costs only UGX 5 million. If taxes on EVs are reduced and the prices are made more affordable, more people will be able to buy them." (FGD, Materwood Boda Stage, 2025)*

Figure 12, reporting the willingness to adopt E-motorcycles by ICE riders, reveals a strong readiness to transition. Panel A shows that approximately 94.4 percent of respondents are willing to make the switch. Age plays a significant role in this willingness. Interested respondents are primarily in the 25–29 (25.9 percent) and 30–34 (22.4 percent) age groups, marking these as key candidates for early adoption. Younger riders aged 18–24 (18.8 percent) also show high interest, indicating strong potential among youth if barriers are addressed. Older age groups 35+ display less optimism, possibly due to resistance to new EV technology or less exposure.

In Panel B, approximately 77 percent of respondents noted that if financial barriers are removed and various financial

Figure 11: Affordability and purchasing mode preferences for EVs



Source: EPRC EV general survey (2025)

or leasing options are introduced, they would be ready to purchase E-motorcycles after one year. In the short term, innovative and user-friendly financing options could serve as the key motivator for encouraging the adoption of E-motorcycles. Interestingly, data shows that only about 2 percent of those initially hesitant indicated they would reconsider if financing became accessible, further supporting that most riders are already receptive to adoption. Overall, the findings suggest that targeted financial models and awareness campaigns aimed at riders aged 18–34 could significantly accelerate the adoption of e-motorcycles, particularly within Uganda's boda-boda sector. An EV rider mentioned learning about electric motorcycles through a radio advert and visiting Gogo company for more information. They found the option feasible, mainly due to the affordable initial payment of UGX 300,000 under Gogo's financing scheme. However, financing remains inaccessible for others. A FGD respondent reported that:

"I'm not ready yet because it's still too expensive, both in terms of the loan and the cash down payment. Also, when it comes to energy, with my UGX 1,000, I can buy petrol and ride, but with the electric ones, I need a minimum of UGX 8,000 for a battery swap. We boda men are poor, and we can't afford that." (FGD, ICE riders, Stella pub stage, Kasangati, 2025)

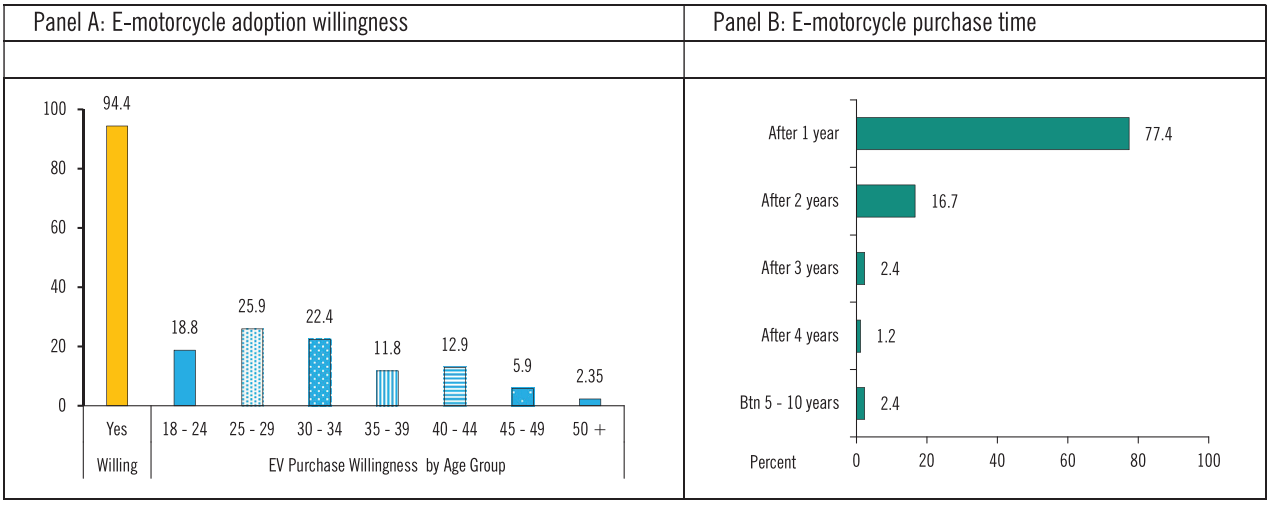
4.3.4 Experiences with EVs

Notably, E-motorcycle respondents reported a high level of satisfaction, with 95.2 percent of the riders stating overall satisfaction as shown in Figure 13 Panel A. Furthermore, 69.1 percent of respondents expressed satisfaction with the charging and battery swapping infrastructure, while 31 percent indicated some dissatisfaction, mainly due to limited services in certain areas. Concerning repair and maintenance services, although 71.4 percent of respondents were satisfied, 28.6 percent were dissatisfied. Participants in a FGD highlighted the cost advantage of electric motorcycles over fuel-powered ones. When comparing fuel and battery costs over the same distance, EVs proved to be cheaper. One rider, who replaced their ICE motorcycle with an E-motorcycle, admitted initial scepticism, but now considers it a more affordable and worthwhile option.

The study also found that, compared to ICE motorcycles, the respondents, reported that E-motorcycles were superior in terms of lower operational costs (90.5 percent), better overall performance (88.1 percent), and durability (88.1 percent). A FGD participant revealed that:

"I have ridden it for three weeks; I wouldn't go back to the ICE motorcycle. Those who return them do so because they fail to make payments, not because of poor performance." … It is durable, and oil is changed only once a year, unlike ICE motorcycles, which require an oil change every week." (FGD, EV riders, Kyengera swap station 2025)

Figure 12: Willingness to adopt E-motorcycles by ICE riders



Source: EPRC ICE motorcyclist survey (2025)

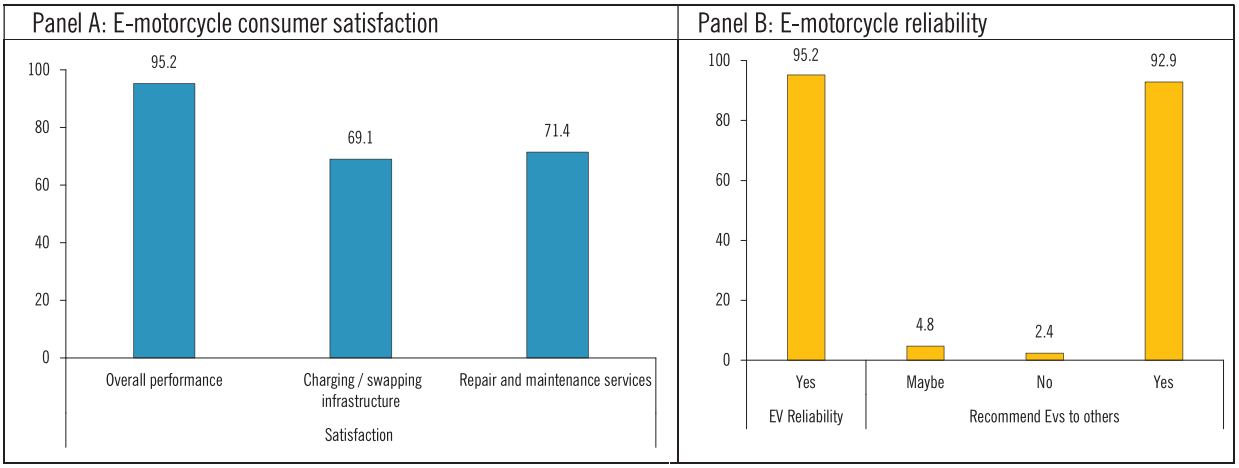
Furthermore, 95.2 percent of respondents regarded E-motorcycles as reliable, with a majority indicating they were more willing to recommend them to others (92.5 percent), as shown in Figure 13 Panel B. This reliability is attributed to simplified engine designs, which feature fewer moving parts, thereby effectively reducing mechanical wear and improving overall durability (Persistent Energy, 2022).

4.4 Barriers, opportunities and potential risks of large-scale EV adoption

4.4.1 Barriers to EV adoption

Table 4 presents the ranking of the key barriers to EV adoption reported by respondents. The most frequently cited barrier was the limited number of EV charging stations (92.6 percent), followed by inadequate maintenance and repair services (84.5 percent) and the high purchase price of EVs (82.6 percent). Other significant concerns included low electricity reliability (77.1 percent), limited battery life (70.7 percent), and the high cost of battery replacement (68.1 percent). These findings support the results suggested by CISL (2022), GoU (2023), and highlight the importance of improving charging infrastructure, reducing upfront costs, and providing reliable maintenance services as top priorities for policymakers to accelerate EV adoption.

Figure 13: E-motorcycle consumer satisfaction and reliability perceptions



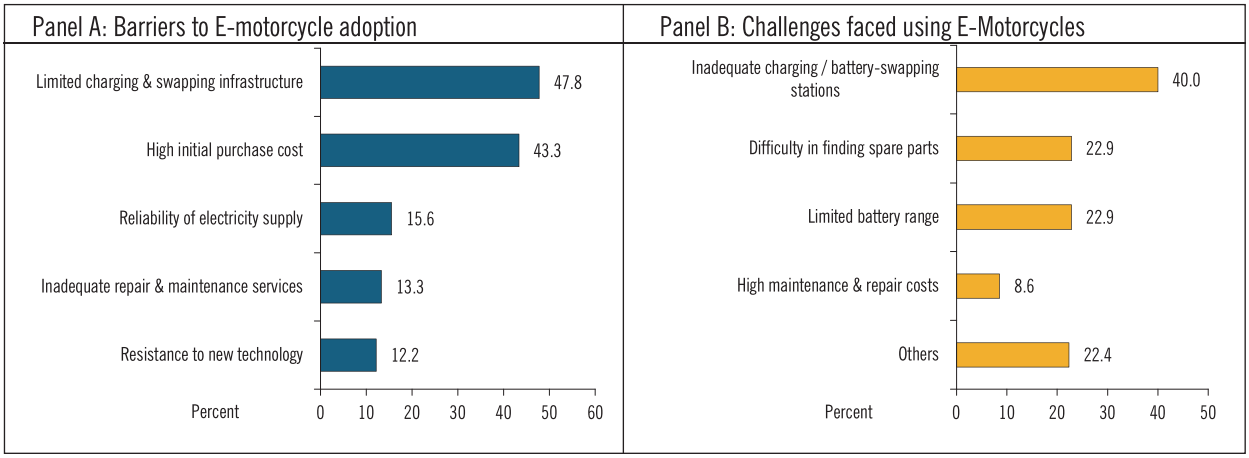
Source: EPRC EV motorcyclist survey (2025)

Table 4: Ranking of barriers to EV adoption

Barrier	Frequency	Percent	Rank
Limited number of EV charging stations	287	92.6	1
Inadequate maintenance and repair services	262	84.5	2
High purchase price	256	82.6	3
Low electricity reliability	239	77.1	4
Limited battery life	219	70.7	5
High battery replacement cost	211	68.1	6
High adaptation cost of electrical system at home	206	66.5	7
Lower resale value	201	64.8	8
Limited driving range	195	62.9	9
High electricity price for charging	193	62.3	10
Long charging time	189	61.0	11
EV reliability concerns	178	57.4	12
Problems of Battery disposal	163	52.6	13
Environmental impact of battery production	144	46.5	14
EV safety concerns	124	40.0	15

Source: EPRC EV general survey (2025)

Figure 14: E-motorcycle adoption barriers and user experience challenges



Source: EPRC ICE and EV motorcyclist survey (2025)

More specifically, inadequate charging infrastructure greatly hampers EV adoption, as it negatively influences public perceptions and willingness to buy. Key informants consistently identified insufficient charging stations as a major barrier to EV adoption in Uganda. While some charging points exist, they are too few to meet the growing demand, especially outside Kampala. This limited network leads to "charging anxiety," particularly for potential buyers of passenger EVs, who need reliable access across long distances. Expanding infrastructure beyond urban areas is regarded as urgent for broader adoption.

Although EVs require lesser maintenance and repair services compared to ICE cars, the availability of these services for EVs remains scarce and inadequate. This is further worsened by the difficulty in accessing spare parts locally whenever required. A key informant reported that:

> *"Our skill capacity is limited to hybrids. Fully EVs require more advanced knowledge and training. While it would be possible to build on our hybrid expertise to cover EVs, it's not just about skills, it also requires significant investment in specialized equipment and tools. The two go hand in hand. As much as we would like to, we don't see any justification for this investment right now since there is no demand." (KII, Dukes garage, Naalya - Wakiso, 2025).*

Garage operators in Kampala highlighted a significant skills and parts shortage for EV and hybrid vehicle maintenance. They lack formal training and rely on online resources for repairs. Spare parts are scarce and hard to find, both locally and internationally, and unlike ICE vehicles, EV components are not easily interchangeable, which further complicates the process of repairs. Relatedly, among ICE riders, the most cited barriers to adopting E-motorcycles include limited charging and swapping infrastructure (47.8 percent) and high initial purchase cost (43.3 percent) as shown in Figure 14 Panel A. This highlights the importance of boosting investment in developing more charging stations, while offering accessible funding options to make EVs more affordable.

Furthermore, it is essential to provide clear and consistent information on financing options, given the misinformation about initial costs and financing within the sector among motorcyclists. Respondents in one FDG mentioned varying initial upfront costs and differing information.

> *"**Respondent 1:** For a two-year financing period, it's about UGX 90,000 per month. For 1.5 years, the payment is around UGX 140,000 per month.*
> ***Respondent 2:** For me, I got mine from WATU, and my financing period is 1.5 years. I pay UGX 107,000 per month, but I got a discount because I am a member of WATU.*
> ***Respondent 3:** Prices keep changing, but initially, WATU's clients paid about UGX 10 million for two years, UGX 8 million for 1.5 years, and UGX 6 million for one year." (FGD, EV riders, Acacia swap station, 2025).*

In relation to user experience, Panel B reveals that E-motorcycle riders also pointed out inadequate charging and swapping infrastructure (40.0 percent) as a major challenge, followed by difficulty in finding spare parts (22.9 percent) and a limited driving range (22.9 percent).

Other related challenges and barriers to EV adoption include the following:

- Reinstating the 25 percent import duty on EVs has created uncertainty around EV taxation, undermining investor confidence amongst some private sector actors. Worse still, the import duty is levied on EV knock-down kits (collection of parts and components needed to assemble EVs) significantly affects EV production domestically.
- Existing transformer capacities are often inadequate, and the process of acquiring and upgrading transformers for EV charging stations is cumbersome and lengthy.
- Heavy dependence on imported components, particularly lithiumion batteries and electronic control units, drives up production costs and leaves local manufacturers vulnerable to global supply chain disruptions.
- The domestic workforce lacks the specialised skills needed for EV component manufacturing, especially in advanced battery technologies.
- Uganda has yet to establish comprehensive standards for EV batteries and their components, as well as accredited testing facilities.
- High financing costs continue to restrict investment across multiple segments of the Emobility value chain.
- Although Ewaste regulations exist, low public awareness, weak enforcement, and the absence of functional E-waste collection sites hinder effective battery and electronics disposal.
- Consumers face information asymmetry about the health of secondhand EV batteries; mechanics report that many buyers unknowingly purchase vehicles with batteries approaching the end of their 15year lifespan.

4.4.2 Risks of large-scale EV adoption

The transition to large-scale EV adoption in Uganda presents significant risks that need to be carefully considered. Understanding these risks is crucial for developing strategies that mitigate their impact and ensure a sustainable and efficient future of mobility. The primary identified risks include loss of sizable revenue amounts due to a reduction in petroleum and oil imports. Relatedly, the business community engaged in associated activities (including spare part dealers, traders, and mechanics, among others) will lose livelihoods. Due to the skills mismatch likely to arise from the switch from ICEs to EVs, a section of maintenance and services providers will be put out of business. Although the legal framework for E-waste management exists, when not effectively implemented, the disposal of E-waste may be hazardous to the environment.

4.4.3 What Uganda could leverage on to foster EV adoption

An introspection of the Ugandan economy indicates that the country possesses certain endowments that can support the EV agenda. Stakeholders have identified advantages that act as enablers, such as EV linkages with the oil and gas sector, mineral development initiatives, demographic dividends, and a high potential for renewable energy, among others, as discussed below.:

i) EV production linkages with the oil and gas sector

The national long-term strategy for Uganda's oil and gas sector is shifting from solely refining to petrochemical production. Petrochemicals form the basis for many industries, including those supporting E-mobility. Materials such as engineered plastics, polymers, lubricants, and copper wiring (essential for EV manufacturing) are produced from petrochemical processes. This strategy acknowledges that, although EV adoption is increasing, Uganda must focus on developing a robust industrial foundation that supplies vital materials for this shift. Through petrochemical investments, Uganda can position itself not only to meet current fuel needs but also to support the future EV industry with key materials.Is.

ii) Mineral development agenda

Mineral development is a key part of the 10-fold economic growth strategy aimed at expanding Uganda's economy. It focuses on exploiting minerals through value addition to cut reliance on imports and establish a vertically integrated industry. This initiative will promote the domestic production of some of the most critical EV components, such as the battery, which accounts for a significant portion of the overall cost. Uganda can leverage its mineral endowment, including cobalt, lithium, and graphite, which are essential for

Figure 15: EV production components

Source: STI - OP (2025)

manufacturing lithium-ion batteries. Figure 15 shows the minerals essential to manufacture EVs and their related components.

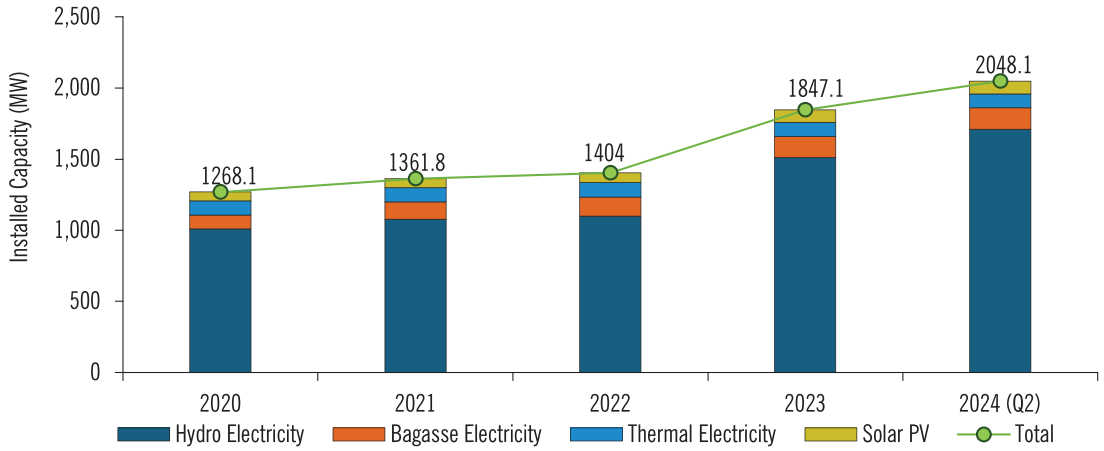
iii) Demographic dividends

Uganda has one of the youngest populations globally, and this demographic is heavily involved in the boda-boda sector, which presents an entry point for EV penetration and adoption. Furthermore, the EV ecosystem, including maintenance and repair, charging/swapping, as well as the assembly and production of EVs, presents unique opportunities for employment and a new wave of skills and technical expertise.

iv) High potential for renewable energy

Setting up a nation-wide EV charging network requires a significant amount of energy to operate. Uganda's current energy production and the potential to increase is high, particularly in renewable energy sources, such as hydroelectricity and solar, as shown in Figure 16. Uganda's installed capacity for hydroelectricity

Figure 16: Uganda's energy production mix (2020 - 2024)



Source: Author's own construction using data from ERA (2024)

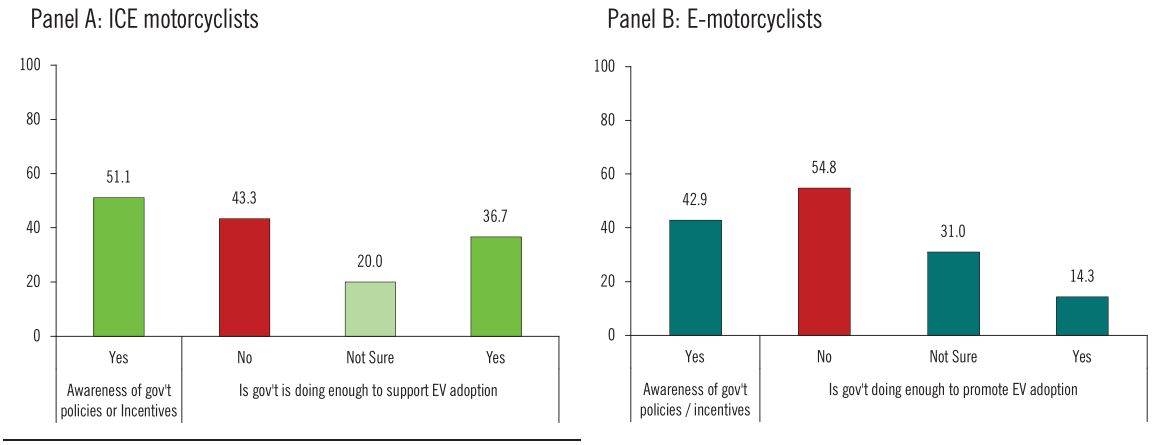
generation reached 2,200 megawatts in 2024, after the launch of the 600-megawatt Karuma hydropower plant. Uganda can leverage this capacity and the potential to expand and generate sufficient electricity to operate the envisaged widespread EV charging network. In areas where electricity distribution remains a challenge, the country could leverage the abundant sunlight to generate solar energy for EV charging.

4.4.4 Government policy and support

Figure 17 highlights a notable difference between ICE motorcyclists and E-motorcyclists regarding perceptions of government support for E-mobility in Uganda. Among ICE motorcyclists (Panel A), 51.1 percent are aware of government policies and incentives, and amongst these, 36.7 percent believe that the government is actively supporting the shift toward E-mobility. However, a significant proportion of respondents (48.9 percent) indicated that they were unaware of any government policies or initiatives supporting EVS. This trend may be due to inconsistent dissemination of EV information and awareness campaigns, with those exposed having a more positive view of the government's efforts to promote EV adoption.

Panel B shows that 57.1 percent of E-motorcyclists are unaware of government policies supporting E-mobility transition. However, 42.9 percent reported awareness, with 54.8 percent of these suggesting that government policies and incentives are not enough to support EV adoption. This lower perception among E-motorcyclists may be due to their

Figure 17: Motorcyclists' perceptions of government support and incentives



Source: ICE and EV motorcyclist survey (2025)

direct exposure to challenges with EV adoption, such as limited battery swap stations, driving range, initial cost, and gaps in the incentive implementation. Overall, this indicates a relatively low presence or visibility of supportive policies or low confidence in available policy initiatives among E-motorcyclists. Therefore, bridging this perception gap through targeted awareness campaigns, visible incentives or infrastructure expansion, and policy coherence, could significantly improve perception among both categories of motorcyclists and encourage greater adoption.

4.5 EV adoption readiness: insights, best practices, and strategies for scaling up

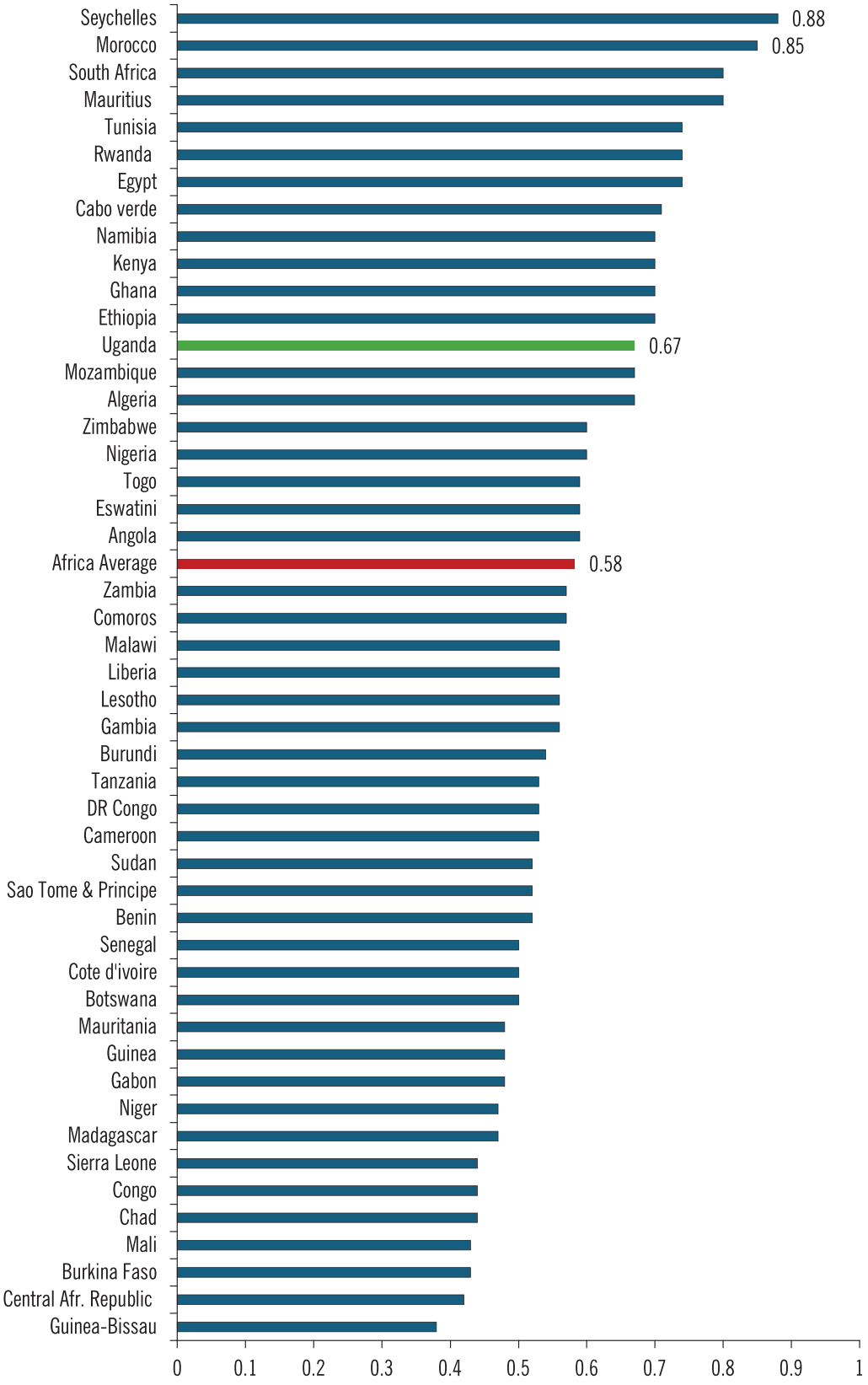
This section provides insights into EV adoption readiness in Africa, examines the best practices and strategies for large-scale EV adoption, and identifies actionable lessons for Uganda. The section commences by providing an overview of EV adoption readiness in Africa and analyses the key drivers in scaling E-mobility within the continent. Additionally, this section highlights several EV-related policies and targets adopted in Africa, emphasising their impact on bolstering the adoption of EVs at scale. Lastly, this section uses Kenya, Tanzania, and South Africa as case studies, and explores the approaches used to scale-up EV adoption. Overall, this section seeks to offer insights to shape Uganda's strategy for promoting a sustainable and scalable transition to electric mobility.

4.5.1 Overview of EV adoption readiness in Africa

This subsection provides insight into best practices and strategies for enhancing EV adoption readiness by analysing data on Africa's EV Adoption Readiness obtained from the Energy for Growth Hub (2024). In essence, this analysis examines the factors influencing the readiness by African countries to adopt EVs at scale and provides insight into the strategies that may be used to boost the EV uptake readiness in other developing economies, including Uganda. The EV Readiness Index comprehensively assesses the preparedness of 48 African countries to adopt EVs on a larger scale (Mutiso, 2024). The EV adoption readiness index was computed using 10 indicators across five (5) categories, including affordability, enabling policies, market potential, power sector maturity, and grid infrastructure.

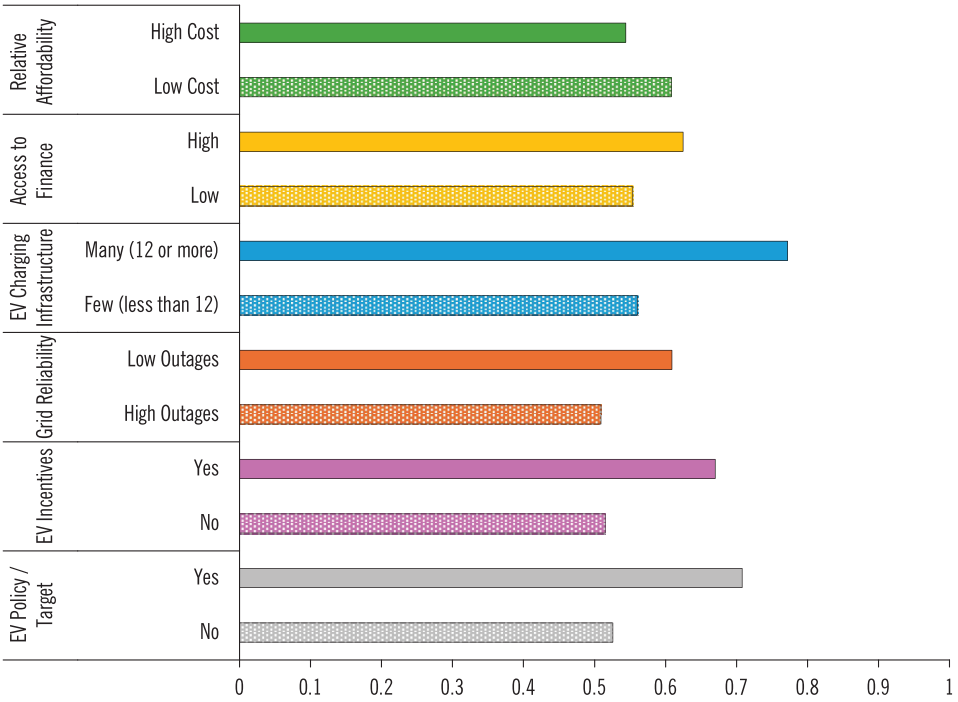
Figure 18 provides an overview of EV adoption readiness, with Seychelles (0.88), Morocco (0.85) and South Africa (0.80) reporting the highest levels across the continent. Furthermore, it reveals that Uganda's score of 0.67 falls within the medium readiness category and lies slightly above the African average of 0.58. Uganda's performance reflects moderate progress in EV adoption readiness, attributed to the existence of EV-enabling policies, incentives, and a national E-mobility strategy, as well as emerging EV charging and swapping infrastructure, and E-motorcycle financing, among other enabling factors. However, Uganda lags behind its peers within the Eastern African region, with Rwanda (0.74), Kenya (0.7) and Ethiopia (0.7) reporting higher scores. While Uganda performs relatively above the continent's average, it should strive to reach the high readiness category by adopting best practices and strategies from leading countries.

Figure 18: EV readiness landscape in Africa (2024)



Source: Author's own construction using data from the Energy for Growth Hub (2024). Note: EV adoption readiness ranked on scale between 0 and 1 is segmented into three categories, including Low (0.3–0.5), Medium (0.5–0.7), and High (0.7–0.9) levels.

Figure 19: Comparative analysis of EV adoption readiness



Source: Author's own construction using data from the Energy for Growth Hub (2024).

Notably, Figure 19 highlights that African countries with supportive EV policies, incentives, reliable electricity, accessible charging infrastructure, and greater affordability are significantly more prepared to adopt EVs. Specifically, countries that have adopted EV policies or targets have an average EV readiness score of 0.71, compared to 0.53 in those without such policies or targets. Similarly, those offering EV incentives average 0.67 in contrast to a 0.52 score in non-incentivising countries. Grid reliability also plays a key role, with countries having fewer power outages scored 0.61, compared to 0.51 in those with frequent outages. The presence of charging infrastructure is equally important, with countries possessing more than 12 EV public charging stations averaging a readiness score of 0.77, while those with fewer stations average 0.56. Furthermore, countries with higher access to finance score 0.63, compared to 0.55 in countries with limited access. Likewise, countries with a lower cost ratio of EV charging to fuel had an average score of 0.61, compared to 0.54 in those with higher costs. These findings underscore the importance of integrated policy action (supportive regulations, financial incentives, infrastructure development, and affordability measures) to enhance EV adoption readiness.

4.5.2 What is driving EV-adoption readiness in Africa?

The study employed dominance regression analysis developed by Budescu (1993) to identify and rank the most influential determinants of EV readiness in Africa based on their relative importance in predicting readiness scores. Table 5 shows that EV policy or target emerges as the most critical factor, with a dominance statistic of 0.27 (standardized dominance value of 0.328). This implies that having clear national policies or targets for EV adoption is the strongest driver of readiness across African countries. This is followed by EV incentives (0.195, standardized 0.236), underscoring the importance of financial and regulatory support mechanisms in encouraging EV uptake. In addition, EV charging infrastructure ranks third (0.141, standardized 0.171), highlighting the role of physical infrastructure in enabling EV adoption. Other factors, including the current rate of motorization (0.097) and relative affordability (0.037), have moderate influence. These findings suggest that, while technical and economic factors play a role, policy frameworks and infrastructure are the dominant levers for boosting EV readiness in Africa.

Table 5: Dominance analysis of EV readiness determinants in Africa

DV: EV Readiness	Dominance statistic	Standardized dom. statistic	Ranking
EV policy/target	0.27	0.328	1
EV incentives	0.195	0.236	2
EV charging infrastructure	0.141	0.171	3
Current rate of motorization	0.097	0.117	4
Relative affordability	0.037	0.045	5
Grid reliability	0.036	0.044	6
Utility financial solvency	0.019	0.024	7
Electricity regulatory index	0.011	0.013	8
Additional capacity for 30% EVs	0.01	0.012	9
Access to finance	0.008	0.01	10
Observations	**48**		
Overall F-Statistic	**0.8241**		

Source: Author's own construction using data from the Energy for Growth Hub (2024). Note: DV – Dependent Variable

4.5.3 EV policy landscape in Africa

This sub-section presents the landscape of EV-related policies/targets and plans adopted in Africa, while stressing their impact on bolstering the adoption of EVs at scale. Table A.3 (see appendix) provides a comprehensive overview of the EV policy landscape across Africa from 2018 to 2024, highlighting various strategies employed by different countries to promote EV adoption. These policies can be categorised into legislation, targets, and ambitions, with each country adopting a unique approach based on its specific circumstances and goals. The variation in policy approaches across countries suggests that a one-size-fits-all solution may not be effective. Uganda will need to tailor its EV strategy to its specific economic, infrastructural, and social context. By examining these diverse strategies, Uganda can gain valuable insights into potential pathways for fostering EV adoption within its own borders.

Largely employed, tax incentives have gained popularity in various countries, including Rwanda, Angola, Ethiopia, Morocco, and Tunisia. These measures often include VAT exemptions, reduced import duties, or preferential tax treatment for EVs and related equipment. Notably, these countries have implemented different versions or combinations of tax incentives. While Rwanda legislated extensive tax incentives for EVs and their parts or equipment in 2021, exempting them from VAT, import duties, and excise duties, Ethiopia exempted EVs from import duties if they were locally assembled, in addition to VAT, surtax, and excise tax exemptions. Such policies considerably lower the cost barrier for EV adoption, making them more accessible to consumers (Liu et al., 2021; Mutiso, 2024). However, before adopting tax incentives, it is important for Uganda to conduct feasibility studies to evaluate the real costs and benefits of these financial incentives and instruments (CISL, 2022).

The development of charging infrastructure represents another critical area, as demonstrated by countries like South Africa, Rwanda, Morocco, and Tunisia. Notably, South Africa set a target in 2018 to build 40 solar-powered EV charging stations annually, and has since secured USD 234 million to develop the comprehensive solar-powered EV charging network, with 120 stations planned for completion by September 2025.[3] In addition, Rwanda has developed a comprehensive master plan for EV charging infrastructure, aiming to ensure that no EV travels more than 50 kilometres without access to a charging station. This masterplan guides investors developing charging infrastructure to prevent the establishment of idle or obsolete stations. By conducting a geospatial analysis, Rwanda is ensuring that stations are established nationwide in areas of high population density and traffic, as well as leveraging existing petrol stations and commercial buildings. Therefore, setting targets and creating an enabling environment for private sector investment and collaborations in EV public charging infrastructure is key in EV adoption readiness. Uganda could follow suit by implementing legislation that mandates the

3 https://empowerafrica.com/south-africa-secures-234m-for-the-worlds-first-solar-powered-ev-charging-network/

installation of charging stations and provides incentives for their deployment nationwide.

The setting of EV Targets represents a third important strategy observed across the continent, mainly in South Africa, Kenya, Nigeria, Ghana, Morocco, and Uganda. These countries have established specific goals for EV adoption across different vehicle categories, from light-duty vehicles to buses and medium/heavy-duty vehicles. For instance, Morocco has set ambitious targets, such as, 258,000 electric cars and 2,000 electric buses by 2030. Notably, Uganda through its national E-mobility strategy (2023), aims to fully transition to E-mobility in public transport and motorcycles by 2030 and passenger vehicle sales by 2040. However, key questions remain – i) What is currently being done to meet these targets? ii) Are resources (both financial and human) being availed to support the achievement of these targets? and iii) Is the policy environment fostering or impeding the attainment of the targets? Therefore, whereas setting clear, time-bound targets for EV penetration in various vehicle categories is important, the actual implementation to achieve these targets is even more critical.

In addition, some countries, including Algeria and Ethiopia, are considering implementing bans or restrictions on ICE vehicles. Ethiopia's ban on the importation of new and used ICE vehicles, which came into effect in January 2024, was simultaneously implemented with a provision of duty-free imports for electric and hybrid vehicles. While Ethiopia's ban on non-EV imports represents a more aggressive approach, Uganda could consider gradually phasing out ICE vehicles while simultaneously promoting local EV production, as Nigeria and South Africa have done through their automotive development plans. This dual strategy can help reduce dependency on imports while building domestic capacity.

Several African countries have set policies to encourage the local production of EVs. Notably, in 2023, Nigeria advanced this agenda through the Nigerian Automotive Industry Development Plan (NAIDP), which targets a 40 percent local content requirement in vehicle manufacturing and aims for 30 percent of locally produced vehicles to be electric by 2032. As part of the NAIDP, Nigeria introduced a dedicated vehicle finance scheme designed to accelerate the adoption of EVs. The initiative aims to support the financing of 45,000 passenger cars and 50,000 commercial vehicles annually. The financing scheme is designed to alleviate the upfront cost barrier for consumers and commercial operators, making electric mobility more accessible. Similarly, South Africa updated its Automotive Production Development Programme in 2024, offering investment incentives specifically to produce electric and hydrogen-powered vehicles. These measures aimed at stimulating local industries, creating jobs, and reducing reliance on imported vehicles.

Lastly, some countries adopted non-financial incentives to boost greater penetration of EVs. For instance, Rwanda implemented measures such as capping electricity tariffs at charging stations to industrial rates, offering lower off-peak tariffs, and integrating EV charging infrastructure into urban planning codes. Additionally, the Rwandese government introduced a carbon tax, designated restricted zones for green transport, and provided preferential treatment for electric vehicles. These non-financial initiatives have made EV ownership more accessible and appealing, resulting in a substantial increase in EV registrations from 19 in 2020 to over 7,000 in 2024.[4]

In conclusion, Uganda ought to implement a comprehensive, tailored strategy, drawing from successful African examples. This involves introducing well-researched tax incentives to lower EV costs, developing a national charging infrastructure master plan with clear deployment targets, and strengthening the implementation of its existing EV targets with appropriate resources and monitoring systems. Additionally, Uganda could gradually phase out high-emission ICE vehicle imports while supporting local EV assembly through tax, incentives and preferential procurement policies. A dedicated vehicle financing scheme would reduce initial expenses, while non-financial incentives like capped charging tariffs, restricted green transport zones, and integrated EV infrastructure planning would enhance EV accessibility and appeal.

4.5.4 Country case studies on EV sector development

As E-mobility advances across Africa, countries such as South Africa, Kenya, and Tanzania offer valuable lessons for Uganda's E-mobility transition. This section examines how these countries have integrated policies, infrastructure investment, and industry partnerships to develop their EV sectors, highlighting practical strategies Uganda can adopt to build a sustainable, competitive, and climate-aligned transport system.

4 https://automag.rw/2024/12/17/rwandas-electric-vehicles-surpass-7000-leading-sustainable-mobility/

South Africa

Between 2017 and 2023, South Africa recorded an impressive increase of USD 213.48 million in EV imports, primarily in electric cars, which accounted for USD 199.73 million (AFEMA, 2024). As of 2024, South Africa's total EV stock includes 1,559 units, of which only four are electric buses (ibid). The South African government has implemented robust policies such as the South African Automotive Masterplan (SAAM 2035) and the Automotive Production Development Programme (APDP2). These policies aim to foster a competitive EV production environment and increase local content from 38.7 percent to 60 percent by 2035 (DTIC, 2018; 2021). The EV White Paper outlines strategies to improve charging infrastructure and leverage local mineral resources for battery manufacturing (EV White Paper, 2023). In 2022, the automotive sector accounted for 2.9 percent of GDP and supported 116,683 direct jobs. Despite this progress, EV sales remain low, with only 4,674 units sold in 2022 (DTIC, 2023). Nevertheless, the combination of government support, industry collaboration, and infrastructure investment positions South Africa as a potential EV hub in the region. Further, tax incentives and technology upgrades are expected to enhance market competitiveness. Therefore, South Africa's experience highlights the importance of long-term planning and the integration of industrial policy. (DTIC, 2018; 2021; 2023).

Kenya

Kenya's electric mobility sector has experienced a surge in demand, evidenced by a USD 6.39 million rise in EV imports between 2019 and 2023 (AFEMA, 2024). A significant portion of this increase comes from the electric motorcycle sector, which contributed USD 5.02 million (ibid). Kenya is actively pursuing a 32 percent reduction in greenhouse gas emissions by 2030, as outlined in its Nationally Determined Contributions (Ministry of Roads and Transport, 2024). The National Climate Change Action Plan (NCCAP) and the National Energy Efficiency and Conservation Strategy (NEECS) provide frameworks to achieve these goals. NEECS targets a 5 percent EV market share by 2025, promoting both vehicle adoption and emissions reduction (Kenya Ministry of Energy, 2020). As of June 2023, 90 percent of Kenya's electricity is sourced from renewables, including geothermal and wind, making the energy sector well-suited to support EV infrastructure (Ministry of Roads and Transport, 2024). In Nairobi, the bus rapid transit (BRT) system incorporates electric buses to reduce fossil fuel dependency. Government-led initiatives and pilot programs emphasise clean transport solutions aligned with the Sustainable Development Goals (SDGs) (Kenya Ministry of Energy, 2020). Kenya also benefits from a centralised task force that coordinates EV policies and development (ibid). Overall, Kenya's progress demonstrates how climate-aligned policies can drive sustainable transportation reforms (Government of Kenya, 2018).

Tanzania

Tanzania is making steady progress in EV adoption, recording USD 17.76 million in EV imports from 2017 to 2023 (AFEMA, 2024). The country's current fleet includes around 10,000 electric motorcycles and 30 electric cars (ibid). Policies such as the Energy Efficiency Action Plan and Tanzania Development Vision 2025 guide its E-mobility strategy. More than 15 EV charging and battery swapping stations have been established, and over 10 E-mobility firms are active in the market (UNDP, 2021; Giki, n.d). With the support of organisations like GIZ and SolutionsPLUS, pilot programs and technical research have accelerated sector development (Giki, n.d). Tanzania also emphasises capacity building by training engineers, public officials, and private sector stakeholders (UNDP, 2021). Public awareness campaigns have helped promote the benefits of EVs to consumers, and fiscal incentives, such as tax reductions and subsidies, enhance affordability (ibid). In addition, the integration of EV policies with broader national energy goals is helping reduce fossil fuel dependence, and partnerships with development agencies provide financial and technical assistance. Tanzania's inclusive and multi-stakeholder approach sets a practical model for other nations in the region (UNDP, 2021; Giki, n.d).

Integrated lessons learnt from Kenya, Tanzania and South Africa

The experiences of Kenya, Tanzania, and South Africa reveal that successful EV adoption in Africa requires a coordinated approach that aligns policy, infrastructure, and institutional capacity. One critical lesson is the importance of embedding EV initiatives within broader climate and development frameworks. Kenya, for instance, integrates EV adoption into its Nationally Determined Contributions (NDCs) and

National Climate Change Action Plans, ensuring coherence with its emissions reduction commitments under the Paris Agreement (Ministry of Roads and Transport, 2024; Government of Kenya, 2018). Similarly, Tanzania aligns its EV strategy with national energy and development goals, such as the Energy Efficiency Action Plan and Vision 2025, creating synergies between transport electrification and long-term sustainability planning (UNDP, 2021).

Infrastructure readiness also emerges as a foundational pillar. South Africa's relatively low EV uptake despite robust policies highlights the need to match regulatory ambition with investment in charging networks and consumer incentives (DTIC, 2023). In contrast, Kenya's ability to leverage 90 percent renewable energy generation capacity for EV infrastructure demonstrates how clean energy systems can facilitate low-emission transport (Kenya Ministry of Energy, 2020). Tanzania complements its infrastructure expansion with practical support, such as public-private partnerships, to deploy over 15 charging and battery-swapping stations (Giki, n.d.), underlining the value of pilot-scale rollouts.

Capacity building and stakeholder engagement are equally vital. Both Tanzania and South Africa stress the need for skills development, training technicians and public officials to manage and maintain EV systems (UNDP, 2021; DTIC, 2018). This is reinforced by Kenya's success in integrating EVs into urban transit through the BRT system, showing how targeted pilot programs can serve as scalable models for broader adoption (Government of Kenya, 2018).

Finally, cross-country evidence underscores the role of industrial policy in catalysing domestic EV ecosystems. South Africa's SAAM 2035 and APDP2 frameworks aim to increase local content and attract investment into EV production, supported by tax incentives and strategic use of critical minerals (DTIC, 2021). Kenya and Tanzania, while earlier in the production curve, also demonstrate the importance of creating enabling environments through fiscal incentives, regulatory clarity, and public awareness campaigns (UNDP, 2021; Kenya Ministry of Energy, 2020).

5.0 CONCLUSION AND POLICY RECOMMENDATIONS

This study examines Uganda's readiness for a large-scale transition towards E-mobility. The country's mobility sector faces significant challenges, with road transport contributing nearly 10 percent of national greenhouse gas emissions (GoU, 2023). Dependence on imported, outdated fossil fuel-powered vehicles has escalated air pollution and environmental damage, ranking Kampala as the fifth (5th) most air-polluted city in Africa and Uganda as the eighth (8th) most polluted country globally (World Air Quality Report, 2024). In this context, the E-mobility industry offers a viable, environmentally friendly solution for decarbonising the transport sector and fostering a more sustainable, healthier transport ecosystem in Uganda.

The findings indicate that Uganda's EV adoption readiness is moderate (0.67 on a scale of 0 to 1) and marginally above Africa's average of 0.58. Despite this, Uganda lags its regional peers, with Rwanda (0.74), Kenya (0.7), and Ethiopia (0.7) scoring higher. This comparative analysis suggests that, although Uganda possesses essential elements and a clear strategic direction, there is an urgent need to accelerate progress and enhance implementation to unlock its E-mobility potential fully.

In addition, the study reveals that, while there is growing optimism about Uganda's readiness for large-scale EV adoption, driven by increasing consumer interest, market demand potential, abundant energy resources, technological innovation, and industrial readiness, as well as supportive government policies, several critical barriers remain. Key among these is the inadequate charging infrastructure, ranked by survey respondents as the most significant obstacle. The study explicitly identifies the classic "chicken-or-egg" dilemma in EV adoption. While private charging infrastructure providers are hesitant to invest due to low EV numbers, the willingness to adopt EVs is simultaneously constrained by the inadequate charging or swapping network.

Notably, the study highlights several emerging issues, including: i) high initial costs of EVs, insufficient maintenance and repair services, and concerns about electricity reliability, all of which significantly influence consumers' willingness

to adopt EVs; ii) high import duties on passenger EVs make them costly and less accessible, while uncertainty regarding import tax policies undermines investor confidence; iii) constraints in existing transformer capacities, combined with the slow and complex process of acquiring and upgrading them, hinder the expansion of charging infrastructure; iv) the market for E-motorcycles is further impacted by a regressive tax on new digital number plates, decreasing their affordability and uptake; v) the E-mobility sector's heavy reliance on imported components raises production costs and increases vulnerability to global supply chain risks. Other barriers specific to EV production and distribution identified include the: shortage of skilled human capital in EV component manufacturing, absence of comprehensive standards and testing technologies, and limited investment due to high capital costs. Overall, these challenges affect Uganda's large-scale EV readiness and slow down progress towards a sustainable E-mobility transition.

Furthermore, the study emphasises a gap between Uganda's policy framework and the actual implementation on the ground. Although the legal, institutional, and regulatory environment is deemed reasonably sufficient, its effectiveness is hindered by several implementation challenges caused by weak institutional capacity, fragmented inter-agency cooperation, insufficient resources, and a lack of specialised skills. Without addressing these fundamental issues, Uganda's shift to E-mobility risks being delayed, despite well-meaning policies and promising prospects for EV growth.

Despite these challenges, Uganda is uniquely positioned to accelerate its E-mobility transition by strategically seizing several opportunities at its disposal. The country's electricity grid, which is over 90 percent supplied by renewable energy, offers a solid foundation for a sustainable, nationwide charging network. Uganda also possesses abundant minerals such as cobalt, lithium, and graphite, essential for manufacturing lithium-ion batteries, giving the country a potential advantage in the regional EV supply chain. Its large, youthful population—especially with significant involvement of youth in the boda-boda (motorcycle) sector—presents a key entry point for EV adoption and penetration. Additionally, this demographic represents a valuable source of human capital that can be trained and integrated into the expanding EV ecosystem, generating green jobs in manufacturing, maintenance, and infrastructure development.

5.1 Actionable policy recommendations

To accelerate Uganda's transition to a sustainable E-mobility ecosystem, a comprehensive and coordinated approach is essential. Table 6 highlights the identified key policy issues and provides actionable recommendations. Therefore, the study recommends the following under each category:

Consumer-related issues

i) **Existence of inadequate and unevenly distributed EV charging infrastructure.** The government should fast-track EV charging infrastructure development by finalising EV regulatory guidelines, streamlining and easing grid connection processes, drafting fundable climate finance proposals for EV infrastructure funding (like Rwanda), de-risking private investment, and developing a national master plan to integrate EV charging into urban planning and commercial areas.

ii) **Low consumer awareness and misconceptions about EVs.** The government should design and implement inclusive public awareness and education campaigns on E-mobility through tailored messaging (in local dialects), public demonstrations, partnerships with local influencers, and the long-term integration of E-mobility education into school curricula.

iii) **High upfront cost of EVs and limited consumer incentives.** The government should introduce and support demand-side incentives (including fiscal, non-fiscal, and innovative financing options) to reduce EV upfront costs and support early market adoption.

EV Manufacturer/Supplier-related issues

i) **Heavy reliance on imported components used in the manufacture of EVs domestically.** Through NDPIV's mineral beneficiation agenda, the government should strive to increase local content in the manufacture of EV components and reduce dependency on imported EV components.

ii) **Inadequate human capital, repair and maintenance services and infrastructure.** The government should develop and implement a comprehensive human capital development strategy for the E-mobility sector, addressing skills gaps across manufacturing, maintenance, and repair services through rapid skills assessments, vocational training integration,

technician certification, and long-term industry-academia partnerships.

Policy, legal and regulation framework-related issues

i) **Existence of regulatory gaps and legislative lag.** Expedite the enactment of crucial EV-specific legislation and guidelines (including the EV Charging Infrastructure Guidelines, 2025; and Plant, Machinery and Vehicles Management Bill, 2024) and develop comprehensive EV standards and testing capabilities.

ii) **Low adherence to E-waste management protocols and limited E-waste recycling infrastructure.** The government should establish a well-regulated EV battery recycling and repurposing ecosystem by strengthening enforcement of Extended Producer Responsibility regulations, investing in E-waste re-use and recycling infrastructure, and raising awareness on E-waste management.

iii) **Second-hand EVs battery health issues and information asymmetry among consumers.** The government should consider implementing a restriction that limits the importation of second-hand EVs to those not exceeding 5 years from their initial registration date, replacing the current 15-year limit and mandate pre-shipment battery examination for EVs before importing them.

Table 6: Actionable policy recommendations

	Policy Issue	Recommendation	Action	Actors
1	**Inadequate and unevenly distributed EV charging Infrastructure.** - The current public charging infrastructure is inadequate, leading to "charging anxiety" and affects EV adoption willingness. - The tedious and lengthy process of acquiring and upgrading transformers impedes EV charging expansion. - The "chicken-or-egg" dilemma simultaneously discourages investment and adoption.	• Develop and implement a comprehensive national EV charging infrastructure master plan, leveraging the National E-mobility strategy. • Establish one-stop charging or swapping stations to ensure Interoperability for all EV operators, possibly on an agent basis or through collective EV company roles. • De-risk initial private sector infrastructure investment to ensure widespread, reliable, and accessible charging.	**Short-term** • Fast-track the finalisation and approval of the draft Electricity (EV Charging Infrastructure) Guidelines, while allocating adequate resources to support their implementation. • Streamline and simplify administrative processes for acquiring and upgrading grid connections and transformers for EV charging stations. • Support E-mobility private actors draft fundable proposals to access funding for expanding EV charging infrastructure. Medium-term • Develop a detailed national EV charging infrastructure master plan, incorporating geospatial analysis to identify optimal locations for investment. • Through PPPs, introduce dedicated public funding programs (mainly matching grants, concessional loans) to de-risk private investments in underserved areas. Long-term • Adopt and enforce a uniform and compatible charging infrastructure network, possibly on an agent basis or through collective EV company roles. • Mandate the inclusion of EV charging facilities in new urban planning codes, building regulations for commercial and residential developments, and public parking areas. • Explore and incentivize innovative business models for charging infrastructure, such as mobile charging units, community-based charging hubs, and solar-charging stations.	MEMD, ERA, MoWT, UNBS, STI-OP ERA, UEDCL, MEMD MEMD, MoFPED, STI-OP, UDB MEMD, MoWT, MLHUD, MoLG, STI-OP, NPA, KCCA and Local Governments MoFPED, UDB ERA, UEDCL, UNBS, STI-OP, MoWT NPA, MoWT ERA, UEDCL, UNBS, STI-OP, MoWT
2	**High upfront cost of EVs and limited consumer incentives.** - 62.4 percent of the survey respondents find EVs unaffordable, while 30 percent require financial options to adopt EVs. - Incentives primarily target producers, with limited direct consumer benefits.	• Introduce comprehensive, and transparent demand-side fiscal and non-fiscal incentives to make EVs more affordable and accessible for consumers, complemented by innovative financing mechanisms.	**Short-term** • Support institutions offering motorcycle finances to develop and promote tailored, low-interest financing and leasing options for EV purchases. Medium-term • The government, through UDB, should scale up access to affordable financing for players across the E-mobility value chain to lower EV production and distribution costs Long-term • Implement non-financial incentives such as preferential parking, dedicated EV lanes, reduced road tolls, or access to restricted urban zones for EVs, drawing from Rwanda's model.	MoFPED, UDB, MoWT, BoU, STI-OP

	Policy Issue	Recommendation	Action	Actors
3	**Inadequate human capital, repair and maintenance services and infrastructure.** Despite the several initiatives undertaken to build E-mobility human capital across the value chain, several gaps still exist: - Scarce and inadequate EV maintenance/repair services, with difficulty accessing EV specialized spare parts. - Garage operators highlight a critical skills gap, lacking formal training. - Inadequate human capital in EV component manufacturing.	• Develop and implement a robust, multi-pronged human capital development strategy for the entire EV value chain, from manufacturing and assembly to maintenance, repair, and emergency response, ensuring a skilled workforce and adequate service infrastructure.	**Short-term** • Conduct a rapid, comprehensive assessment of current EV technical skills gaps across all key sectors (mechanics, electricians, emergency responders, manufacturing technicians). • Establish a national registry or certification program for qualified EV technicians and repair centers. **Medium-term** • Mainstream E-mobility courses and specialized curricula into vocational training institutions (TVETs) and tertiary institutions. • Launch and support training programs for existing ICE mechanics on basic EV maintenance and repair. • Incentivize local businesses and garages to invest in specialized EV diagnostic tools, equipment, and safety protocols, and facilitate import/local distribution of essential EV spare parts. **Long-term** • Implement comprehensive apprenticeship programs and strengthen industry-academia partnerships in advanced EV manufacturing and maintenance. • Develop and enforce robust certification and licensing frameworks for all EV-related professions to ensure high standards of quality, safety, and professionalism.	STI-OP, MoWT, MoES, MoFPED, MGLSD, NCDC, PSFU, UNBS
4	**Existence of regulatory gaps and legislative lag**. - Key legal instruments (mainly the Plant, Machinery and Vehicles Management Bill, 2024), remain in draft form, creating regulatory ambiguities in areas like EV inspections, safety, and technician licensing. - Gaps exist in developing requisite standards for EVs/ components and testing technologies.	• Expedite the enactment of crucial EV-specific legislation and develop comprehensive standards and testing capabilities to ensure market stability, consumer safety, and product quality. • Strengthen partnerships and stakeholder collaboration among E-mobility actors, such as government MDA's, private investors, academia, and development partners.	**Short-term** • Prioritize and fast-track the enactment of the Plant, Machinery and Vehicles Management Bill (2024) to provide a coordinated and legally binding framework for EVs, addressing inspection, roadworthiness, safety, and pollution control. • With consultation from the E-mobility actors, develop and publish clear technical standards for EV components (e.g., batteries, charging connectors, motors) and charging infrastructure, while drawing lessons from Kenya and Rwanda, among others. **Medium-term** • Upgrade the national testing and certification centers (under UNBS) with capabilities for comprehensive testing of EVs and components, including battery health and performance. • Develop and implement specific regulations for the safe transportation, storage, and handling of EV batteries throughout their lifecycle. **Long-term** • Strengthen the existing regulatory bodies (including ERA, UNBS, NEMA) with specialized expertise, adequate resources, and clear mandates for comprehensive oversight of the E-mobility sector.	ERA, MoWT, UNBS, MoES, MoFPED, NEMA, STI-OP,

	Policy Issue	Recommendation	Action	Actors
5	**Heavy reliance on imported components used in the manufacture of EVs locally.** - Heavy reliance on imported components (e.g., lithium-ion batteries, electronic control units) drives up EV production costs and exposes the sector to global supply chain disruptions. - Inadequate skilled human capital in manufacturing EV components and parts.	• Leverage the mineral beneficiation agenda to increase local content in the manufacture of EV components and reduce dependency on imports.	**Short-term** • Undertake a comprehensive value chain analysis to identify specific EV components with high potential for local manufacturing, especially those where Uganda has mineral endowments (mainly cobalt, lithium and graphite, among others). • Provide targeted investment incentives (e.g., tax holidays, land allocation, access to finances) to investors willing to establish EV component manufacturing facilities. • Leverage the transition of the oil and gas sector to petrochemical production to supply essential materials for EV manufacturing. **Medium-term** • Invest in research and development infrastructure and support local innovation hubs focused on EV battery technology, vehicle design, and charging solutions. • Launch specialized vocational training programs and apprenticeships focused on skills required for EV component assembly and manufacturing. • **Long-term** • Establish a long-term strategic plan for the sustainable extraction and processing of critical minerals necessary for EV manufacturing, while ensuring social and environmental safeguards.	STI-OP, MoFPED, UNOC, MoES, MGLSD, MTIC, NPA, UIA
6	**Low Consumer Awareness and Misconceptions about EVs.** - 50.3 percent of the respondents reported that they were *"somewhat aware"* of EVs, and 7.7 percent were *"not aware."* - Awareness is notably lower among respondents in the rural areas, among women, and in Northern/Western regions. - Misinformation regarding EV performance, safety, purchase price and maintenance costs exists and significantly affects willingness to adopt EVs.	• Conduct comprehensive and targeted public awareness and education campaigns to highlight EV benefits, address misinformation, and boost consumer confidence on EVs.	**Short-term** • Adopt (and/or strengthen existing) public awareness campaigns, taking into consideration local dialects (through digital platforms like internet and social media, as well as community engagements) to highlight the economic, environmental, and performance benefits of EVs. • Organize public demonstration events and test drives in urban and rural areas, mainly E-motorcycles and public transport EVs, to provide direct exposure and foster awareness. **Medium-term** • Develop tailored educational materials and programs for specific demographic groups (mainly, women and youth) and regions (e.g., Northern, Western) that address their unique concerns and information needs. • Partner with local leaders, social influencers, and existing taxi and boda-boda associations to disseminate accurate information and boost trust on EVs. • **Long-term** • Mainstream E-mobility awareness and sustainability education into the school curricula to enhance long-term behavioral change and cultivate a future generation responsive towards sustainable transportation.	Ministry of ICT & National Guidance, MoWT, MoES, NCDC, STI-OP, KCCA, and Local Governments

	Policy Issue	Recommendation	Action	Actors
7	**Adherence to E-waste management protocols and elementary E-waste recycling infrastructure.** - Although E-waste management protocols and regulations are in place, awareness, compliance, and enforcement remain limited. - Uganda has a single E-waste recycling and management facility established in 2021, but limited awareness, resources and capacity gaps hinder its effectiveness and reach.	• Establish a well-regulated EV battery recycling and repurposing ecosystem by strengthening enforcement of EPR regulations, investing in E-waste recycling infrastructure, and raising public awareness on E-waste management.	**Short-term** • Launch targeted public awareness campaigns on the importance of proper EV battery disposal and the environmental dangers of improper E-waste handling. • Encourage and incentivize private sector investment in repurposing and second-life applications of depleted EV batteries for less demanding uses (for instance, household energy storage). **Medium-and long-term** • Strengthen the enforcement mechanisms for E-waste management protocols and regulations such as EPR to ensure manufacturers/importers are accountable for battery lifecycle management. • Establish E-waste collection centers in major cities and towns.	NEMA, MEMD, MTIC, MoFPED, STI-OP, UNBS, KCCA and Local Governments
8	**Second-hand EVs battery health issues and information asymmetry among consumers.** - Mechanics reveal an information gap among EV buyers, who often purchase EVs with batteries nearing the end of their 15-year lifespan.	• Regulate the import of second-hand EVs and batteries to ensure quality and safety.	**Short/medium-term** • Consider implementing a restriction that limits the importation of second-hand EVs to those not exceeding 5 years from their initial registration date, replacing the current 15-year limit. • Mandate pre-shipment battery examination for EVs before importing them. For batteries with a low health status, replacement of batteries before importation should be enforced.	MoWT, MoFPED, UNBS, URA

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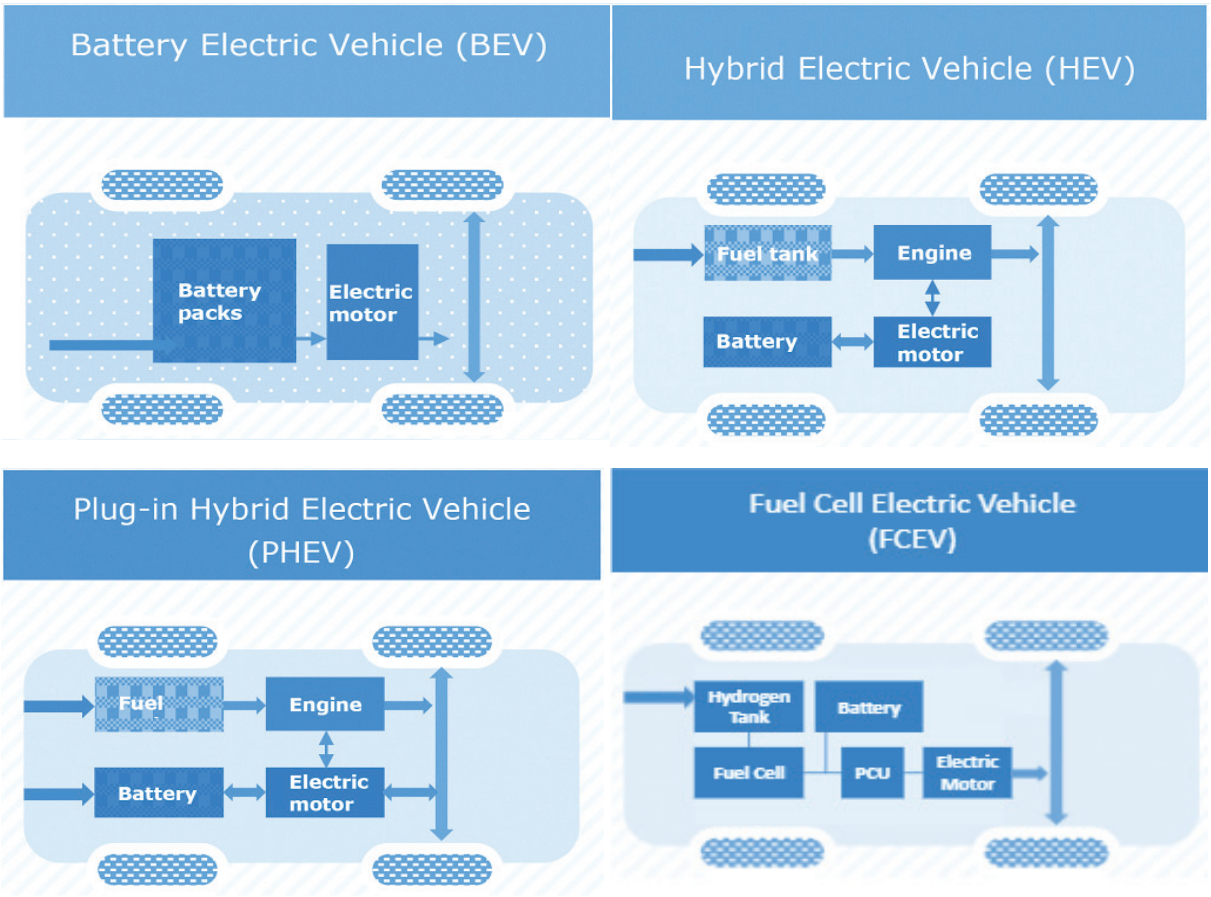
APPENDIX

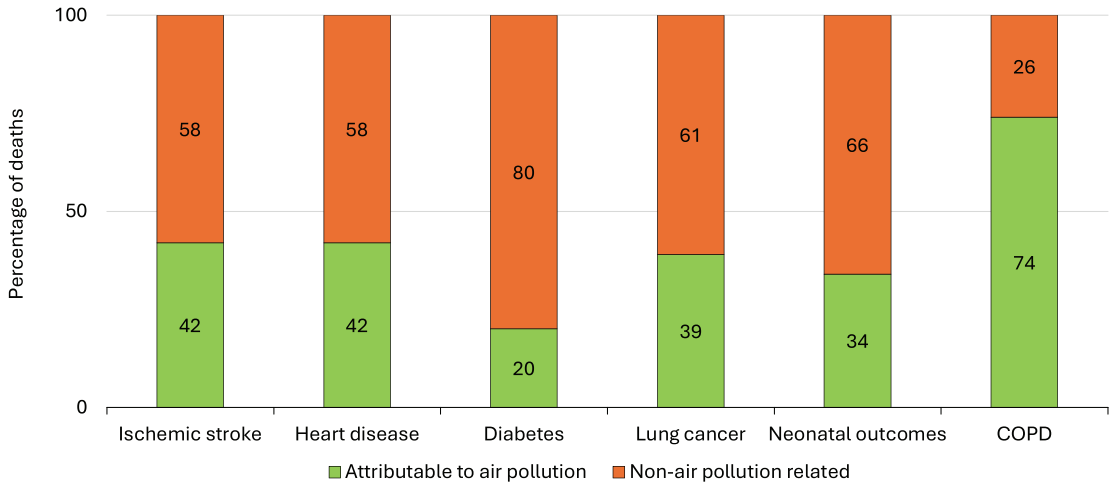
Figure A. 1: Variations in EV propulsion motors



Source: e-AMRIT

Types of electric vehicles. https://e-amrit.niti.gov.in/types-of-electric-vehicles

Figure A. 2: Cause-specific disease burden in Uganda (total air pollution, deaths)



Source: Source: Author's own construction using Global Burden of Disease Study 2023. IHME, 2025.

B.1 Africa EV readiness data and methodology

The Africa EV Readiness Index assess the preparedness of 48 African countries to adopt EVs on a larger scale (Mutiso, 2024). Six (6) countries—Djibouti, Equatorial Guinea, Eritrea, Libya, Somalia, and South Sudan—were omitted due to data unavailability. The EV Readiness Index covers ten indicators across five categories: enabling policies, market potential, affordability, grid infrastructure, and power sector maturity, all adapted to the African context (Table A.1 below).

Table A. 1: Description of EV readiness index variables

Variables	Description
EV readiness score	Level of readiness (0.7 to 0.9) - high, (0.5 to 0.7) - medium, (0.3 to 0.5) - low
EV policy/target	Does the country have an EV policy or target (Yes -1, No - 0)
EV incentives	Does the country have EV incentives (Yes -1, No - 0)
Additional capacity for 30% EVs	Additional electricity generation is required to electrify 30 percent of road transport
Grid reliability	Annual average duration in hours of outages
Current rate of motorization	Vehicles per 1,000 inhabitants
EV charging infrastructure	Number of public EV charging stations
Electricity Regulatory Index	AfDB index assessing regulatory/legal dimensions of power sector
Utility Financial Solvency	World Bank utility financial performance
Relative affordability	Cost ratio of electricity to gasoline needed for equivalent EV and ICE car models to travel 100 miles.
Access to finance	Percentage population (above the age of 15) that have borrowed from financial institution or mobile money account

Source: Author's own construction using Energy for Growth Hub database (2025)

Table A. 2: Summary statistics of the EV readiness determinants

Variable	Obs.	Mean	Std. Dev.	Min	Max
EV readiness score	48	0.583	0.122	0.38	0.88
EV policy/target	48	0.313	0.468	0	1
EV incentives	48	0.438	0.501	0	1
Additional capacity for 30% EVs	48	54.144	135.957	0.88	899.73
Grid reliability	45	763.395	1,507.05	0.72	8,849.4
Current rate of motorization	48	69.098	90.627	0.7	401.7
EV charging infrastructure	28	12.321	22.613	1	86
Access to finance	39	12.795	7.838	4	40
Electricity Regulatory Index	43	0.497	0.186	0.1	0.85
Utility Financial Solvency	45	86.613	18.546	44.25	113.56
Relative affordability	48	30.881	18.886	4.33	88.3

Source: Author's own construction using data from the Energy for Growth Hub (2024).

B.2 Dominance analysis

The study employed Budescu's (1993) dominance analysis of relative importance to investigate the key drivers of EV readiness and its underlying dimensions. This method, applicable to both linear and nonlinear models, offers several advantages for assessing variable importance. Specifically, it enables a direct quantification of importance based on a variable's contribution

to reducing prediction error. Additionally, it allows for straightforward comparisons of relative importance among variables without relying on indirect proxies, and it effectively captures a variable's direct, total, and partial effects.

Dominance analysis begins by ranking explanatory variables according to their explanatory power. In essence, a variable $\boldsymbol{x_i}$ is said to *dominate* another variable $\boldsymbol{x_j}$ if its contribution to predicting the outcome $\boldsymbol{y}$ is greater across all possible subsets of other variables $\boldsymbol{x_h}$. Formally, this is expressed as:

$$R^2(y|x_i x_h) - R^2(y|x_h) \geq R^2(y|x_j x_h) - R^2(y|x_h), \qquad (A.1)$$

Where R^2 represents the goodness-of-fit of the respective model subsets. For this analysis, McFadden's pseudo - R^2 (McFadden 1973) is used to measure model fit, specified as:

$$Pseudo - R^2(y|x) = 1 - [\frac{ll(y|x)}{ll(0)}], \qquad (A.2)$$

Where $ll(y|x)$ is the log-likelihood of the model with predictors, and $ll(0)$ is the log-likelihood of the model with only a constant. To summarize the overall usefulness of each variable, Budescu (1993) proposes a metric called mean usefulness, computed as:

$$C_{X_i} = \sum_{k=0}^{p-1} \frac{C_{X_i}^{(k)}}{p}, \qquad (A.3)$$

Where p is the number of explanatory variables in the full model and $C_{X_i}^{(k)}$ the average incremental contribution of $\boldsymbol{x_i}$ across all subsets containing $k+1$ variables (x_i and k other variables), denoted as:

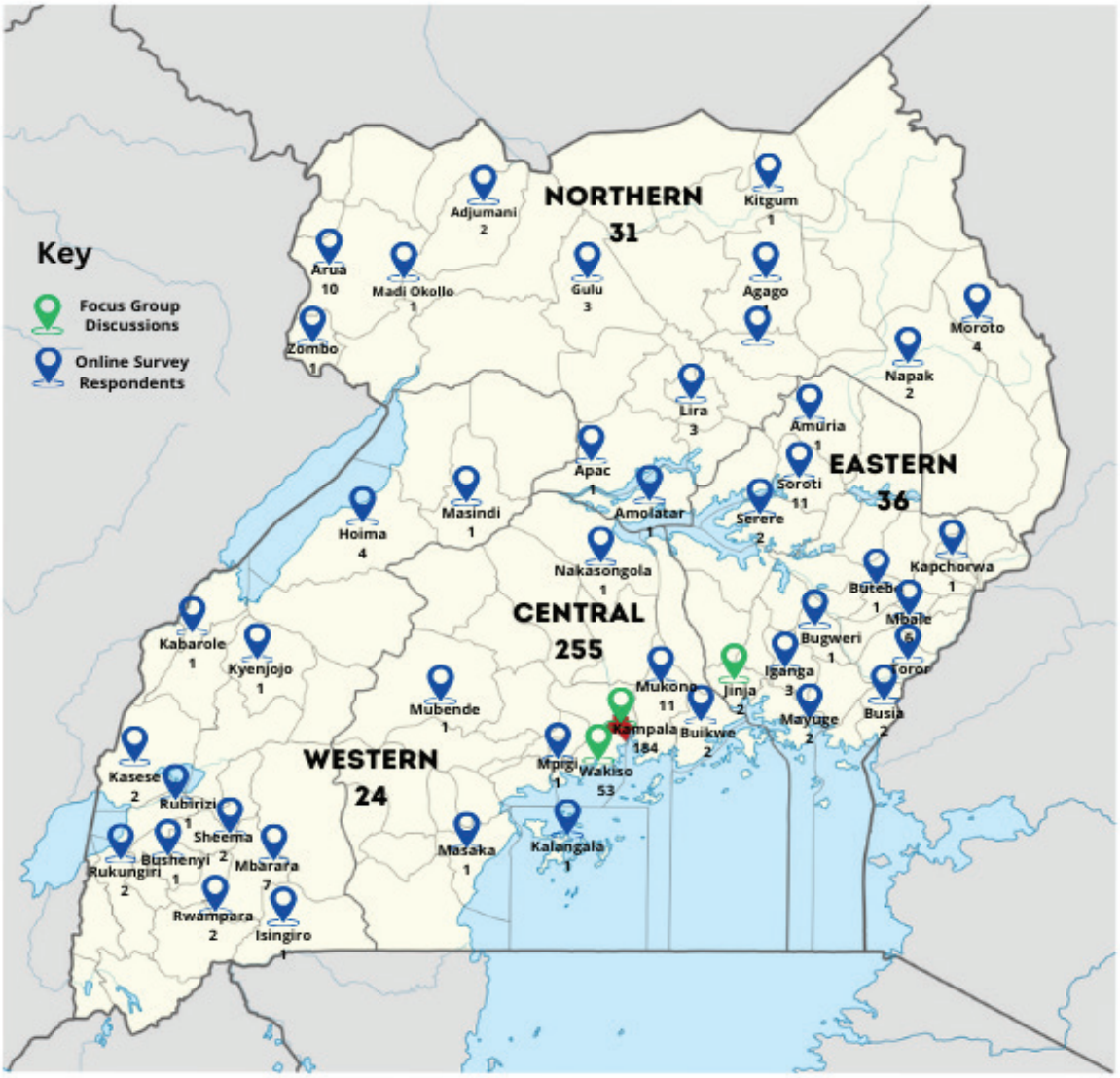
$$C_{X_i}^{(k)} = \sum \frac{[R^2(y|x_i, x_h) - R^2(y|x_h)]}{\frac{p-1}{k}}, \qquad (A.4)$$

Finally, to determine the relative importance weight of each variable, the study specifies the importance weights W_{x_i} as:

$$W_{xi} = \frac{C_{x_i}}{\sum_{j=0}^{p} C_{x_j}}, \qquad (A.5)$$

Budescu (1993) emphasizes that these importance weights are fully consistent with dominance analysis only when the latter yields a clear hierarchical ordering of variables. In cases where such dominance relationships are ambiguous, the computed weights should be interpreted with caution and only for variables for which dominance is clearly established.

Figure A. 3: Map showing the geographical spread of the survey respondents



Source: Author's construction (2025)

Table A. 3: Overview of the EV policy landscape in Africa (2018 - 2024)

Year	Country	Policy type	EV Policy measures	EV Category
2018	South Africa	Target	Add 40 solar powered public EV charging stations per annum.	EVSE
2018	South Africa	Target	Convert 5% of the public and national fleet to cleaner alternative fuel and efficient technology vehicles by 2025, with an annual increase of 2% thereafter.	All
2019	Cabo Verde	Target	100% EVs in government LDV stock by 2030.	LDV
2019	Cabo Verde	Target	15% share of EVs in medium truck sales by 2025, 35% by 2030 and 100% by 2035.	M/HDV
2019	Cabo Verde	Target	25% share of EVs in heavy truck sales by 2030 and 100% by 2035.	M/HDV
2019	Cabo Verde	Target	35% share of passenger LDV sales to be EVs by 2025, 70% by 2030 and 100% by 2035.	LDV
2019	Cabo Verde	Target	50% share of EVs in urban bus sales by 2025, 75% by 2030 and 100% by 2040.	Bus
2020	Kenya	Ambition	5% share of electric/hybrid vehicles in total vehicles imported by 2025.	All
2020	Nigeria	Ambition	100% transition to EV by 2060 with interim targets of 1% EV and 2% HEV by 2030, and 60% EV and 20% HEV by 2050.	LDV
2021	Algeria	Legislation	Ban on imports more than 3 years old.	All
2021	Rwanda	Legislation	Tariffs at charging stations are capped at industrial rates, with lower off-peak tariffs; provision of charging stations including planning codes.	EVSE
2021	Rwanda	Legislation	Introduction of a carbon tax, establishment of restricted zones for green transport, and further preferential treatment for EVs.	All
2021	Rwanda	Legislation	VAT, withholding tax, and import duty exemptions for EVs and associated parts/equipment.	All
2022	Angola	Legislation	50% reduction of both import duty and vehicle tax for EVs.	All
2022	Cabo Verde	Ambition	Work towards all sales of new cars and vans being zero emission globally by 2040, or by no later than 2035 in leading markets.	LDV
2022	Ethiopia	Legislation	EVs are not subject to import duties if locally assembled, reduced rates apply for partially and fully assembled imports. They are also exempt from VAT, surtax, and excise tax.	All
2022	Gambia	Target	Promote low emission fuel and HEVs, introduce an age limit of a maximum of 3 years for imported vehicles.	LDV
2022	Ghana	Ambition	4%, 16%, and 32% of public buses sold to be EVs in 2025, 2030, and 2050 respectively.	Bus
2022	Ghana	Ambition	4%, 16%, and 32% of cars sold to be EVs in 2025, 2030, and 2050 respectively.	LDV
2022	Ghana	Ambition	Work towards all sales of new cars and vans being zero emission globally by 2040, or by no later than 2035 in leading markets.	LDV
2022	Kenya	Ambition	Work towards all sales of new cars and vans being zero emission globally by 2040, or by no later than 2035 in leading markets.	LDV
2022	Morocco	Target	Target of 258,000 electric cars in 2030.	LDV
2022	Morocco	Target	Target of 250,000 electric 2/3Ws in 2030.	2/3W
2022	Morocco	Target	Target of 2,000 electric buses in 2030.	Bus
2022	Morocco	Legislation	Reduced duties, green loans and subsidies, as well as exemptions for EVs from luxury and road taxes.	All
2022	Morocco	Target	Target of almost 30,000 charging points for LDVs, 2/3Ws, and buses by 2030.	EVSE
2022	Morocco	Ambition	Work towards all sales of new cars and vans being zero emission globally by 2040, or by no later than 2035 in leading markets.	LDV
2022	Rwanda	Ambition	Work towards all sales of new cars and vans being zero emission globally by 2040, or by no later than 2035 in leading markets.	LDV
2022	Seychelles	Target	100% of public bus stock to be electric by 2050.	Bus

Year	Country	Policy type	EV Policy measures	EV Category
2022	Seychelles	Target	30% of new private vehicle sales to be electric by 2030.	LDV
2022	Tunisia	Legislation	Customs duties rates are reduced to 10% and value-added tax rate to 7% levied on electric car chargers.	EVSE
2022	Zimbabwe	Target	Reduction of gasoline and diesel demand by ICE vehicles through the uptake of electric and hydrogen vehicles.	All
2023	Cabo Verde	Ambition	30% EV sales in M/HDVs by 2030, 100% by 2040.	M/HDV
2023	Ghana	Ambition	30% EV sales in M/HDVs by 2030, 100% by 2040.	M/HDV
2023	Nigeria	Legislation	Nigerian Automotive Industry Development Plan (NADIP) aims to boost local production of vehicles (40% local content target) and promote EVs (30% locally produced vehicles to be electric) by 2032, with incentives including reduced import duties and tax incentives for manufacturers.	All
2023	Nigeria	Legislation	A vehicle finance scheme aims to facilitate the adoption of 45,000 passenger cars and 50,000 commercial vehicles per annum.	LDV
2023	Uganda	Target	Fully transition to E-mobility in public transport and motorcycles by 2030 and passenger vehicle sales by 2040.	All
2024	Ethiopia	Ambition	A ban on the import of non-EVs	All
2024	South Africa	Legislation	Specific investment incentives to produce electric and hydrogen-powered vehicles under the Automotive Production Development Programme.	All

Source: Author's compilation using Global EV Policy Explorer Database (2024)[5]

*Note: **LDV** - light-duty vehicle (cars and vans); **M/HDV** - medium/heavy duty vehicle (freight and vocational vehicles); **EVSE** - electric vehicle supply equipment (charging infrastructure); **2/3W** - two or three wheelers (motorcycles and rickshaws); **All** – includes all EV categories.*

The policies and measures listed in the table are structured in three categories:

- Legislation: legally binding commitments such as regulations and standards.
- Targets: announced government targets, for example those incorporated into legislation, budgetary commitments, national climate plans, or electric vehicle strategies.
- Ambitions: government goals or objectives (also known as unofficial targets) as set out in a policy document such as a deployment roadmap or strategy, often without specific targets.

5 https://www.iea.org/data-and-statistics/data-tools/global-ev-policy-explorer

Table A. 4: Summary of the consultative meetings (FGDs)

Category	No.	Stage Name	Location	District
ICE BODA	1	Asinaga stage	Nansana	Wakiso
	2	Materwood B stage	Kyaliwajjala	Wakiso
	3	Stella Pub stage	Kasangati	Wakiso
	4	Orange City stage	Kyengera	Wakiso
	5	Total stage	Kyengera	Wakiso
	6	Kamwokya station	Kawempe	Kampala
	7	Kiyembe stage	Ntinda	Kampala
	8	Gombolola court stage A	Makindye	Kampala
	9	Diplomat stage	Kisungu Makindye	Kampala
	10	Gombolola stage B	Makindye	Kampala
	11	Agapower stage	Kaliro road	Jinja
	12	Shell Muvele stage	Amber court	Jinja
EV BODA	13	Swap station	Kamwokya	Kampala
	14	Swap station	Ntinda	Kampala
	15	Swap station	Nakawa	Kampala
	16	Swap station	Nansana	Wakiso
	17	Swap station	Kyengera	Wakiso
TAXIS	18	Entebbe stage	Bwaise	Kampala
	19	Bwaise terminal	Bwaise	Kampala

Table A. 5: List of key informant interview participants

No.	Organization	Location
Government MDAs		
1	Electricity Regulatory Authority	Third Street, Lugogo Industrial Area; Kampala
2	Uganda National Bureau of Standards	Bweyogerere, Industrial Park, Kampala
3	Uganda National Oil Company (UNOC)	Yusuf Lule Road
4	Uganda Revenue Authority (URA)	Nakawa Division, Kampala
5	Science Technology and Innovation – Office of the President (STI - OP) Secretariat	Plot 14B Katalima Road, Kampala
6	Ministry of Works and Transport (MoWT)	Old Port Bell Road, Kampala
7	National Environment Management Authority (NEMA)	NEMA House, Jinja Road, Kampala
8	Kiira Motors Corporation (KMC)	Kiira EV Plant, Jinja District
10	Presidential CEO Forum (PCF)	Uganda Business Facility Centre, Kampala
11	Ministry of Energy and Mineral Development (MEMD)	Amber House, Jinja Road, Kampala
Non-Governmental Organisations		
12	Green Hub East Africa	Kitgum House, Plot 53, Jinja Road, Kampala
13	Africa E-Mobility Alliance and Uganda Electric Mobility Association	Ntinda
14	Strategy Research and Analytics Solutions (StRAS)	Jinja
Private Sector Actors		
15	Dukes Garage & National Auto Garage Owners Association (NAGOA)	Naalya

16	Ko-Hoshiko Garage	Kawempe Division
17	S-Line Garage	Nakawa Division
18	Zuriel Auto Garage	Ntinda
19	Oryx Energies Uganda	Industrial Area
20	Kalocein Investment Limited (terminal management)	Bwaise terminal
21	GOGO Electric	Ntinda
22	Zembo Electric / UEMA	Kalema Road,
23	United Riders Boda-Boda Co-operative	Kyengera Branch
24	Freedom EV Limited	Bwaise Terminal

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