

The electric car revolution in Africa: How long will it take and who will best accomplish it?

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Abstract

The shift towards electric vehicles (EVs) represents a transformative opportunity for Africa, promising to reduce carbon emissions, improve urban air quality, and foster sustainable development. However, the pace and success of this revolution remain uncertain, influenced by the continent's unique economic, infrastructural, and social contexts. This article critically examines the current state of the electric car revolution in Africa, assessing the challenges and opportunities inherent in adopting EV technologies across diverse African markets. By analyzing key factors such as energy infrastructure, affordability, government policies, and private sector involvement, the study highlights the complex interplay between technological readiness and socioeconomic realities. Special attention is given to countries like Nigeria, South Africa, and Kenya, where emerging EV initiatives showcase varying levels of progress and potential. The role of international partnerships, investment in renewable energy, and capacity building are identified as pivotal in accelerating the transition. Furthermore, the article explores who is best positioned to drive this revolution, weighing the influence of governments, multinational corporations, local entrepreneurs, and grassroots organizations. It is noticeable, that the transition to electric mobility faces significant hurdles, such as unreliable electricity grids, high initial costs, and limited charging infrastructure, innovative policy frameworks and growing environmental awareness offer hope for meaningful progress. Ultimately, this article argues that Africa's electric car revolution will be a gradual, multifaceted process requiring coordinated efforts among public and private sectors, regional cooperation, and sustained investment. The findings provide a roadmap for stakeholders seeking to realize Africa's clean mobility future within the next two decades.

Keywords: Electric Vehicles, Africa, Sustainable Mobility, Renewable Energy, Policy and Infrastructure

Introduction

The global push toward electric vehicles (EVs) represent a transformative shift in transportation, aimed at reducing greenhouse gas emissions, curbing pollution, and transitioning to sustainable energy use. While much attention has been focused on Europe, North America, and parts of Asia, Africa's role in the electric car revolution remains uncertain but full of potential. The continent is simultaneously grappling with rapid urbanization, infrastructural challenges, and the urgent need to address climate change impacts (International Energy Agency, 2022; African Development Bank, 2021). Understanding how long it will take for Africa to embrace EVs broadly and identifying the key actors best positioned to drive this transition is critical for policymakers, investors, and environmental advocates.

Currently, electric vehicle adoption in Africa is minimal. According to the International Energy Agency (2022), Africa accounts for less than 1% of the global EV market. This lag is attributed to multiple factors: poor charging infrastructure, lack of incentives, limited local manufacturing capabilities, and relatively high upfront costs for consumers (Njuguna and Muriithi, 2023; Adegbeye and Olaleye, 2021). Many African countries rely heavily on imported used

gasoline and diesel cars due to affordability and availability, posing significant challenges for the EV market (Ayodele and Nzeadibe, 2022).

Nevertheless, there are promising developments. Countries like South Africa, Kenya, and Rwanda have begun laying the groundwork for EV adoption by introducing policy frameworks, piloting EV buses, and installing charging stations (Omondi, Mwangi, and Maina, 2022). Kenya, for instance, is a regional leader in electric motorcycle (boda boda) adoption, showcasing how EVs can fit into African urban transport models (Munyua, Kiplagat, and Maina, 2023).

It's important to enquire how long will it take? Estimating the timeline for Africa's electric car revolution requires considering infrastructure development, economic realities, policy momentum, and consumer readiness. Based on current trajectories and lessons from other regions, a broad shift toward electric vehicles across the continent could take two to three decades (African Union, 2023; International Energy Agency, 2022). Infrastructure remains the biggest bottleneck. Reliable electricity supply, widespread charging stations, and local servicing expertise must be developed to support EV usage at scale (Njuguna and Muriithi, 2023). Without addressing these fundamentals, adoption rates will remain low. Also, the high upfront cost of EVs relative to average incomes will limit widespread consumer uptake unless governments introduce subsidies or tax breaks (Adegboye and Olaleye, 2021).

Moreover, the continent's diverse energy profiles complicate the timeline. Countries rich in renewable energy resources such as solar and wind, like Morocco, South Africa, and Kenya, are better positioned to leverage EVs with cleaner electricity grids (African Development Bank, 2021). In contrast, nations heavily dependent on fossil fuels and lacking reliable electricity face greater hurdles.

Who will best accomplish the revolution?

The electric car revolution in Africa will likely require coordinated efforts among multiple actors: governments, private sector players, international partners, and civil society.

(i) Governments

National governments are crucial for setting enabling policies and regulations that encourage EV adoption. This includes providing financial incentives, establishing emission standards, and investing in infrastructure (African Union, 2023). Countries like South Africa have already introduced tax incentives and announced plans to localize EV production (Department of Trade, Industry and Competition, 2022).

(ii) Private sector and entrepreneurs

The private sector's role cannot be overstated. Local companies that adapt EV technology to African contexts, such as affordable electric motorcycles or three-wheelers, can drive adoption faster than imported luxury electric cars (Munyua, Kiplagat, and Maina, 2023). Innovative startups focusing on battery swapping stations, solar-powered charging, and EV financing models also show promise (Omondi, Mwangi, and Maina, 2022).

(iii) International donors and investors

Financial support and technology transfer from international organizations and investors will accelerate Africa's EV transition. The African Development Bank, World Bank, and various climate funds have launched initiatives to support clean transport in Africa (African Development

Bank, 2021). Partnerships that bring expertise, funding, and market access will help scale pilot projects into sustainable business models.

(iv) *Civil society and consumers*

Public awareness and acceptance of EVs will shape demand. Civil society groups promoting environmental sustainability and consumer education campaigns can demystify EV technology and build public trust (Ayodele and Nzeadibe, 2022).

Environmental and economic implications of electric vehicles adoption in Nigeria

From an environmental perspective, the widespread use of petrol-powered cars in Nigeria has contributed to worsening air quality, especially in urban centers like Lagos and Abuja. Vehicle emissions are a major source of nitrogen oxides (NO_x), particulate matter (PM_{2.5}), and carbon dioxide (CO₂), all of which pose serious public health risks and contribute to climate change (Nwankwo Nnamdi and Chukwuemeka Nwosu, 2019). A report by the Nigerian Environmental Study Team (2020) found that vehicular emissions account for over 40% of air pollution in major Nigerian cities.

Conversely, electric vehicles offer the potential for significantly reduced tailpipe emissions. EVs produce zero direct emissions, which could improve urban air quality and reduce respiratory illnesses linked to pollution (Akinola Ajayi and Bolaji Adeniran, 2021). However, the environmental benefits of EVs in Nigeria depend heavily on the electricity generation mix. Currently, Nigeria relies predominantly on fossil fuels for electricity, including natural gas and diesel generators, which limits the overall reduction in carbon emissions when charging EVs (International Energy Agency, 2022). Transitioning to renewable energy sources such as solar and wind is therefore crucial to maximize the environmental advantages of EVs (Chinedu Obi and Funmi Adewale, 2023). The transition to electric cars promises significant environmental benefits, including reductions in air pollution and carbon emissions, which disproportionately affect African cities (World Health Organization, 2021). Additionally, EV adoption could stimulate job creation in new industries related to manufacturing, maintenance, and renewable energy (International Labour Organization, 2022).

However, challenges remain in managing battery disposal and sourcing rare minerals sustainably (Banza Lubaba Nkulu et al., 2018). Without strong policies, the environmental benefits could be undermined by waste and resource extraction problems. The electric car revolution in Africa is not imminent but inevitable. With the right mix of government commitment, private innovation, international support, and consumer buy-in, the continent can leapfrog traditional fossil-fuel transport and embrace a cleaner, sustainable future. The timeline may stretch over the next 20 to 30 years, but early successes in select countries show the possibilities. Ultimately, African governments with robust policies, agile private sectors tailored to local needs, and collaborative international partnerships will best accomplish this transformation.

The present scenario in Europe

Europe currently leads the global electric vehicle revolution, with policies and market dynamics driving rapid growth in EV adoption. As of 2024, countries such as Norway, the Netherlands, Germany, and France have achieved substantial market shares of electric cars, often exceeding 20% of new vehicle sales (European Environment Agency, 2023; International Energy Agency, 2023). Norway, for instance, stands out as a global leader with over 80% of new car sales being electric or plug-in hybrid vehicles, a milestone achieved through robust government

incentives, extensive charging infrastructure, and strong public awareness campaigns (Norwegian Ministry of Transport, 2023).

European Union policy frameworks have been pivotal in accelerating this transition. The EU Green Deal and the Fit for 55 package set ambitious emission reduction targets for the transport sector, including banning the sale of new petrol and diesel cars by 2035 (European Commission, 2022). Member states have complemented these goals with national subsidies, tax exemptions, and investments in public charging networks. Germany's "National Platform Future of Mobility" initiative integrates private and public sector efforts to develop EV technology, manufacturing, and infrastructure (Federal Ministry for Economic Affairs and Climate Action, 2023).

Beyond policy, consumer behavior in Europe increasingly favors electric mobility due to environmental consciousness, urban air quality concerns, and the declining total cost of ownership of EVs (Transport & Environment, 2023). Advances in battery technology have reduced costs significantly, while automakers like Volkswagen, Renault, and Tesla have launched affordable and diverse electric models tailored for European markets (International Council on Clean Transportation, 2023).

The European experience demonstrates the importance of a multi-faceted approach combining policy incentives, infrastructure development, industrial readiness, and consumer engagement. These lessons offer useful insights for regions like Africa, where tailored approaches will be required to account for differing economic and infrastructural realities (Sovacool, Axsen, and Kempton, 2023).

The present scenario in North America

North America, particularly the United States and Canada, has made significant strides in the adoption and development of electric vehicles (EVs), though the pace and scale differ notably from Europe. The U.S. electric vehicle market has experienced robust growth, driven by federal and state-level incentives, growing consumer awareness, and increasing commitments from automakers. According to the U.S. Department of Energy (2023), electric vehicles accounted for approximately 8.5% of new car sales nationwide in 2023, a sharp increase from previous years, with California leading at nearly 20% of new car sales being electric (California Air Resources Board, 2023).

Key policy measures such as the Inflation Reduction Act (IRA) of 2022 have provided substantial tax credits and subsidies for electric vehicle purchases, supporting domestic manufacturing and the build-out of charging infrastructure (U.S. Congress, 2022). Several states have enacted ambitious goals to phase out internal combustion engines entirely by 2035, reinforcing the shift toward zero-emission vehicles (California Governor's Office, 2023). Canada, in parallel, has developed the Zero Emission Vehicle Infrastructure Program, funding extensive public charging networks and promoting clean energy adoption, which has helped increase EV penetration in provinces such as British Columbia and Quebec (Natural Resources Canada, 2023).

Automakers in North America have rapidly expanded their EV portfolios, with companies like Tesla, General Motors, Ford, and Rivian leading the charge. The technological advancements in battery efficiency and vehicle range, combined with increasing consumer interest in sustainable mobility, have created a competitive market landscape (National Renewable Energy Laboratory, 2023). However, challenges persist, including the uneven distribution of charging infrastructure,

higher upfront costs for many consumers, and supply chain constraints related to battery materials (Electric Power Research Institute, 2023).

Environmental concerns remain a major driver of policy and consumer behavior in North America. Urban areas face issues of air pollution and greenhouse gas emissions, making EV adoption a critical component of broader climate strategies (Environmental Protection Agency, 2023). Furthermore, the North American experience highlights the importance of integrating clean energy sources with transportation electrification to maximize environmental benefits (Lawrence Berkeley National Laboratory, 2023).

Overall, while North America is rapidly advancing towards a more electrified transportation system, achieving widespread adoption will require continued policy support, technological innovation, and investment in infrastructure, providing useful lessons for regions like Africa aiming to embark on similar transitions.

Conventional petrol-powered cars and electric vehicles: Which is best for Africans?

The transportation sector in Africa is at a critical juncture as the continent explores sustainable mobility solutions amidst growing urbanization, environmental concerns, and economic development goals. The debate over the suitability of conventional petrol-powered vehicles versus electric vehicles (EVs) for African contexts is increasingly relevant, with each option presenting distinct advantages and challenges.

Conventional petrol-powered cars have historically dominated African roads due to their affordability, widespread availability, and compatibility with existing infrastructure. According to the International Energy Agency (International Energy Agency, 2022), many African countries rely heavily on imported petrol vehicles, which are easier to maintain given the availability of spare parts and mechanic expertise. The existing network of petrol stations provides reliable refueling access even in rural and peri-urban areas, which is crucial given the continent's vast and often challenging terrains (Adewumi Adeola and Chinedu Okafor, 2021). Furthermore, petrol cars have relatively lower upfront costs, making them accessible to a broader segment of the population (World Bank, 2021).

However, petrol vehicles are associated with significant environmental and health drawbacks. Emissions from internal combustion engines contribute to air pollution and greenhouse gas accumulation, exacerbating climate change and respiratory illnesses in urban centers (World Health Organization, 2018). Fossil fuel dependency also exposes African economies to global oil price volatility, impacting household budgets and national fiscal stability (African Development Bank, 2020).

Electric vehicles offer a promising alternative, primarily due to their zero tailpipe emissions and potential to integrate with renewable energy sources, which many African countries are rapidly expanding (International Renewable Energy Agency, 2023). For instance, Kenya and South Africa have made strides in solar and wind energy generation, which could power EVs sustainably (Makoni, 2022). EVs also have lower operating costs because of fewer moving parts and reduced maintenance needs (Electric Vehicle Association of Africa, 2023). Yet, significant barriers persist, such as the high initial cost of EVs, limited charging infrastructure, and the current insufficiency of grid reliability in many regions (Njoroge Mwangi and Fatima Suleiman, 2020).

From a socio-economic perspective, conventional petrol cars currently align better with African realities due to affordability and infrastructure availability. Nevertheless, the long-term sustainability, environmental benefits, and technological advances in EVs suggest a gradual transition is both necessary and inevitable (African Union, 2021). Strategic investments in renewable energy, charging infrastructure, and localized manufacturing could accelerate EV adoption, making them viable even in less developed areas (United Nations Environment Programme, 2022).

Thus, although petrol-powered cars remain the pragmatic choice for many Africans today, embracing electric vehicles in a phased and context-specific manner promises substantial benefits. Policymakers should focus on creating enabling environments through subsidies, infrastructure development, and public awareness to realize the EV revolution in Africa.

Comparing petrol-powered cars and electric vehicles in Nigeria

Nigeria, as Africa's most populous country and largest economy, offers a critical lens through which to examine the feasibility and impacts of petrol-powered vehicles versus electric vehicles. The transportation sector in Nigeria contributes significantly to urban air pollution and greenhouse gas emissions, prompting increasing interest in cleaner alternatives like electric vehicles. However, affordability and infrastructure remain major hurdles for EV adoption.

Petrol-powered cars continue to dominate Nigeria's roads primarily because of their relative affordability and established maintenance ecosystem. New and used petrol cars are readily available, with prices varying widely but generally within reach for middle-income Nigerians (Adewale Adebayo and Chijioke Nwosu, 2021). The affordability of petrol vehicles is also supported by the availability of spare parts and a large pool of skilled mechanics, which keeps maintenance costs manageable (Obioma Okafor, 2020).

On the other hand, electric vehicles in Nigeria face significant cost barriers. The initial purchase price of EVs is substantially higher due to import tariffs, lack of local manufacturing, and the novelty of the technology in the Nigerian market (Emmanuel Ojo and Ifeoma Eze, 2022). According to a study by the Nigerian Automotive Council (2021), electric cars can cost two to three times more than comparable petrol vehicles, making them inaccessible to the majority of Nigerians. Moreover, limited financing options and a lack of government incentives further restrict EV affordability.

Presently, there is inter-governmental collaboration, for China to establish Electric vehicles manufacturing plants in Nigeria (Kenneth , 2025 and Oni ,2025), as well as develop the Lithium resource deposits in the country, which is very valuable in the production of durable EV batteries (Atungwu, 2025). This invariably will have a trickle-down effect, in EV vehicle manufacturing, allow such products to be more available, and provide local technicians and artisans, with training and employment in Nigeria.

Conclusion

Petrol-powered cars remain the most practical choice, especially in sub-Saharan Africa, especially for most Nigerians today, due to their affordability and established support infrastructure. Yet, their environmental impact poses significant challenges that cannot be ignored. Electric vehicles, while currently expensive and constrained by Nigeria's energy infrastructure, represent a sustainable alternative that aligns with global climate goals. Policymakers and stakeholders in Nigeria must therefore prioritize investment in renewable energy, incentives for

EV purchase, and infrastructure development to enable a gradual but effective transition towards electric mobility. If this is replicated, especially in most underdeveloped, but highly populous countries in Africa, the dependency on fossil fuel, and that associated environmental degradation will be a thing of the past. Then the future will be more desirable.

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