ELECTRIC MOBILITY TRANSITION

KIGALI, RWANDA

WE DRIVE CHANGE

WOMEN IN E-MOBILITY DRIVE CHANGE

EXECUTIVE SUMMARY

Kigali is navigating the early stages of e-mobility adoption, with national policies like the NDC and Climate Change Action Plan laying the groundwork. While the city-level policies are developing, they remain less advanced compared to national frameworks. Private sector initiatives are gaining traction, driven by a focus on reducing operational costs and aligning with environmental goals. However, challenges persist, such as high upfront costs and the need for comprehensive charging infrastructure.

Stakeholder engagement is evolving, with start-ups playing a crucial role by collaborating with public officials to address barriers to e-mobility. Despite this, informal transport operators remain relatively marginalized and require more inclusion in the transition process.

To advance e-mobility effectively, Kigali needs further detailed research on its impact across different vehicle types. Enhancing transparency and involving transport providers in policy formulation is essential for developing effective financial models. Additionally, integrating e-mobility with urban planning will ensure the strategic placement and safety of charging infrastructure, facilitating a smoother transition.

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INTRODUCTION

Global agendas emphasize sustainability to combat climate change, with transportation generating 23% of global greenhouse gas emissions. Promoting public transportation and electric mobility is crucial. The “Avoid-Shift-Improve” paradigm guides this transition, aiming to phase out internal combustion engines (ICE). However, international agendas often neglect local complexities and can have adverse social effects, particularly on low-income groups. The COVID-19 pandemic has further strained informal markets, complicating the transition to sustainability.

East African cities, including Kigali, face challenges in implementing e-mobility solutions. Electric vehicles are entering the market slowly, mainly in micro-mobility contexts. This transition involves a complex value chain of vehicles, charging infrastructure, and multi-sectoral cooperation. Addressing social justice, informal solutions, and workers’ rights is crucial. Bottom-up activism and local start-ups often support this transition. Policies must integrate formal and informal practices to increase acceptance of e-mobility innovations.

Electric Mobility in Kigali, Rwanda

Kigali leads Rwanda’s transition to electric mobility, focusing on reducing emissions and improving air quality through policy support, infrastructure development, and stakeholder engagement.

Policy Support

Rwanda promotes electric vehicle adoption with tax incentives, subsidies, and renewable energy investments. The National Strategy for Transformation (NST1) emphasizes green growth and climate resilience, reducing fossil fuel dependency.

Infrastructure Development

Kigali invests in charging infrastructure, partnering with private sector players and integrating renewable energy sources like solar power.

Stakeholder Engagement

Kigali’s transition involves government agencies, private companies, NGOs and the informal transport sector. The government supports moto-taxi operators with training and financial aid to switch to electric motorcycles.

Challenges and Socio-Economic Considerations

Challenges include socio-economic impacts on those relying on traditional vehicles, high investment costs, and infrastructure readiness. Policies must offer subsidies, microloans and capacity-building programs to support informal transport providers.

Public Response and Bottom-Up Initiatives

Public response is mixed, with growing support for sustainable transport but concerns about EV affordability and practicality. Bottom-up initiatives, including local start-ups and grassroots campaigns, play a crucial role in promoting electric mobility.

Recommendations

- Financial Support: Provide subsidies and financial assistance for EV transition.
- Infrastructure Expansion: Develop charging infrastructure, especially in underserved areas.
- Awareness Campaigns: Promote e-mobility benefits to increase public support.

E-MOBILITY POLICY ENVIRONMENT IN KIGALI

BARRIERS AND OPPORTUNITIES

Overview

Electric mobility offers significant opportunities for diverse mobility providers, necessitating an enabling policy environment for public transport companies, corporations, innovators and individual drivers. Rwanda is in the early stages of developing policies for transport electrification, identifying e-mobility as a low-carbon strategy to mitigate carbon emissions and urban air pollution. However, these policies remain nascent and fragmented.

National Policies

In May 2020, Rwanda's second Nationally Determined Contribution (NDC) identified electric mobility as a climate change mitigation measure, targeting a 9% reduction in greenhouse gas emissions in the energy sector by 2030. The NDC outlines a plan for the progressive adoption of electric buses, cars, and motorcycles starting in 2020, although this plan is conditional on external financial support. This builds on earlier mentions of electric mobility in Rwanda's Third National Communication under the United Nations Framework Convention on Climate Change.

Rwanda is currently revising its National Transport Policy to align with e-mobility goals set out in the NDC. A 2019 feasibility study by the Rwanda Green Fund (FONERWA) initiated efforts towards an e-mobility strategy, projecting a 17% reduction in greenhouse gas emissions by 2030 if targets for electric vehicle adoption are met. Following this, President Paul Kagame announced plans to replace conventional motorcycles with electric ones.

Rwanda is also developing financial incentives and technical standards to promote e-mobility. Recommendations from the feasibility study include reduced import duties, VAT exemptions, and special electricity tariffs for charging stations. The Rwanda Standards Board is working on establishing charging standards.

Local Policies

At the city level, the Kigali 2050 Transport Master Plan, updated in 2020, references the deployment of charging stations at fuel stations, though details on the extent, location and timeline of deployment are lacking.

Challenges and Opportunities

The transition to e-mobility in Kigali faces several challenges, including a fragmented and nascent policy environment, high investment costs and infrastructure readiness. Additionally, there are socio-economic impacts on those relying on traditional vehicles, which need to be addressed.

However, there are significant opportunities for Kigali's e-mobility transition. There is potential for a substantial reduction in greenhouse gas emissions, especially with the integration of renewable energy sources like solar power. Government support, along with international donors, can play a crucial role in facilitating this transition.

To overcome these challenges and capitalize on opportunities, Kigali needs to enhance financial support for the transition to electric vehicles, expand the development of charging infrastructure, particularly in underserved areas, and conduct public awareness campaigns to promote the benefits of e-mobility and increase public support.

ELECTRIC MOBILITY STAKEHOLDER LANDSCAPE

Overview

Transportation is seen as a complex system requiring support from a wide range of institutions. In Kigali, multiple stakeholders, including public authorities, private e-mobility companies and traditional transport providers, are involved in the shift to electric vehicles. However, their levels of involvement vary significantly.

Public Authorities

National-level institutions are primarily responsible for transport policy development in Kigali. Local city authorities, such as the City of Kigali government, manage urban development and coordinate with national entities. The Rwanda Utilities and Regulatory Authority (RURA) plays a crucial role in regulating urban transport services. National authorities often dominate the e-mobility discussions and policy developments, with limited input from local authorities.

New E-Mobility Private Players

Kigali is witnessing a rise in private sector initiatives in e-mobility. Companies like Volkswagen, Ampersand, Safi Ride, Rwanda Electric Mobility (REM) and Gura Ride are leading pilot projects. These companies actively engage with public institutions to shape policies and regulations for e-mobility. Discussions and workshops, often organized by public institutions or international organizations, facilitate these interactions.

Traditional Transport Providers

Traditional transport providers, including minibus operators and moto-taxi drivers, play a significant role in Kigali's transport system. However, their involvement in e-mobility discussions has been limited. The phase-out of non-licensed minibuses and the growing share of moto-taxi services highlight the need for their inclusion in e-mobility planning. Direct engagement with motorcycle taxi drivers for data collection and feasibility testing is occurring but varies by company strategy.

International Organizations and Academia

Academia, NGOs and international organizations like UN Environment and UN-Habitat contribute significantly to e-mobility research and development in Kigali. They support projects, facilitate stakeholder engagement, and provide expertise and funding to advance e-mobility initiatives. These entities play a vital role in assessing the current transport scenario and developing sustainable e-mobility solutions.

Overall, Kigali's e-mobility landscape involves a mix of public and private stakeholders, each playing distinct roles in policy development, project implementation, and stakeholder engagement. Despite challenges in coordination and involvement, the city's e-mobility transition is progressing with active participation from various sectors.

OPPORTUNITIES AND BARRIERS FOR PROMOTION OF E-MOBILITY

Opportunities

Ecological gains, such as climate change mitigation and reduction in air pollution, are significant drivers for e-mobility in Kigali. Public sector representatives, international organizations and local operators emphasize these environmental benefits. Additionally, reducing dependency on petrol and shifting to renewable energy are crucial incentives. Cost reduction in vehicle operation and maintenance, particularly for electric two- and three-wheelers, is another key advantage highlighted by start-ups, transport providers and local authorities in Kigali.

Economic opportunities include job creation, fostering a dynamic start-up scene and urban planning innovations. There is also strong international support and funding for e-mobility projects, enhancing the development of this sector.

Barriers

Several barriers hinder the mainstreaming of e-mobility in Kigali. Negative perceptions of EVs and a lack of awareness about their benefits are major issues, particularly from the public sector's perspective. Public and transport operators need convincing of the advantages and cost-effectiveness of EVs.

Infrastructure challenges, such as poor road conditions and the high costs of deploying charging stations, are significant concerns. While the development of charging infrastructure presents opportunities for the private sector, urban planning for these stations remains underdeveloped. Reliability, cost and access to electricity also pose challenges.

Policy gaps and bureaucratic hurdles complicate the transition to e-mobility. Despite the government's push for eco-friendly policies, start-ups face obstacles due to missing regulations and limited technical support.

Sectoral Dynamics

Public authorities at the national level focus on creating a conducive environment through legal and regulatory frameworks, while the private sector, particularly start-ups, drives innovation and implementation. Cooperation among international NGOs, academia, industry and start-ups is strong, with projects like the EU-funded SOLUTIONSplus promoting e-mobility.

The involvement of traditional transport providers is limited. High upfront investment costs and the need for a conducive policy environment are significant barriers. Despite some efforts to engage operators, more needs to be done to include them in the e-mobility transition. Transport providers acknowledge the potential benefits but remain cautious about the costs and competition from new mobility solutions.

Overall, Kigali's transition to e-mobility presents both significant opportunities and formidable challenges. Addressing infrastructure, policy and awareness issues will be crucial for the successful promotion and adoption of e-mobility in the city's transportation system.

DISCUSSION AND CONCLUSIONS ON E-MOBILITY

Overview of Policy and Project Development

Kigali is in the early stages of transitioning towards transport electrification. Rwanda has more advanced policies compared to its East African counterparts, with electric vehicles featured prominently in environmental and climate documents, such as the NDC and Climate Change Action Plan. The country is also developing technical standards for e-vehicles and has a strategic approach detailed in a comprehensive feasibility study. However, city-level policies in Kigali are less advanced, only vaguely mentioning e-mobility or working towards developing relevant strategies.

On-the-ground developments in Kigali are dynamic, primarily driven by small private companies. These projects are at various stages, from prototyping to limited fleet deployment. The private sector is actively exploring the economic benefits of lower operational and maintenance costs associated with electric vehicles.

Role of Different Stakeholders

In Kigali, private stakeholders are highly mobilized, driven by the need to meet decarbonization targets, reduce air pollution, and benefit from the economic advantages of EVs. Despite significant financial and technical barriers, such as high upfront investment costs and concerns about EV performance in local conditions, start-ups are the most active players in the e-mobility transition.

Coalitions between start-ups and public sector officials are forming to overcome procedural difficulties and open business opportunities. These collaborations are incentivized by the potential for e-mobility to help achieve environmental and economic goals, such as energy independence and economic growth.

Positioning of Informal Actors and Operators

The study identifies a gap in the recognition and involvement of informal actors and transport operators in Kigali's e-mobility transition. While start-ups and public authorities engage in policy discussions, transport operators and their associations are not adequately involved. This marginalization raises questions about the ability of e-mobility initiatives to address the needs of these providers, particularly those operating buses and minibuses, which require significant investment to transition to electric mobility.

IDENTIFIED GAPS AND RECOMMENDATIONS

Need for Further Research
More granular research on e-mobility is needed, distinguishing between different transport modes and vehicles. Effects of electrification vary due to differences in investment costs and technical characteristics, necessitating detailed analysis.

Stakeholder Involvement
Decision-making and policy formulation must be transparent, with structured engagement from transport providers. Co-production schemes should be implemented to consider their needs and expectations, exploring financial models like leasing or rental schemes to ease the transition.

Urban Planning Integration
E-mobility strategies must integrate urban planning. The location of charging infrastructure, safety, and connectivity between transport modes are crucial. Inclusive planning practices should consider informal and semi-formal transport services and infrastructure to maximize the benefits of e-mobility.

CONCLUSION

The study calls for an inclusive approach to electric mobility in Kigali, involving all stakeholders, especially transport providers. This approach should address financial constraints and consider redistributive effects that benefit these providers. Effective policy and project implementation will require continuous research, transparent decision-making, and integrated urban planning to ensure a successful and inclusive transition to e-mobility in Kigali.

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Author Contributions

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J.A.O., J.S.; writing—original draft preparation, J.G.; E.M.; A.N.; J.A.O.; J.S.;
E.T.; writing—review and editing, J.G.; E.M.; A.N.; J.A.O.; supervision, J.G.; E.M.; project administration, O.L.; funding acquisition, O.L. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

The study was conducted according to the H2020 ethics standards, and approved by the SOLUTIONSplus consortium (January 2020).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The data presented in this study are available on request from the corresponding authors. The data are not publicly available due to confidentiality agreement with the interviewees included in this study.

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Conflicts of Interest

The authors of the article are involved in the SOLUTIONSplus project, dealing with the roll-out of e-mobility solutions in Rwanda and Tanzania.