



Rwanda's e-Mobility Transition: Snapshot of the Market Opportunity

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Context

This document is intended for foreign private sector participants, to provide an indicative summary of the progress and current activity being undertaken in Rwanda to transition internal combustion engine vehicles to electric vehicles. It should be noted that foreign direct investment, and the expertise that often accompanies it, would be welcomed as catalytic capital for these ambitions to be realised in the shortest possible timeframe. In addition to the economic opportunities this could bring there is a significant positive environmental impact resulting from the consequential reduction in CO2 emissions. The information is taken from public sources.

Background & Current Landscape

Rwanda is at an early stage of an e-mobility transition. The Kigali City Master Plan 2020 outlines a land use and zoning strategy to leverage urban growth for modernization¹. As part of that strategy, there is an intention to introduce e-buses in combination with feeder services of e-moto taxis and shared e-bikes². However, Rwanda's disaggregated network of c.3,000 bus and minibuses for the 47 public bus and minibuses companies and cooperatives meant a focus on integration was needed before electrification.

Following this, Rwanda's Nationally Determined Contribution (NDC) outlines a goal to phase in electric buses, along with passenger vehicles, and motorcycles starting in 2020. It calls for up to US\$900 million for EV purchases and infrastructure development³. A detailed plan for meeting those goals is yet to be established.

There are four key considerations for managing the e-bus transition (recognised by case studies and best practices globally):

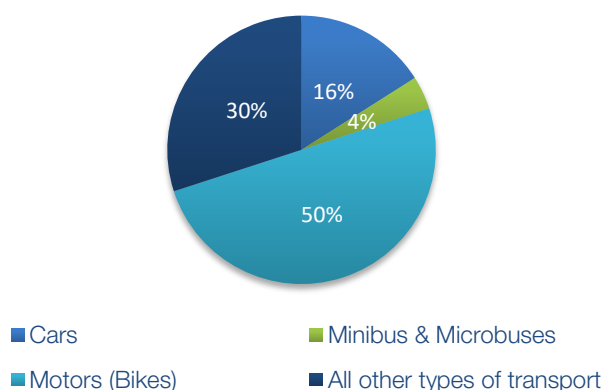
1. *Charging infrastructure/equipment standards* (letting the private sector know what technology to install without hampering competitive innovation for future updates in boosting range and speed of charging).
2. *Land availability* (cost and location) suitable for terminus sites.
3. *Financing availability* for the upfront capital expenditure into infrastructure and assets.
4. *Grid reliability* – fears of a single charging station outage could render a fleet unusable need to be resolved.

At the end of 2018, Rwanda had 216,204 registered vehicles, with motorcycles representing a 50% share and passenger four-wheelers nearly 20% (Figure 1). By 2030, the total number of vehicles on the road will grow by 16.5% annually, with light-duty vehicles growing by 20%⁴. The population is expected to grow to 16.2m by 2032 from 10.5m in 2012.

Personal car ownership in Rwanda is below 2% of the population⁵ for affordability reasons. The most typical net annual wage is about US\$ 7,000 (RWF 6,945,496)⁶, and a new vehicle costs around US\$23,881 (RWF20,500,000) for the most affordable locally assembled Volkswagen car⁷. Consequently, motorcycles constitute the leading form of [personal] transport in the country. Taxi cooperatives and individual motorcyclists operating licensed fleets make up the modal choice for available public transportation.

Figure 1

No. of vehicles registered by category, 2018



There are clear environment and social benefits arising from transition to EVs in terms of reduction of air pollution, CO2 emissions. Furthermore, the focus on new technology helps the country to orient itself towards a growth economy. The Government of Rwanda wishes to embrace the expansion of electric vehicles (EVs), by supporting uptake of EVs with a strong focus on scaling the adoption of electric motorcycles (e-motos)⁸. As it stands, only a few e-motos are in operation as taxis, with private companies have only just begun introducing business models to improve affordability and access to the two-wheelers. One Rwandan e-moto company estimates it will require between US\$70 and US\$90 million of working capital to replace all internal combustion engine-driven motorcycles in Rwanda with e-motos by 2025. For e-buses and e-cars, significant feasibility assessments and pilot studies have been performed over the past 3 years.

A reliance on expensive imported fuels, the significant skills gap in technical and managerial jobs, and poor access to finance are constraints that motorcycle companies point to as hampering business development⁹. There is a significant cost-savings argument for government to provide financial and non-financial incentives to scaling and accelerating the e-moto transition. Around 95% of energy-related imports are fossil fuels and with the country landlocked, fuel costs are over 70% higher than in neighbouring countries. Analysis carried out in 2020 by the International Growth Centre (IGC) found that an estimated net RWF 17 billion (USD 16.9m) could be saved on fuel imports, along with additional electricity revenue, with a shift to 100% e-motos by 2025¹⁰. It is worth noting that the majority (over 60% as of 2020) of Rwanda's electricity generation is from renewable energy (hydro and geothermal)

Only 17.4% of the approximately 12 million Rwandans live in urban areas¹¹, with scattered settlements in rural areas often unsuitable for high-occupancy public transport¹². Non-motorised trips make up a large share of the country's mode of transport meaning rural residents rely on walking, bicycles, carts, and motorbikes¹³. To reach these areas with e-mobility solutions, collaboration between the e-moto manufacturers and off-grid power producers is needed.

Developments

There are a number of e-mobility movements underway to build knowledge and understanding the appetite for electric solutions within Kigali and further afield:

- **International Finance Corporation (IFC)** dispatched a team of consultants to conduct the feasibility study of e-buses in City of Kigali. This is expected to be published in the second half of 2021 with recommendations for action.
- **Global Green Growth Institute** assessed electric bus charging infrastructure including recommendations on charging infrastructure types, vehicle models, and charging locations. The report also provides a comparison of the total cost of ownership (TCO) of installing and operating electric buses compared to diesel buses. Concurrently, they supported 13 Government of Rwanda officials to complete training in electric bus system modelling, optimization and aspects included within the report. The next phase for them will be to mobilise the resources and investment necessary to enable the transition.
- **Moving Rwanda**, a digital mobility project collaboration between Siemens, Volkswagen, Germany's Federal Ministry for Economic Cooperation and Development, the German development agency GIZ, SAP, and the engineering firm Inros Lackner. The **pilot by Siemens and VW** explores the potential of e-mobility for helping transform how people travel throughout Africa's cities with up to 50 electric VW Golfs deployed in Kigali for testing. They are also testing ride hailing and car sharing solutions with c.75% of Rwandans owning a mobile phone but less than 4% owning a car. Further information on these schemes can be found [here](#).
- **Ampersand**, one of the first players into the e-motorcycle space has secured a \$3.5m investment from the Ecosystem Integrity Fund (EIF), making it the largest e-mobility investment by a venture capital fund in sub-Saharan Africa to date. They assemble and finance electric motorcycles that are cheaper, cleaner, and

better performing than most petrol motorcycle taxis that are in use across east Africa. They also build and operate a network of battery swap stations, allowing drivers to change batteries faster than refilling a tank. The pilot started in May 2019 and since then the fleet of 35 drivers have cumulatively covered more than 1.3 million kilometers¹⁴ - the company has a waiting list of over 7,000 drivers.

- **United Nations Development Programme (UNDP)**, working with the Government, launched a Retrofit Electric Motorcycle Project to accelerate the transition from petrol-fueled motors, to electric ones. During the six-month pilot phase (from June 2021), 80 motorcycles will be retrofitted, then targeting 30,000 over 5 years specifically for used bikes that are older than 3 years.

Policy Measures

To facilitate the promotion of electric vehicles, the Government of Rwanda approved the policy for e-mobility adaptation (e-vehicles and motorcycles) during the Cabinet meeting held on 14th April 2021. It contains the following incentives that apply to electric vehicles, plug-in hybrid electric vehicles and hybrid electric vehicles:

1. Electricity tariff for charging stations shall be capped at the industrial tariff level (large industry category) and the vehicles will benefit from a reduced tariff during off-peak times.
2. Electric vehicles, spare parts, batteries and charging station equipment shall be treated as VAT zero rated products, and an exemption of import and excise duties.
3. Exemption of Withholding Tax of 5% at customs.
4. Rent-free land for charging stations (for land owned by Government).
5. Provisions of EV charging stations in the building code and City planning rules.
6. Free license and authorization for commercial EVs.
7. Companies manufacturing and assembling electric and hybrid vehicles in Rwanda are given other incentives such as 15% Corporate Income Tax (CIT) and a tax holiday.
8. Provide preference to electric vehicles for Government hired vehicles.

Notable Events

Sustainable Markets Initiative and World Economic Forum Workshop:

Following the announcement of the approved policy points, the SMI and the Forum gathered key local and international stakeholders for Rwanda's e-mobility transition into a workshop (in May 2021) to discuss the next steps and recommendations to accelerate action. With contributions from private sector companies, government ministries, academics, and NGOs, these were the key takeaways discussed at the session:

Light Duty Vehicle Recommendations:

- Pilots and demonstrations are necessary to build context for investors and policymakers.
- Funding needs to go to long-term projects – the NAMA Facility with the Carbon Trust and Rwanda Green Fund is one model for how funding could work.
- Capacity-building is essential – human capital is needed for sufficient EV maintenance and operations such that trust can be built with the public to: 1. mitigate “range anxiety” for charging, and 2. alleviate the perception that there is a shortage of qualified EV maintenance professionals (consideration could be given to an immigration policy for attracting foreign talent).

Heavy Duty Vehicle Recommendations:

- Generate demand: there is a need to conduct a successful pilot with clearly defined outcomes and learnings; scoping of the pilot project must weigh up width of visibility vs low variability (i.e., wider engagement with more risk, or narrower pilot with greater control).
- Consider how to share risks appropriately between original equipment manufacturers (OEMs), financiers, operators, utilities and policymakers.
- Important to engage more actively with vehicle manufacturers in order to tailor a design brief for specific locations – this will improve the effectiveness of the pilot and help with capacity-building.

Key Takeaways:

- The Government of Rwanda welcomes international collaboration and private sector engagement. Through the pilot schemes underway to date, and the incentives set out in Government's policy, the Rwanda Development Board (department of the Government) is ready and willing to engage with third parties.
- Geographically and politically, Rwanda has been cited as a favourable location for pilots ahead of expansion into east Africa. The stable climate (no extreme temperatures) and forward thinking government attitude towards sustainability policy (e.g., banning of single use plastics) makes this is an accommodating testbed.
- The pilot schemes progress to date have been successful and drawn the attention of major global players. One report quoted a complete transition to electric mobility would cost Rwanda \$900m USD and could provide the Government a potential saving of RWF 23bn (\$22m USD) in fuel imports per year.
- The financing gap and key technical expertise are the two major areas requiring further support to see these studies become large scale demonstrations of viability for the rest of the world. The commercial opportunity exists with proof of a working model in Rwanda before expanding further afield into east Africa and wider across the sub-Saharan.

Contact

For more information and to engage in further discussion, please connect with one of the following contacts:

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