Say Goodbye to the Petrol Moto:

Rwanda's 2025 Shift from Petrol to Electric Motorcycles

KENYA | December 2024

Image Credits: Ampersand

AFRICA E-MOBILITY ALLIANCE

In Summary

Rwanda is making significant strides in electric mobility, announcing a registration ban of internal combustion engine (ICE) motorcycles for commercial use in Kigali by January 2025[1]. Going forward only new registrations of electric motorcycle taxis (also called "Moto" in Rwanda) will be permitted within the City of Kigali. Rwanda is committed and determined to go electric, like fellow East African country Ethiopia, which announced a ban on all internal combustion engine (ICE) vehicles in 2020[2]. Other neighbouring members, Kenya and Uganda, also have ambitious plans, with Kenya having a goal of 5% electric vehicles of total vehicles by 2025[3], and Uganda to fully transition to electric vehicles before 2040[4].

The drive toward a greener transport solution is crucial for African nations with increasing populations, but also increasing issues of polluted air, rising fuel prices, and urban congestion. This remarkable transition and commitment by the Rwandan government is not a surprise, as the Government of Rwanda has been committed to a green transition for the past 5 years: in 2019, President Paul Kagame announced his commitment to shift from internal combustion engine (ICE) motorcycles to electric motorcycles, which since has been backed by multiple Electric Vehicle (EV) sector promoting government policies such as VAT and import duty exemptions.

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1 https://www.newtimes.co.rw/article/21528/news/rwanda/rwanda-to-halt-registration-of-petrol-motor-cycles-in-2025

2 https://cleantechnica.com/2024/07/31/ethiopia-says-ice-vehicle-import-ban-continues-as-part-of-new-economic-reforms-only-ev-imports-allowed/

3 https://cleantechnica.com/2024/07/01/dynamics-of-electric-mobility-transition-in-kenya/

4 https://sti.go.ug/wp-content/uploads/2024/07/National-E-Mobility-Strategy.pdf (VI)

Global EV interest in Rwanda

With the commitment toward a greener commercial transport industry with motorcycles came interest from large global OEMs like BYD, which recently opened a dealership in Rwanda earlier in 2024 under CFAO mobility. This new wave of interest brings along affordability and increased demand, which ultimately makes electric mobility solutions - from electric bicycles, motorcycles, cars and buses - affordable and accessible for Rwandan citizens.

Credits: Spiro electric motorcycles

Current EV Players in Rwanda and the Electric Vehicle Sector

Rwanda's EV market has seen a recent growth in all facets of the sector. Companies such as eBee and eWaka made their entrance in 2024 with their electric bicycles leveraging their experience from Kenya and bringing innovative products to local commuters and businesses as alternative cargo solutions. Kigali's delivery service Vuba Vuba and other grocery shops adopted

these electric bicycles rapidly, recognizing them for their simple operations and reduced costs of delivery.

Kigali's electric motorcycle taxi market has been led by Ampersand, established in 2016 and rapidly growing since then.[5] The company provides not just electric vehicles but also smart lithium batteries, battery swapping stations, performance and location tracking software and other necessary equipment to promote e-mobility,[6] and won the ACE Award for Sustainable Supply Chains in 2023.[7] China's BYD has also entered the Rwanda market through its partnership with Ampersand.[8] Another key player in Rwanda's electric two-wheeler market is Spiro, who has deployed dozens of battery swapping stations and cabinets around Kigali and recently ventured into Rwanda's secondary cities as well. Further noticeable market players are REM (Rwanda Electric Motorcycles), which works to convert Rwanda's fleet of TVS motorcycles to electric; REVOO, which has opened multiple shops in Kigali offering electric scooters mostly used for personal commuting; and S.U.L E-Mobility, which offers electric two wheelers (e2W) with fixed batteries which can be charged at EvP chargers across Kigali.

Outside of e-motorcycles, Kigali is pushing the promotion of electric buses to make public mass transport greener as 40% of Rwanda's transport emissions (13% of total emissions in Rwanda)[9]

[5] https://www.ampersand.solar/about
[6] https://www.state.gov/reports/2024-investment-climate-statements/rwanda/
[7] https://www.state.gov/reports/2024-investment-climate-statements/rwanda/
[8] https://www.globalfleet.com/en/safety-environment/africa-middle-east/features/byds-strategic-move-catalyze-e-mobility-rwanda-and-kenya?a=API07&t%5B0%5D=Africa&t%5B1%5D=EVs&t%5B2%5D=BYD&curl=1
[9] https://climatechange.gov.rw/index.php?id=35&tx_news_pi1%5Bnews%5D=213&tx_news_pi1%

are attributed to buses while 26% of the transport emissions are from motorcycles. Local bus operators have recently shifted to e-buses, mostly sourced from companies such as IZI Electric and Kenya-based BasiGo, two companies that both received grants from Rwanda's Green Fund. As of October 2024, BasiGo has six e-buses in operations in Kigali, while IZI Electric has seven electric buses in operations. Both companies have pledged to bring up to 100 e-buses to Rwanda over the next few years, highlighting the need by the bus operators, as well as the improved performance compared to CO2 emitting diesel buses.

For heavy-duty electric vehicles, Ox Delivers produces a line of British-designed electric trucks that can be assembled on site and are offered through a pay-as-you go model. They are designed to provide necessary transportation options for rural Rwandans, and also provide an associated B2B marketplace and necessary charging infrastructure to make the usage of such trucks viable.[10]

Finally, in the personal use electric four-wheeler sector, Rwanda has seen a significant uptake of hybrid cars, while the pure electric car market is still growing. According to Rwanda Revenue Authority (RRA) in 2020, Rwanda had only 19 EVs (hybrid and fully electric) registered, increasing by October 2024 to 512 fully electric cars and 6,660 hybrids.[11] Companies such as Kabisa, KAS Auto, Volkswagen, Greenleaf Motors, Auto 24 are on the forefront to promote and

5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&tx_news_pi1%5B@widget_0%5D%5BcurrentPage%5D=3&cHash=6cf0cdb0e9a306ae78b547ec9700a421

[10] https://www.oxdelivers.com/

[11] https://www.newtimes.co.rw/article/21106/news/business/inside-surge-in-hybrid-cars-in-rwandas-automotive-market source

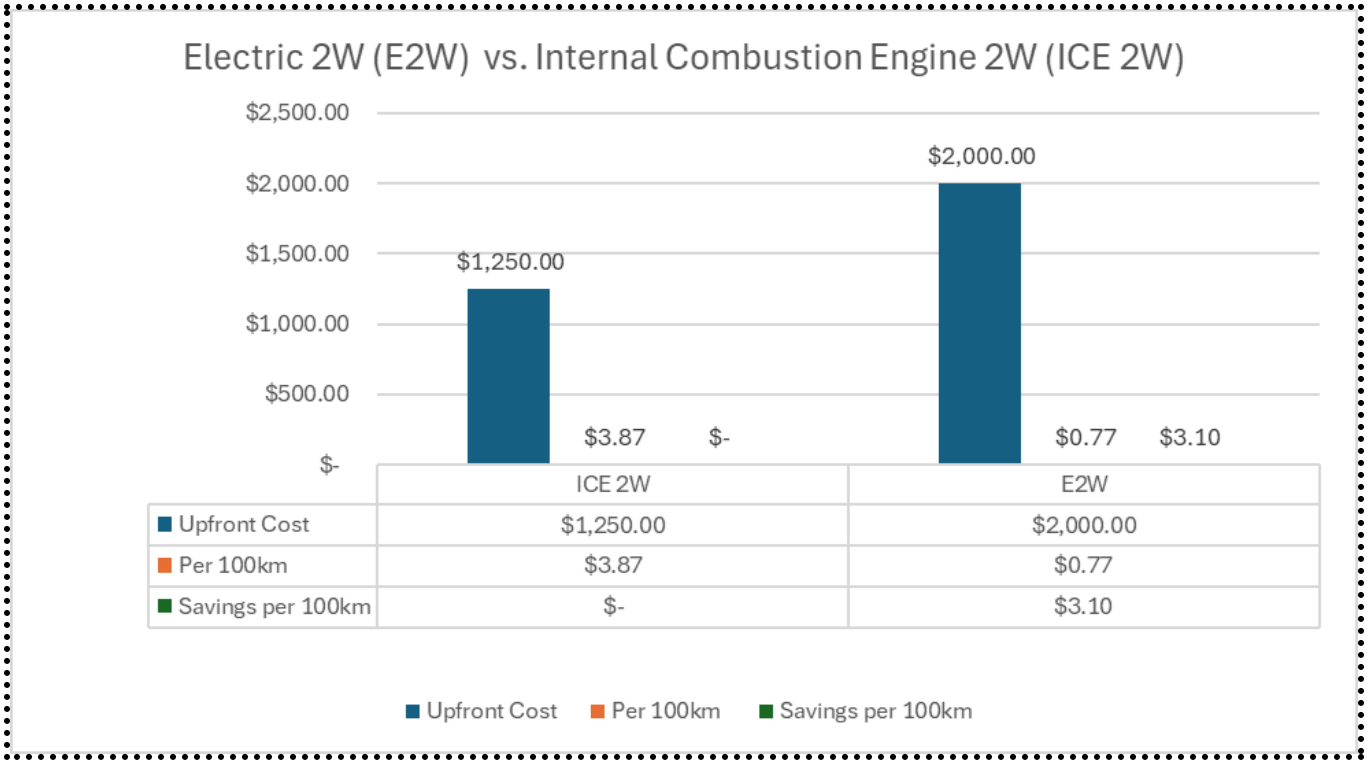
import more electric cars, while the charging infrastructure and installation service is mainly provided through enterprises such as EvP and Meshpower.

In general, Rwanda's EV market is still in its early stages but set to high growth through the Government of Rwanda's proactive policy framework. Recently, in October 2024, the key players of Rwanda's EV sector came together for a two-day forum to discuss challenges and opportunities, organized by GIZ Rwanda and MININFRA. This forum included stakeholders from various government institutions, financing partners, academia, utilities and various key private sector players.[12]

[12] https://changing-transport.org/driving-rwandas-green-future/

Electric 2-Wheeler vs. Internal Combustion Engine 2-Wheeler

Data from Ampersand and Roam (Kenya) shows the variance in ownership and operating cost for electric 2W and ICEV.



Data averaged from Ampersand, Roam, and Fuel prices

State of Electric-Mobility Policy in Rwanda

A strategic government paper was released in 2021 by Rwanda's Ministry of Infrastructure (MININFRA) which assessed the state of play of e-mobility as of late 2020, calculating the then-limited number of electric vehicles on the country's roads and sketching out both challenges

to further adoption and near-term policies to promote further EV rollout.[13] Many of these were adopted, including subsidies in 2021[14] and, later, VAT tax breaks, import duty exemptions and incentives for domestic production.[15] As of 2024, plans were underway to produce 40,000 electric motorcycles as part of a joint project between BYD, the Chinese automobile OEM, and Ampersand, the Rwanda-based electric motorcycle producer.[16] Rwanda has also stated its Vision 2030 targets to electrify 20% of buses, 30% of motorcycles and 8% of cars by 2030.

Another key incentive is being implemented by Rwanda Energy Group (REG), Rwanda's power utility company, which is providing e-mobility companies with their lowest industry power tariff when setting up charging or battery swapping stations. Finally, at least compared to neighboring countries like Uganda, Rwanda is slightly on the forefront in regards to the deployment of e-motorcycles. As far as data can be identified, there are approximately 5,000 active e-motorcycles in Kigali - 3,750 Ampersand bikes, 1,300 Spiro bikes, and an unconfirmed number of REM, S.U.L. and REVOO bikes.[17] While these numbers indicate the success of the existing policies, several of the promised policies which would help to further drive the transition to e-mobility are not yet fully in place as they lack implementation. Notably among these is the

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13 https://www.mininfra.gov.rw/fileadmin/user_upload/Mininfra/Publications/Laws_Orders_and_Instructions/Transport/16062021_Strategic_Paper_for_e-mobility_adaptation_in_Rwanda-Final.pdf

14 https://www.mininfra.gov.rw/updates/news-details/rwanda-has-awesome-new-incentives-for-electric-vehicles

15 https://www.environment.gov.rw/index.php?eID=dumpFile&t=f&f=55460&token=6003242e29667513f33c128466ffc760c62d81d8

16 https://www.globalfleet.com/en/safety-environment/africa-middle-east/features/byds-strategic-move-catalyze-e-mobility-rwanda-and-kenya?a=APl07&t%5B0%5D=Africa&t%5B1%5D=EVs&t%5B2%5D=BYD&curl=1

17 https://www.ifc.org/en/stories/2024/kigali-shift-electric-motorcycles-brings-climate-benefit

provision of free land for charging stations, although the City of Kigali is working on a master plan to implement this in the future.

Existing Barriers

The government of Rwanda has worked hard to connect its efforts to decarbonise all forms of transportation with its efforts to modernise its economy. Programs such as the Kigali International Finance Centre and several government funds are designed to promote foreign investment in e-mobility.[18] The country also has struck deals with the World Bank to issue a sustainable development bond, operates green procurement programs, and has a Renewable Energy Fund through the Rwanda Development Bank to promote solar minigrid development.[19] In practice, however, the U.S. State Department reports that foreign investment is hampered by a variety of economic factors, including competition from state-owned enterprises, transportation and materials import challenges, and a complicated and unfavourable tax environment.[20]

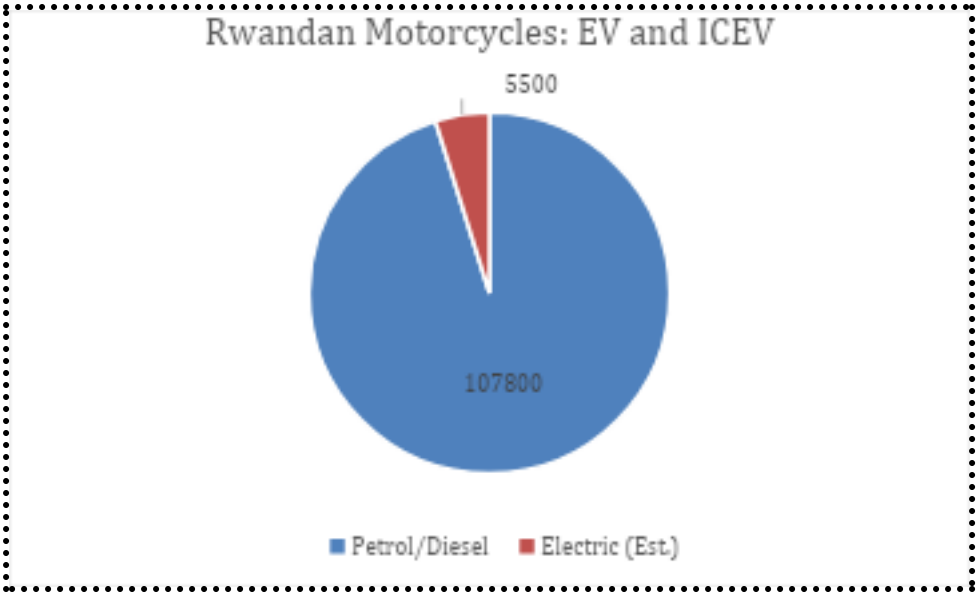
Thus, while Rwanda's private sector has been reasonably successful in facilitating the deployment of e-motorcycles, efforts to resolve these other issues to the extent possible – such as by reforming or otherwise rationalising tax codes and providing other benefits for external investment – would go a long way towards accelerating the e-mobility transition. Establishing clear phase out dates for ICE motorcycles across the country, beyond existing goals of

[18] https://www.state.gov/reports/2024-investment-climate-statements/rwanda/
[19] https://www.state.gov/reports/2024-investment-climate-statements/rwanda/
[20] https://www.state.gov/reports/2024-investment-climate-statements/rwanda/

decarbonizing fully by 2050, are also critical, as they will provide a market signal confirming the need for the private sector to transition.[21] Continuing and expanding government support for domestic manufacturing is a final way to reduce barriers that should help Rwanda to achieve decarbonization goals and accelerate economic development. There is little reason for Rwanda not to follow the path of Uganda in the formulation of policy specifics, given that many of the challenges faced by one country are also faced by the other.

The table below shows the total number of electric 2W as a percentage of total motorcycles in Rwanda.

Electric Motorcycles as a % of Total Count in Rwanda



[21] https://www.state.gov/reports/2024-investment-climate-statements/rwanda/

Data from https://www.ifc.org/en/stories/2024/kigali-shift-electric-motorcycles-brings-climate-benefit and https://worldpopulationreview.com/country-rankings/motorcycles-by-country

Electric Moto's in Kigali: A View From the Ground

The ban on newly registered ICE taxi bikes in Kigali by January 2025, which was announced by MININFRA ahead of the COP29 meetings in November 2024, is a bold step by the Government of Rwanda (GoR) towards their decarbonization targets. This is also a clear sign that GoR both believes in the currently deployed EV solutions, by players such as Ampersand and Spiro, and seeks to further support moto drivers themselves, as E2W have proven reduced operating costs of up to 40% compared to ICE bikes.

The ban on new ICEV motos has been well-received among the major players in Rwandan e-motorcycles. Josh Whale, CEO of Ampersand stated: "We applaud Rwanda's decisive step to double down and Ampersand is very enthusiastic about embracing this call to action. Rwanda has once again demonstrated its leadership in electric mobility on this continent".[22] Meanwhile Spiro CEO Kaushik Burman called the ban "a pivotal move that showcases exemplary leadership in climate action" and said he holds "deep admiration for the Rwandan government's visionary approach."[23]

[22] Private communication, 2024

[23] https://www.linkedin.com/pulse/kigalis-bold-step-towards-sustainable-mobility-milestone-africa-ldnie/?trackingId=Q19TqEAWbedKxyUljfm%2Flg%3D%3D

Estimates show that Kigali sees at least 500 new motorcycles registered every month. This demand can and will be served by the key players, according to direct communication with AfEMA. Ampersand states their current bike assembly capacity at 30 per day, while Spiro is at 20 bikes produced each day. Ampersand, however, claims they can increase production to 90 units daily; Spiro's potential scaling is not currently clear. The firms are also optimistic about their ability to integrate motorcycles produced by other manufacturers into their proprietary battery swapping networks, and the potential for partnerships with other OEMs seeking to break into the E2W and E3W sector. Finally, the increase in e-motorcycles is expected to result in moto drivers realizing substantial maintenance and fuel savings, which can then be reinvested or used to provide economic mobility.

The outlook is overall rosy, although there are some specific challenges. E-motorcycle manufacturers report that government and financial institutions have stepped up to the challenge of accelerating the transition to e-mobility. An unofficial group of EV players, including Ampersand and Spiro, is cooperating with REG to source and deploy necessary lower-voltage transformers necessary to support charging infrastructure, and to ensure charging demand does not overtax the electrical grid. New charging infrastructure will, where possible, be shared between EV players, to help further accelerate the transition.

A larger challenge will lie in terms of obtaining good-quality bikes. Ampersand CEO Josh Whale reported that the ban on new ICEV imports may lead to bad-quality EV bikes being imported to the country, and stated that "Some surprisingly low-quality vehicles and batteries have already been seen entering the market in recent months." There may also be challenges

relating to sourcing necessary spare parts, although the more simple mechanisms of EV bikes could help to reduce the severity of this problem.

Conclusion: Challenges and Solutions

Rwanda has made great efforts to accelerate the electrification of commercial-use fleets. The way forward for Rwanda is to set up a clearly defined and implementable electric mobility policy through the government, which would pave the way for other neighbouring countries wanting to emulate this. The transition to E2W brings hope for others to follow suit, given Ethiopia's recent nationwide ban on ICE imports. If Rwanda publishes a more detailed e-mobility policy plan that acts as a guidebook for other East African Community members, this may increase the interest of the policymakers. Doing so would help to kick the transition to e-mobility into an even higher gear, facilitating not just electric but also economic mobility and an overall healthier environment.

Specific challenges, and some potential solutions, include the following:

1. Costs - Minimizing costs associated with e-bikes and especially their batteries will be key going forward. Innovations like battery swapping will likely be especially useful, as they can help reduce the up-front cost for e-motorcycle buyers.

2. Financing – Collaboration with platforms like Bboxx and Watu for more accessible financing options for the moto/boda riders.

3. Shift from Imports – In the medium term, Rwanda must work to shift away from a full dependence on imported parts, even if paired as today with domestic assembly, and start promoting local production of EVs across the value chain. Setting local production targets, as countries like Thailand have already done, and offering further tax breaks and incentives for domestic manufacturing, as in Kenya and India, will assist with this.[24]

4. Power reliability and greening – Rwanda enjoys an electricity surplus, and 58% of the country's electricity comes from hydroelectric or solar.[25]

5. Circularity – Integrating the circular economy into day-to-day operations of the EV sector is necessary to ensure true sustainability. Standards preventing substandard batteries and promoting proper disposal and recycling, as possible, are critical. The GoR needs a strategy for battery circularity, perhaps based on the Kenya Electric Battery Initiative by AfEMA.

[24] https://africaema.org/resources/AfEMA_policy_paper_2023_Kenya_ii.pdf (p. 17-18)
[25] https://www.reg.rw/what-we-do/generation/

Conversation with Ampersand:

- Active Ampersand riders 3750 in Kigali. Observed 15-20% share of total PARC in metro Kigali, perhaps 10% in periurban areas of the city.
- Currently producing 30 motorcycles a day, but we have capacity to increase this to 90 motorcycles per day.
- Total fleet of moto taxis estimated to be around 55-65,000 in the greater Kigali area.
- Monthly new registrations in Rwanda typically around 750-800 motorcycles per month, of which roughly 500 are sold monthly in Kigali. Our planned vehicle and battery production capacity from H2 next year will be sufficient to meet all this monthly demand.
- Since we offer 40% lower opex costs than a petrol motorcycle, we may also expect the cost of moto rides to passengers to decrease and the ability of Rwandan citizens to afford powered transport to grow, i.e. more motos/ employment.
- We are also glad to work with motorcycle manufacturers and existing distributors in Rwanda that wish to supply quality electric motorcycles into the market utilising Ampersand's proven battery swap network, and assist motorcycle OEMs that wish to develop commercial use motorcycles and three-wheelers for the Rwanda and Africa market.

Response/quote: Josh Wale, CEO of Ampersand

Ampersand started Africa's e-mobility revolution right here in Rwanda, developing our technology right here, and selling Africa's first electric motorcycles in Rwanda over five years ago. We applaud Rwanda's decisive step to double down and are enthusiastic about embracing this call to action. Rwanda has once again demonstrated its leadership in electric mobility on this continent.

Due to supply chain lead times, the first few months of 2025 will likely see some shortfall of new electric motorcycles in Kigali, and some riders may need to wait a little longer than usual to replace their existing motorcycles. Overall though we do not expect this to cause major disruption. There will be other details to iron out, but we're excited and looking forward to 2025.

Challenges

Rwandan public and financial institutions have already been stepping up admirably, to work with us to support this transformation at an accelerated pace.

Our charging network capacity will need to be expanded at a more rapid pace than we'd originally planned, but not vastly so. REG has already studied the demand and assured us the grid has the generation and transmission capacity (HV and MV). In the short term additional lower KVA transformers (e.g. 100-800 KVA) will need to be procured, which also have a lead time. Ampersand is also working together with other EV players to share charging and transformers to simplify the process. The sector is working closely with REG and MININFRA on the details.

We expect grid demand to be around 7-8 kWh per motorcycle per day based on current riding patterns. Ampersand currently delivers over 50 MWh of power to drivers daily.

Product risk - Rwanda's bold policy move may lead to some parties to attempt to import electric motorcycles into the market that are not fit for purpose. Some surprisingly low-quality vehicles and batteries have already been seen entering the market in recent months.

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Citation: *Africa E-Mobility Alliance Research, Peter Kossakowski, "Say Goodbye to the Petrol Moto: Rwanda's 2025 Shift from Petrol to Electric Motorcycles" (2024)*

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