

SHOULD AFRICA HEAD TOWARDS ELECTRIC MOBILITY?

Demographic growth in Africa combined with rapid urbanisation poses adaptation challenges, particularly in the transport and mobility sector. Although electric mobility is often mentioned as a lever for rapid transformation of this sector, its deployment raises many questions related to the African context.

1- THE RISE OF E-MOBILITY IN AFRICA: BETWEEN BRAKES AND DRIVERS

The global electric vehicle market has been growing rapidly in recent years¹. Electric car sales have increased by 55% in 2022, driven by China, Europe and the US.² Today, nearly one in five cars sold in China and Europe is a plug-in electric vehicle (BEV and PHEV)³. In the South, and particularly in East and South-East Asia, it is mainly two-wheelers that are leading this electric revolution. In India, for example, sales of electric two-wheelers jumped by 132% in 2021.⁴ Indonesia,⁵ Malaysia,⁶ Pakistan,⁷ or even Thailand⁸ for example, are following the same trends, whereas Africa still appears to lag behind.

As the last frontier of the automotive industry,⁹ Africa is also the last major region in the world to be affected by electric mobility. However, electric vehicles (EVs) have been receiving unprecedented attention in recent years. Some people see this as an "indispensable opportunity"¹⁰ for the continent, overlooking the many obstacles it faces, including low motorisation rates and heavy dependence on second-hand vehicles, difficulties in accessing electricity and network reliability, relatively low per capita incomes in the face of the prohibitive price of electric vehicles, and a highly carbon-intensive electricity mix.

However, beyond these obstacles, it is possible to identify some drivers of which the continent can be proud. Africa has a vast renewable energy potential that is gradually being exploited. There is also the development of decentralised energy solutions and a relatively low cost of electricity compared to fossil fuel prices in several countries. In addition, the conditions of use of vehicles would reduce their total cost of ownership, as well as the re-evaluation of vehicle import norms and standards in several African countries, and the establishment of incentives for the promotion of electric vehicles.

Building on these drivers, several actors (States, local authorities, international organisations or electric mobility start-ups, etc.) have deployed electric mobility solutions on the continent in recent years. However, between these pioneering and future projects, there is still a lot of uncertainty about the possible trajectories of a sustainable deployment of electromobility in Africa.

2- E-MOBILITY AS A RESPONSE TO VARIOUS SUSTAINABLE DEVELOPMENT ISSUES IN AFRICA

Despite the obvious barriers to deployment, the rise of e-mobility in Africa could provide answers to many of the socio-environmental and economic challenges facing the continent.

E-mobility can contribute towards reducing atmospheric pollution related to transport in Africa

The environmental challenges associated with the large-scale deployment of electric vehicles are many and varied (potential for mitigating climate change, reducing air pollution and noise pollution, improving public health, etc.). With regard to air pollution linked to transport, although



Africa accounts for only a tiny proportion of it on a global scale, it is taking on worrying proportions in African cities. These emissions are increasing at an average annual rate of 7% in African cities.¹¹ In a context of strong demographic and urban growth, the increase in motorised transport modes based on an ageing vehicle fleet and the use of poor-quality fuels are major contributors. According to UNEP data, over 60% of new vehicle registrations in Africa are second-hand.¹² Although these vehicles meet real and growing mobility needs, they generate worrying public health problems related to pollution.

In 2021, CO₂ emissions from the transport sector in Africa have been estimated at 348.88 MtCO₂.¹³ For example, air pollution is estimated to be the fourth leading cause of reduced disability-adjusted life expectancy (DALY) in sub-Saharan Africa, resulting in nearly 176 000 premature deaths each.¹⁴ More alarming sources place it as the second leading cause of death after HIV-AIDS.¹⁵ Yet air monitoring is limited across the continent. Only 7 out of 54 African states have accurate and functional air quality monitoring systems.¹⁶ The cumulative effect of population growth (particularly in cities), the emergence of a middle class with a preference for individual motorisation, and the inherent deficiencies of public transport are expected to lead to unprecedented levels of pollution. This will increase the risks to public health, not to mention the economic stakes involved. In a study on air quality in African cities, some researchers¹⁷ estimates the economic cost of pollution at about 2.7% of the continent's annual GDP.

E-mobility could contribute to the dynamism of the automobile industry in Africa

Other more structural, or even strategic, macroeconomic issues concern the possibilities of industrialisation offered by the electric vehicle in Africa. The simplification of vehicles brought about by the switch to electric motorisation has encouraged an interest in local manufacturing and/or assembly¹⁸ Unlike conventional vehicles, the manufacturing process for EVs is less demanding in terms of the number of parts and components, but also in terms of time.¹⁹ The local assembly of EVs in Africa also adds an important issue of "tropicalisation", i.e. adapting vehicles to the local context. Tropicalising EVs means making technological choices that are in line with physical, social, and even economic and societal realities, such as the choice of battery chemistry to withstand high levels of humidity and/or temperature, the reinforcement of suspensions to compensate for poor road quality, the carrying capacity of vehicles, and their modularity (ability to meet several needs).

Several car manufacturers have recently expressed interest in relocating part of their production activities to Africa. For example, the Chinese giants BYD and Dongfeng have signed memoranda of understanding respectively in Morocco and Egypt to open assembly plants there²⁰ while in Rwanda, the German Volkswagen is testing locally assembled e-Golfs²¹. Other endogenous initiatives led by actors native to the continent (startups, local entrepreneurs, public actors, etc.) are also emerging. In most cases, it is a matter of local assembly from imported parts, as in Zimbabwe with the Mobility for Africa project²², but also locally manufactured parts or even retrofitting of old thermal vehicles. These different strategies cover various issues for project leaders, end users and territories. For project developers, for example, they offer the possibility of significantly reducing production costs and "tropicalising" the vehicles. For end-users, these benefits range from more competitive purchase prices to the availability of vehicles and spare parts, as well as competent personnel for maintenance. Finally, these initiatives offer the territories where they are deployed a rise in the power of the automotive industry with impacts on employability, and above all, a way out of dependence on fossil fuels, seen in particular from the point of view of subsidies for petroleum products or the oil bill and its volatility, which weigh heavily on the budgets of the States. In Nigeria, for example, 96% of public revenue (10.59 billion dollars) in 2021 was devoted to servicing the debt contracted for subsidies to maintain fuel prices low and stable.²³ The desire to abolish this subsidy in this country, as elsewhere on the continent, is most often met with waves of protests that threaten social peace.²⁴ Consequently, turning to the financing of

the fight against climate change by supporting the use of alternative fuels in transport could help several African states to break the energy, social and political, and even geopolitical, deadlock.

3- WHAT LEVER(S) FOR A SUCCESSFUL E-MOBILITY TRANSITION IN AFRICA?

The dynamics of transport electrification in Africa take different forms and rhythms depending on the country. The evolution of this transition will depend above all on the level of development of each State, but also on other factors such as access to energy²⁵, the purchase price of EVs, behavioural choices (mobility uses and practices, individual motorisation vs. collective transport, etc.) and motorisation dynamics (fleet growth, composition, types of energy used, etc.). The inclusion of these choices and dynamics in public policies or their regulation by the latter are also important factors to take into account.

The entry through public policies is an essential point, especially in terms of choice of trajectory. Contrary to the countries of the North (Europe and the United States in particular) where the electrification of road transport is above all embodied by the car and strongly supported by incentive policies, transport electrification initiatives in Africa could follow a singular trajectory, particularly in terms of segment. Available data on household car ownership in Africa indicates a low motorisation rate.²⁶ At the same time, the majority of motorised journeys made on the continent (between 50 and 90% on average depending on the city) are made by so-called "informal" transport²⁷. Minibuses, taxis, tricycles and motorbike taxis form the basis of this fleet of vehicles for on-demand transport on the continent. Because of their place in motorised travel and the intensity of their use, they should be the main target of transport electrification policies on the continent. Among them, tricycles and motorbikes have a head start. They are the only vehicle segments less directly competed by the second-hand market with a faster return on investment for operators (drivers and owners). With smaller battery packs and relatively lower power requirements, they are also more likely to fit the battery swap model, making them less dependent on a network of charging points. The bus segment, which is more cumbersome to deploy in terms of operational management, energy consumption and grid risks, could also benefit from this transition through electric minibuses backed by a charging system based on a renewable energy source. Recent research²⁸ also explores this potential.

However, in order to turn all these opportunities into strengths and ensure a fair and inclusive transition of transport to electric in Africa, several challenges such as innovation through research still need to be addressed. Africa is the continent that devotes the least resources to research and development. According to the latest UNESCO report, African countries spent less than 1% of their GDP on research in 2018 compared to 2.73% in North America, 2.13% in South East Asia and 2.02% in the European Union.²⁹ In Sub-Saharan Africa specifically, this ratio was about 0.51% on average, compared to 0.83% in South Africa.³⁰ Data on transport and especially those resulting from experimental phases of electro-mobility in real conditions will be crucial for designing and refining electric mobility solutions in these sociotechnical contexts, which are still not very favourable and poorly supported by incentive policies.

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- ²⁰ <https://www.dw.com/en/africa-begins-to-emerge-as-car-industry-hub/a-59500532>
- ²¹ <https://www.volkswagen-newsroom.com/en/press-releases/first-for-africa-volkswagen-and-siemens-launch-joint-electric-mobility-pilot-project-in-rwanda-5510>
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