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Accelerating the Electric Mobility Transition

Enabling India-Africa Cooperation Through the EMBRACE Platform

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Executive Summary

As part of the global push to reduce transportation sector emissions, countries are accelerating their shifts to electric mobility (e-mobility). Emerging economies, particularly India and across Africa, must play a critical role in this transition. To this end, India and several African countries face similar opportunities and challenges, including rapidly increasing urban populations and a drive to create skilled and trained workforces. Moreover, as part of both regions' growing concerns related to energy security, these countries are seeking to reduce their dependence on fossil fuel imports and are pushing for sustainable, low-emission transportation.

Strategic collaboration between India and countries in Africa has the potential to accelerate this transition for both regions while also establishing a replicable model for the Global South at large. This paper examines the evolving landscape of e-mobility in India and select African countries, identifies key opportunities and challenges, and recommends steps to deepen cooperation to accelerate e-mobility adaptation across the countries.

To facilitate this cooperation, this paper proposes the EMBRACE Platform (Electric Mobility Bridge for Regional Africa-India Cooperation and Exchange) as a structured, dedicated platform to accelerate e-mobility by strengthening regional cooperation, developing mechanisms to share best practices, and creating sectoral partnerships to foster electric vehicle (EV) adoption.

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Table 1: Proposed Key Themes and Priorities for National EV Collaborations

Themes	Priorities	Actions
Policies, standards, and knowledge exchange	Design supply-side incentives and regulations to strengthen the manufacturing ecosystem.	Facilitate regular convenings and peer-to-peer exchanges among policymakers in government, leaders in industry, and members of academia to share best practices.
	Harmonize domestic policy and regulations.	Facilitate regular convenings and support the exchange of best practices on policies, incentives, and standards.
	Facilitate innovation, skilling, and circular economic activity.	Develop collaborative frameworks for skilling initiatives as well as technology adoption (e.g., battery swapping, second-life use of batteries, vehicle retrofitting, and recycling).
Trade and investment	Facilitate technology partnerships and local manufacturing.	Foster industry collaboration on manufacturing and mineral processing to mobilize resources.
	Create avenues for shared infrastructure and technological innovation.	Jointly develop opportunities to enhance market access, skilling initiatives, technology localization, and joint innovation.
Infrastructure development	Enable joint ventures and cross-border investments.	Focus on projects such as charging networks, manufacturing plants, retrofitting, and recycling infrastructure; share best practices.

Source: CSIS Chair on India and Emerging Asia Economics.

The EMBRACE Platform offers a strategic and timely strategy to catalyze e-mobility adoption, local manufacturing, skill development, and circular value chains through cross-country collaboration. By leveraging their comparative strengths and addressing shared challenges, India and various African countries can jointly shape a more sustainable, inclusive, and competitive e-mobility future.

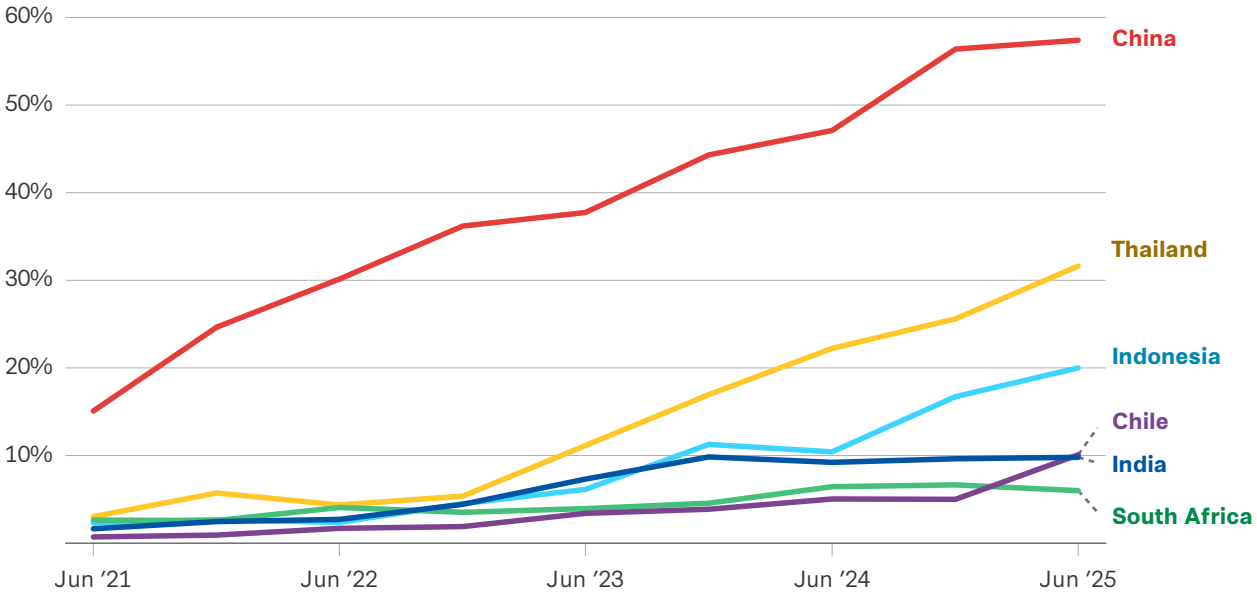
Introduction

The impact of climate change has intensified worldwide, disproportionately **affecting** communities in the Global South, despite their limited contributions to historical greenhouse gas (GHG) emissions. Countries across the Global South must address rising climate challenges while balancing broader development goals such as economic growth, job creation, and trade enhancement. In fast-growing regions like India and Africa, where urban populations and energy demands are expanding rapidly, embedding sustainability into economic planning is essential for long-term prosperity. Recognizing this, policymakers are integrating energy security with low-emission technologies not only to meet climate targets, but also to foster economic progress by strengthening the local manufacturing and service sectors to create more local employment opportunities.

The transportation sector is central to the transition. It is both a critical enabler of economic activities—connecting markets, driving trade, and facilitating the movement of people and goods—and a significant source of GHG emissions. Globally, the transportation sector is the third-largest CO_2 emitter, with road transportation alone **accounting** for over 70 percent of the sector's emissions. To address this, many countries are **turning their focus toward** decarbonizing transportation through the adoption of low-emission technologies, namely EVs. This shift can **unlock** major opportunities for economic development through reduced reliance on expensive and imported fuels, enhanced productivity due to improved air quality, and the creation of new manufacturing and employment opportunities.

Though countries like Norway and China are currently leading the EV transition, emerging economies in Africa and Asia are following suit. Many countries are already **demonstrating** sustained EV adoption, building momentum toward climate resilience, harnessing economic opportunities, and expanding employment.

Figure 1: EVs as Share of Registered Light-Duty Vehicles in Emerging Economies



Note: **A registered light-duty vehicle refers to passenger cars, SUVs, minivans, and light-duty pickup trucks under a certain weight and approved for use by the government. In the United States, the maximum weight for such a vehicle is 8,500 lb. (3,800 kg); globally, the limit is 10,000 lb. (around 4,500 kg); and in India the maximum is approximately 7,700 lb. (3,500 kg).

Source: "EV Volumes," AutoVista Group, https://ev-volumes.com/#.

With distinct economic and policy structures, resource availability, and social priorities throughout the Global South, the transition to low-emissions technologies will take many forms. This diversity presents a valuable pool of knowledge in policy design, financing, technology deployment, and supply chain integration. Strengthening collaboration across the Global South can facilitate the exchange of insights, foster joint innovation, and create foundations for integrated EV supply chains to accelerate the e-mobility transition. In addition, leveraging this collaboration and regional strengths will facilitate real commercial gains built on technological and financial innovation.

Moving toward innovative and cooperative approaches across the Global South, and away from the traditionally siloed efforts, can accelerate progress and advance both economic development and climate goals. This is particularly important for India and many countries across Africa that are well-positioned to harness complementary strengths in policy design, manufacturing, and innovation.

BENEFITS OF GLOBAL SOUTH COOPERATION

Countries in the Global South can seek to harness a range of benefits from increased collaboration:

- Countries can develop bilateral and multilateral relationships underpinning commercial ties to build resilient EV supply chains—spanning critical minerals, vehicle components manufacturing, and assembly line development. This has the potential to unlock new markets and investment opportunities, enhancing regional economic growth and increasing employment.
- Improved regional coordination mechanisms can facilitate the exchange of ideas, identify areas of cross-collaboration, and strengthen institutional measures for rapid EV deployment.
- As countries continue to evolve their EV ecosystems, the exchange of best practices can lead to the development of nuanced policy frameworks that are better suited to local contexts by drawing lessons from countries with similar economic and infrastructure challenges. Facilitating the exchange of best practices enables countries to avoid costly missteps in their own EV transitions.
- A robust platform for continued dialogue among partners in the Global South would enable policymakers and private sector stakeholders to identify opportunities to create sectoral partnerships, expand the field of knowledge, and support context-specific development and manufacturing solutions as domestic ecosystems mature.

UNTAPPED POTENTIAL OF INDIA-AFRICA COLLABORATION

India and Africa have long shared close trade relations across key sectors, including automobiles, pharmaceuticals, education, and agriculture. Over the years, trade between India and Africa has **increased** substantially, from $68.5 billion in 2011-2012 to $83.3 billion in 2023-2024, making India the continent's third-largest trading partner. India's trade volume with Africa is expected to double to $200 billion by 2031, presenting a timely opportunity to deepen economic and technology partnerships.

India has been a frontrunner on the EV transition in the Global South, supported by strong policy leadership and an expanding manufacturing ecosystem. In contrast, many countries in Africa are in the early stages of building modern, low-carbon transportation systems. By building on their long-standing cooperation in the automobile sector and channeling it into the EV value chain, India and African countries can drive innovation, reduce costs, and lay the foundation for developing strong regional coordination mechanisms.

India's national and state-level EV policy frameworks are designed to establish a robust EV value chain. These policies create a strong enabling environment that encourages demand creation, boosts manufacturing, and supports the expansion of EV charging infrastructure (EVCI). Africa, though at an early stage of EV adoption, has a unique opportunity to leapfrog conventional vehicles and go directly to EVs while expanding its own manufacturing ecosystem by drawing from India's policy, manufacturing, and market development experiences.

India and African countries should accelerate Global South cooperation to address challenges on both the demand and supply sides of EV deployment, including economic, material, and market barriers. To realize these opportunities, the countries should cooperatively focus on:

- Strengthening supply chain resilience for EV manufacturing and critical minerals;
- Integrating advanced technologies and harmonizing policy frameworks;
- Developing an investment-friendly ecosystem to drive sector growth;
- Enabling skill development and technology localization; and
- Creating knowledge-sharing platforms to accelerate sectoral learning

There is significant common ground between India and Africa in the EV sector, with India at a pivotal stage of scaling clean transportation and several African countries entering global EV supply chains. Considering their similar ground experiences and growth trajectories, the partnerships can **focus** particularly on electric two-wheelers (E2W), electric three-wheelers (E3W), e-buses, and **battery technologies**. African countries can become reliable supply chain partners for Indian EV manufacturers, while India offers valuable expertise to support Africa's evolving market, particularly in manufacturing and policy design.

ABOUT THIS PAPER

This paper aims to outline a strategic framework for strengthening Global South collaboration to accelerate the e-mobility transition, with a particular focus on fostering partnership between India and Africa. It examines how collaboration between India and African countries can be deepened, drawing on a defined country selection framework (see Framework for Partner Country Selection), which has identified four African countries for focused engagement with India in this initial phase of collaboration. However, the framework is flexible and can be expanded in subsequent phases to include additional African countries.

Realizing Collaboration Opportunities in Electric Mobility

As part of development strategies, countries are increasingly recognizing the benefits of adopting low-emission technologies, including reducing dependence on imported fossil fuels, decreasing air pollution, and expanding local manufacturing ecosystems and jobs. E-mobility in particular plays a critical role in this transition due to its interlinkages with emissions reduction and economic development. Against this backdrop, India and several African countries are pursuing e-mobility, backed by clear policy intent and action plans. This section examines the present stage of the EV transition in India and Africa and identifies specific areas of collaboration to accelerate progress in the sector.

INDIA'S E-MOBILITY TRANSITION

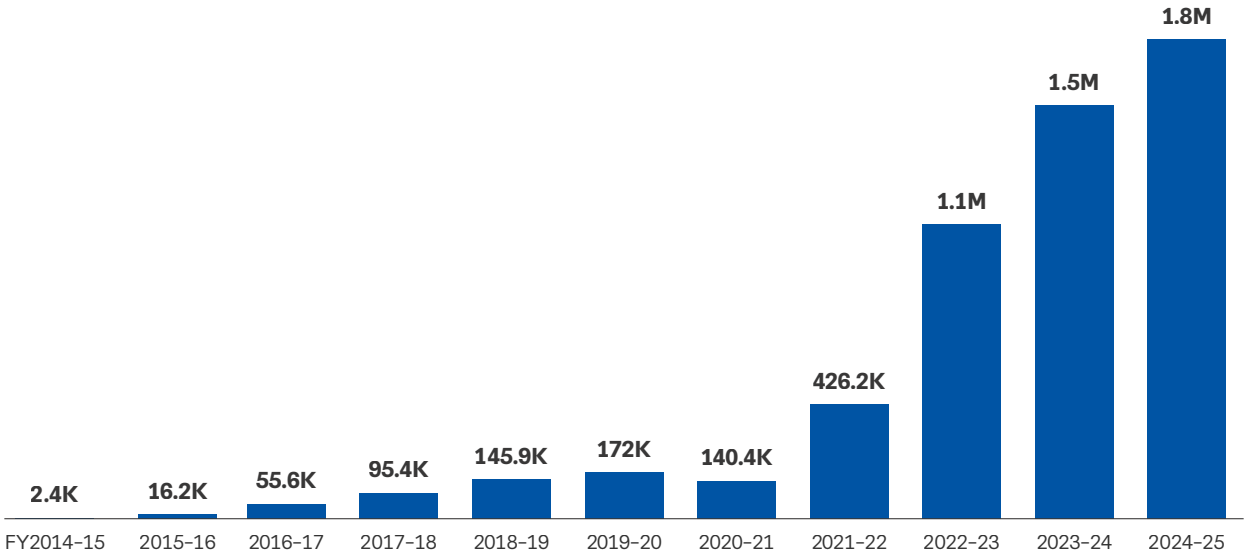
Transportation is one of India's fastest-growing sectors, **expanding** at a compound annual growth rate (CAGR) of 5.9 percent. India is the **fourth-largest** automobile manufacturer in the world, and the sector contributes 7.1 percent to India's gross domestic product (GDP) and 49 percent to its manufacturing GDP. Alongside industrial output, **job creation** and global trade are cornerstones of this sector in India. However, the transportation sector is also the country's **second-largest** CO_2 emitter, with road transportation alone accounting for more than **90 percent** of those emissions. India is at a crossroads, trying to balance pursuing its economic and development goals while also **reducing** its emissions intensity as outlined in its **Nationally Determined Contributions** (NDC) targets. To reduce the

transportation sector's emissions, which are **projected** to double by 2050, India is making significant strides to electrify the sector and shift toward low-emissions technologies.

India is **expected** to add 80 million EVs on the road under the government's EV target, which aims for 30 percent of new vehicle sales to be electric by 2030. To **facilitate** this transition, the Indian government, as well as 30 subnational governments, have introduced or are in the process of introducing demand-side and supply-side incentives aimed at promoting EV adoption, streamlining charging infrastructure, enhancing local manufacturing, and creating jobs.

In addition, fiscal incentives from the central government have evolved as described in Table 2. The most recent tranche comes from the 2024 launch of the PM Electric Drive Revolution in Innovative Vehicle Enhancement (**PM E-DRIVE**) scheme, with an initial outlay of $1.3 billion to incentivize the purchase of various type of EVs, charging infrastructure, and automobile testing facilities. Through consistent policy support and financial incentives, the EV sector in India has registered exponential progress. Figure 2 shows the year-on-year increase in annual EV registrations (all categories) in India.

Figure 2: Annual EV Registrations (FY 2014–FY 2024) in India



Source: "India Parivahan Portal," Government of India, https://vahan.parivahan.gov.in/vahan/; and "EV National Volume Monitor," Council on Energy, Environment and Water, April 2025, https://www.ceew.in/gfc/tools_and_dashboards/electric-mobility/national-volume-monitor.

CHANGING DYNAMICS OF INDIA'S AUTOMOTIVE SECTOR

In tandem with the global transition, India's automotive sector has shifted toward e-mobility, building on strong government backing and rapidly growing domestic innovation. Leading Indian original equipment manufacturers (OEMs) such as Tata Motors, Mahindra, Ashok Leyland, and TVS have rolled out mass-market EVs such as passenger cars, E2Ws, E3Ws, and e-buses. Additionally, startups such as Ather Energy, Ola Electric, and SUN Mobility have continuously evolved to create tailored solutions for India's changing mobility patterns.

The central and state governments of India have long supported this focus on e-mobility through various policies and schemes. Launched in January 2013, the National Electric Mobility Mission Plan

2020 (**NEMMP-2020**) laid the groundwork for key national programs such as the Faster Adoption and Manufacturing of (Hybrid) and Electric Vehicles (**FAME-I** and **FAME-II**) schemes; Scheme to Promote Manufacturing of Electric Passenger Cars in India (**SPMEPCI**); Production Linked Incentives (**PLI**) for EVs, battery manufacturing, and critical minerals processing; and the **PM E-DRIVE** scheme. These central interventions have established a strong policy and financial framework, while much of the on-ground progress has been supported by proactive subnational policies. Many states have set up dedicated nodal agencies and designed region-specific incentives to address local priorities and accelerate EV adoption. States such as Tamil Nadu, Maharashtra, and Gujarat are emerging as EV manufacturing hubs in India. At the same time, major investments are flowing into localized supply chains, **including** into battery gigafactories.

INDIA'S EV SECTOR CHALLENGES

While significant progress has been made in India's EV transition, key challenges remain:

- **Insufficient charging infrastructure:** As of April 2025, India had **installed** close to 26,000 public charging stations (PCSs). This translates to a ratio of only one PCS for every 235 EVs on the road. It is **critically low** when compared to the ratio of one charger for every 7 to 15 EVs in various European countries. Although schemes such as PM E-DRIVE and various subnational policies focus on the rapid installation of PCSs, momentum needs to be accelerated to alleviate range anxiety. Moreover, EVCI is unevenly distributed, further increasing range anxiety among potential EV consumers in both urban and rural areas. Focused, long-term planning is necessary to ensure that the charging needs of the emerging consumer base are addressed to offer easier access and convenience.
- **Supply chain vulnerability:** The EV production ecosystem needs to address supply chain-related issues and vulnerabilities. Specifically, the sector heavily **relies** on imports for battery components, among other critical parts, and is constantly affected by global supply chain disruptions. While a robust local manufacturing ecosystem is required, India should explore strengthening supply chains through sourcing raw materials from reliable partners. Additionally, India has the opportunity to electrify the largest diesel-consuming segments of the economy: trucking and agriculture. To do so, India must **continue to build** international strategic partnerships, emphasize domestic reliance to build robust supply chains, and enable innovation to reduce costs and enhance overall trust in the sector.
- **Lack of technology standardization:** EVCI, battery chemistries, and technology are still evolving. Charging connectors need to be **standardized** to enable interoperability and to ensure that the limited number of PCSs available can be utilized more efficiently.
- **Workforce limitations:** The limited **availability** of a skilled workforce is another challenge that needs to be addressed. Mechanisms to train and upskill the workforce currently associated with the traditional automotive industry, as well as building a new workforce, need to match the pace of the expanding EV ecosystem.

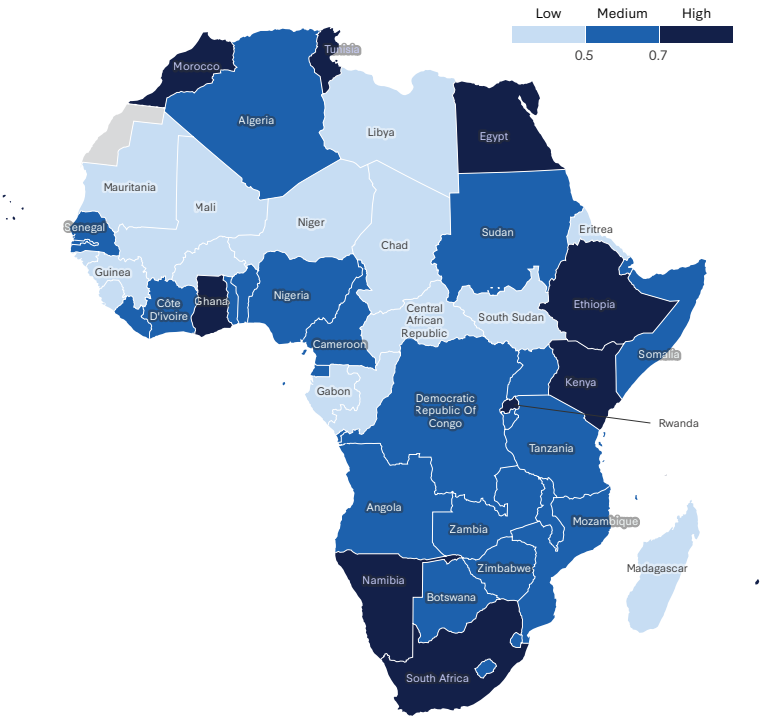
AFRICA'S EVOLVING E-MOBILITY LANDSCAPE

As a whole, Africa is **experiencing** rapid motorization, driven largely by the import of used internal combustion engine (ICE) vehicles. While Africa's EV market is **nascent**, countries across the continent are prioritizing the manufacturing and adoption of EVs, depending on existing infrastructure and resource availability. For instance, South Africa's Comprehensive EV Roadmap **focuses** on

manufacturing and localization of the value chain, leveraging the country's existing automotive manufacturing value chain. Kenya, meanwhile, has **drafted** a National E-Mobility Policy that centers on domestic manufacturing and job creation. Nigeria's energy transition plan **aims** to achieve 100 percent EV adoption by 2060, while Mauritius has **developed** a 10-year roadmap aiming to create favorable market conditions for EV adoption by 2030. In 2024, Ethiopia became the first country in the world to **ban** the import of ICE vehicles, paving the way for the electrification of transportation. The development of the EV sector in Africa, similar to India, remains intertwined with the economic objectives of job creation and infrastructure development.

Figure 3 illustrates the various levels of EV adoption readiness in Africa based on each country's EV polices, incentives, grid reliability, and EVCI.

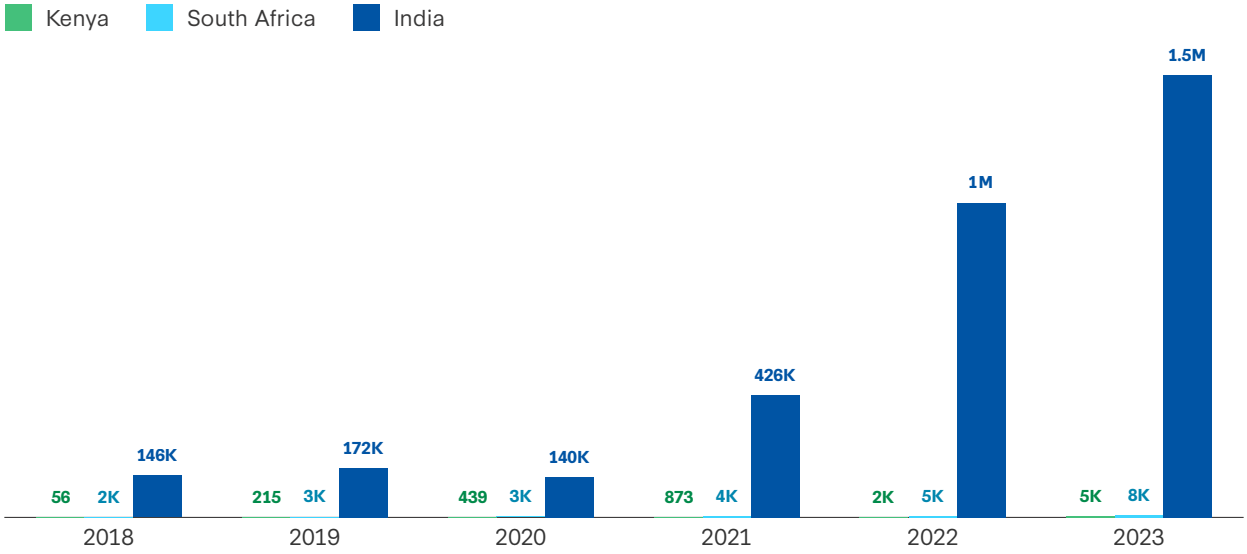
Figure 3: EV Readiness of African Countries



Source: Rose Mutiso et al., "2025 Update: Africa EV Readiness and Impact Index," Energy for Growth Hub, June 24, 2025, https://energyforgrowth.org/article/2025-update-africa-ev-readiness-and-impact-index/.

Despite recent progress, Africa's pace of EV transition remains slow. With the lowest global EV adoption rate, total EV passenger car sales in 2024 accounted for less than 1 percent market share, **comprising** nearly 11,000 units. However, demand for other EV form factors, such as E2Ws and E3Ws, is rising rapidly. E2Ws are **projected** to account for 50 percent of all 2W sales in Africa by 2040. Many countries on the continent are characterized by fast-growing economies, rapid urbanization, and abundant renewable energy resources, presenting significant opportunities to expand EV manufacturing and adoption. Figure 4 shows that growth in the total number of registered EVs has been slow, especially compared to India.

Figure 4: Total Registered EVs in India, South Africa, and Kenya



Source: "India Parivahan Portal," Government of India, https://vahan.parivahan.gov.in/vahan/; and "EV National Volume Monitor," Council on Energy, Environment and Water, April 2025, https://www.ceew.in/gfc/tools_and_dashboards/electric-mobility/national-volume-monitor; "National Transportation Saftey Authority," Government of Kenya, https://www.ntsa.go.ke/; "Electrifying Kenya's Public Transportation Sector," Electric Mobility Association of Kenya, 2024, https://e-mobilitykenya.org/downloads/; and "Global EV Data Explorer," International Energy Agency, July 31, 2025, https://www.iea.org/data-and-statistics/data-tools/global-ev-data-explorer.

AFRICA'S AUTOMOTIVE MANUFACTURING EVOLUTION

Africa's automotive manufacturing sector has a long history, with many of the largest auto manufacturers—e.g., Toyota, Stellantis, and Renault—establishing major operations in **Morocco** and **South Africa**, though the majority of vehicles produced there are **destined** for the European Union. Indian manufacturers have also **maintained** a long-standing presence in Africa, including Tata Motors, Mahindra and Mahindra, and TVS Motor Company. A number of domestic OEMs in Africa have also emerged, including **Kiira Motors** in Uganda and **Innoson Vehicle Manufacturing** (IVM) in Nigeria, both focusing on domestic innovation and projects tailored to the local contexts.

Over the last decade, Africa's automobile sector has **shifted its focus** toward the EV manufacturing ecosystem, leveraging **investments** from leading global automobile manufacturers in **cooperation** with many African governments. Multiple countries have introduced policies and incentives favorable to domestic EV manufacturing and have even pooled substantial resources to build an international EV ecosystem, including **$54 million** from South Africa and close to **$100 million** in public-private financing from Uganda. So far, 21 African countries have set up or are in the process of **setting up** EV manufacturing plants.

However, significant gaps **persist** in the local infrastructure needed to support the adoption of EVs across Africa. To address these challenges, many domestic startups are **building** solutions tailored to the African market, such as battery swapping and subscription-to-own models. The aim is to **overcome** barriers related to upfront investment costs, electricity reliability, and post-sale service. Moreover, some companies are locally designing and assembling E2Ws and E3Ws or retrofitting ICE 2Ws to better suit Africa's road conditions and to **reduce** costs.

BOTTLENECKS TO THE EV TRANSITION IN AFRICA

There are several obstacles to Africa's EV transition:

- **Prevalence of used ICE vehicles and the high cost of EVs:** Used ICE vehicles **dominate** the four-wheeler (4W) passenger car market in Africa, constituting 85 percent of all sales. Without **strong incentives**, EVs struggle to achieve price competitiveness, discouraging growth and investment in EV manufacturing for domestic consumption. Deliberate policy design, such as Ethiopia's **ban** on the import of ICE vehicles, can potentially shift market trends and address this concern.
- **Financing and capital constraints:** Setting up and developing EV manufacturing and supply chains requires significant upfront investments, but **rising** financing costs are slowing the sector's growth. The region **faces** a financial deficit in the range of $20–$25 billion per year to meet its industrialization and manufacturing goals, nearly half of the $50 billion the continent's manufacturing sector requires annually, according to the African Development Bank. With potentially **$9 billion** in financing required by 2030 to advance a sustainable E2W market alone across Kenya, Nigeria, Uganda, Rwanda, and Ethiopia, local investors and financing institutions remain **hesitant** to support the sector due to early-stage risk aversion.
- **Insufficient electricity generation and grid reliability:** Electricity demand consistently outpaces generation in Africa, with an estimated 43 percent of the population (over 600 million people) **lacking access** to reliable electricity as of 2022. Countries such as Zimbabwe, South Africa, and Nigeria **struggle** with inadequate power supplies despite massive investments in increasing electricity generation. This poses major obstacles to scaling up manufacturing and EV charging infrastructure. Additionally, African utilities consistently **score poorly** on grid efficiency and reliability, with high system inefficiencies and losses. As countries advance their EV goals, it is crucial that electricity infrastructure development and investment be prioritized to enhance electricity generation and grid reliability.
- **Lack of domestic manufacturing capacity and skilled workforce:** Most countries in Africa **lack** both the infrastructure necessary to support local manufacturing and the **skilled workforce** required to run it. This poses significant **barriers** to scaling up EV manufacturing. While skilling remains a common challenge in India and Africa, international partnerships focusing on capacity building can help address this concern and provide a platform for more strategic dialogue among the countries.

THE E-MOBILITY POLICY LANDSCAPES IN INDIA AND AFRICA

India's EV policy landscape has advanced considerably over the past decade, shaped by a combination of national and subnational initiatives aimed at building a robust and self-sustaining e-mobility ecosystem. Africa's EV policy landscape is still at an early stage, with efforts varying widely across countries depending on market readiness, infrastructure capacity, and national priorities. While a few African countries have introduced dedicated e-mobility policies or incentives, many others are integrating EV measures within broader transportation or energy strategies. Although the continent's EV adoption remains nascent, growing commitment and urbanization trends provide a strong foundation for scaling the transition in the coming years.

This paper selected the top 10 countries in Africa based on **largest** GDP for the purpose of initial assessment: South Africa, Egypt, Nigeria, Kenya, Morocco, Ethiopia, Algeria, Tanzania, Angola, and Côte d'Ivoire. While South Africa and Nigeria have launched national plans, the others have more general frameworks focused on EV transition and emissions reduction.

Table 2 provides a broad overview of the national-level EV policies and frameworks from these countries, along with those in India, for seven broad categories. See appendix (Table 5) for more details on the different policies of the selected 10 African countries.

Table 2: EV Policy Snapshot of Africa's 10 Largest Economies and India

Category	Africa	India
Key initiatives and national strategies *Any effort made toward a national EV strategy (only national-level policies are included)*	Many countries have taken some policy actions to enable EV adoption. However, a strategic framework is essential but not common across the studied African countries. Only a select few, including South Africa, Nigeria, Kenya, Rwanda, and **Egypt**, have drafted strategic frameworks. Many of these strategies outline goals and promises, but few offer binding targets toward their stated goals.	India has **launched** several national initiatives for the EV transition, led by the National Electric Mobility Mission Plan 2020 (NEMMP-2020), launched in 2013. This early policy **spurred** key schemes and legislation to encourage EV adoption and manufacturing, including the **FAME** schemes, the **PM E-Drive** Scheme, the Scheme to Promote Manufacturing of Electric Passenger Cars in India (**SPMEPCI**) as well as key regulations in India's **PLI** schemes to increase domestic EV manufacturing and supply chains.
EV targets *Quantifiable metrics with stipulated deadlines*	Many countries have set ambitious goals for EV adoption, including Kenya's **goal** of achieving 5 percent of new registrations as EVs by 2025, and 100 percent EVs by 2050. Nigeria is among the few that have **set targets** specifically for domestic manufacturing of EVs, aiming for 30 percent of EVs to be locally produced by 2030.	India has **set** a non-binding target for 30 percent of all vehicle sales to be electric by 2030. The NEMMP-2020 **outlined** a goal of 6 to 7 million year-on-year EV sales by 2020, from which actual EV sales fell short, **reaching** only 332,000 in 2020.
Regulatory policies *Regulatory requirements for vehicles on the road and imported, as well as for related infrastructure*	There is a rise in regulation to disincentivize ICE and non-clean fuel vehicles, primarily through import restrictions. Given the high incidence of used ICE vehicle imports into Africa, many countries have **increased** age limits or issued strict restrictions on ICE vehicle imports.	India **has** many pieces of legislation across all components related to the EV transition, including financing for manufacturing and charging infrastructure, as well as stricter emissions requirements and import duties.

Category	Africa	India
National incentives *Demand- and supply-side incentives to increase EV manufacturing and adoption*	Incentives for EV adoption have been a starting point for many countries in their EV transitions. Africa has **low vehicle ownership**, and countries have started rolling out incentives for EVs that will increase their adoption over ICE vehicles, such as Egypt's **favorable regulations** on EV imports for consumers. Some countries have also begun introducing supply-side incentives to support manufacturing, including **South Africa's investment allowance** for locally produced EVs and hybrid vehicles.	Incentives are a core component of India's EV strategy. Through the **FAME** and **PM-Drive** schemes, India introduced incentives for EVs, with some conditions related to local contexts and fleet operators. FAME **offered** subsidies up to $180/kWh (i.e., 40 percent of the original MSRP of the vehicle). Additionally, India's **PLI** schemes include targeted incentives for advanced chemistries development (batteries) and related EV value chains.
Investments and financing *Any direct subsidization or financing schemes facilitated by the government at a national level*	Many countries have earmarked budgets toward EVs, such as South Africa's **$54 million** budget to incentivize EV production and Kenya Power and Lighting Company's **$1.9 million** commitment to setting up EV charging stations over three years. Egypt's has committed to **subsidizing** 35 percent of domestic EV production per vehicle, the most generous direct financial incentive model among African countries.	India has mobilized large-scale financing for a number of its schemes, including **$1 billion** toward PM-E DRIVE for purchase incentives, **$392 million** toward electric bus procurement, and **$3 billion** for domestic manufacturing incentives under the PLI scheme.
Infrastructure *Efforts to build robust infrastructure and supply chains for EVs*	Infrastructure is a priority for African countries, with range anxiety and underdeveloped infrastructure being primary **concerns** among sub-Saharan African consumers. Nigeria's largest city, Lagos, has **made** a large push for e-bus procurement to electrify public transit. South Africa is a leader, with almost **400 public charging stations** by the end of 2024. Kenya has **stipulated** that 5 percent of parking spaces in new buildings be dedicated to EV charging.	India has made a push for greater infrastructure to support greater adoption of EVs. Under FAME II, the government **pledged** $91 million to set up 7,432 charging stations across India. Many states within the country have also set up stand-alone targets under their state EV policies, including **Tamil Nadu** and **Andhra Pradesh**.

Category	Africa	India
Joint actions, MOUs, or partnerships *Bilateral or multilateral partnerships with any foreign partner, including corporations*	Many African countries receive industrial expertise from large EV manufacturers, including BYD in China. Some countries, such as **Egypt**, have joined with allied countries in joint manufacturing ventures.	India has signed several bilateral partnerships aimed at accelerating EV adoption, including with **Japan** and **South Korea**. Additionally, several state governments (e.g., **Tamil Nadu with VinFast**) have signed MOUs with key OEMs.

Source: CSIS Chair on India and Emerging Asia Economics.

Realizing Opportunities to Advance the E-mobility Transition Through Collaboration

Historically, the automobile sector has been a key area of cooperation between India and Africa. Anchored in shared knowledge exchange, market development, and resource security, India and Africa have the opportunity to create a mutually beneficial framework for e-mobility. With different resources and stages of development, the two regions will need to play distinct roles through this cooperation.

India can perform several key actions to support Africa's e-mobility goals:

- **Share policy and regulatory expertise.** India has specific policy lessons to share through its **established** fuel consumption standards, such as the Corporate Average Fuel Efficiency (CAFE) norms, which ensure that manufacturers transition toward producing a more fuel-efficient fleet. With India's example, African countries can address the challenge posed by the prevalence of ICE vehicles on the continent. Indian policymakers and industry can work with African partners to develop regulations for used vehicle imports, design incentives for EV adoption, and share lessons on achieving price parity through local innovation and economies of scale.
- **Support the development of financing models.** Efforts to build local capacity and infrastructure are currently being **driven** by private international firms through blended finance mechanisms in Africa. India's experience with tailored financing and risk-sharing tools can be leveraged to identify key opportunities to spur investments in domestic markets.
- **Draw lessons from the electricity sector.** While electricity reliability and access are complex and multifaceted issues, there are myriad potential solutions specific to EV manufacturing in Africa. Solutions may comprise low-cost financing and subsidies for renewable energy for EV manufacturers or financing for battery-swapping pilot programs, both to scale charging infrastructure and to improve grid reliability. India's experiences in the integration of distributed renewable energy and mini-grid solutions, as well as in piloting battery swapping and behind-the-meter storage, are extremely relevant to address these challenges, especially in developing scaled battery innovations and grid management solutions suited to local contexts in African nations.
- **Build skilling models.** To upskill and reskill its workforce, India has established several skilling models through initiatives such as **Skill India** and a range of public-private partnerships. As the India-Africa partnerships on the manufacturing ecosystem evolve, knowledge exchange and

skilling programs can be designed with both economic and manufacturing needs in mind to build local capacity.

Governments in Africa can likewise undertake several actions to facilitate e-mobility collaboration with India:

- **Enable diversified and value-added supply chains.** India needs to strengthen its supply chains to establish and securely maintain a flourishing domestic EV manufacturing ecosystem. Africa is **home** to vast reserves of lithium, cobalt, manganese, and nickel, all essential components of EV batteries. Beyond importing raw materials from Africa, Indian firms can play a proactive role in mineral and economic development by investing in sustainable mining, supporting local processing and refining capacities, and establishing joint ventures that can create stronger supply chains for both regions. This approach can help generate greater value domestically, build resilient regional supply chains, and produce benefits for both the African minerals sector and India's EV industry.
- **Collaborate on battery recycling and circular economy models. India** and many countries in Africa, including **South Africa** and **Kenya**, are considering the secondary use of batteries and establishing battery recycling ecosystems. These efforts present an incredible opportunity to collaborate on building circular economy frameworks that can meet battery demand for small-form factors (e.g., E2Ws and E3Ws) while also addressing electricity storage issues for many countries with abundant renewable energy potential.
- **Create innovation and opportunities to scale up.** India's automobile companies are already **well-established** in many African countries. The emerging EV market in Africa presents new opportunities to expand the existing consumer base or to enter local partnerships, particularly for players who already have a nuanced understanding of regional automobile markets. For India's automobile sector, Africa's emerging market not only provides scale but also will lead to lower costs and facilitate innovative production suitable for diverse conditions, benefiting consumers in both regions. At the same time, OEMs can invest in building local value chains, launch joint skilling initiatives, and create local employment opportunities.
- **Create partnerships for the ecosystem.** By presenting a united Global South region at international forums, India and African countries can drive more equitable trade terms for critical minerals, promote open technology transfer, and push for increased funding and research. This collaborative approach can foster a more inclusive global EV future.

India and Africa are both at pivotal junctures in their e-mobility transitions—Africa with its strong policy intent to leapfrog ICE vehicles, and India with its goal to significantly scale up EV adoption. Considering evolving global trends, there are numerous opportunities to strengthen Global South coordination on e-mobility, including facilitating the exchange of ideas, expanding supply chains, and accelerating EV deployment across the region.

Framework for Partner Country Selection

India's engagement with Africa on e-mobility marks a strategic opportunity for both regions to advance their economic and sustainability goals. This section outlines the framework adopted for selecting initial focus countries, providing a backdrop for collaboration between India and Africa. Subsequently, this framework can be expanded to include more countries and deepen cooperation across the Global South.

COUNTRY SELECTION FRAMEWORK

The research team developed a comprehensive selection framework involving seven parameters to identify potential partner countries in Africa with which India can collaborate. While this framework offers an objective basis for the current assessment, it is important to note that the results may evolve as the parameters and underlying factors change. Under the initial phase, four African countries were identified, but the framework can be scaled and expanded to more countries in subsequent phases as the India-Africa partnership deepens.

The first step was to short-list countries based on GDP—a proxy for market size, consumer base, and infrastructure capacity—which can drive demand for EVs and related industries. The 10 countries **short-listed** for further assessment based on their GDP were South Africa, Egypt, Nigeria, Kenya, Morocco, Algeria, Tanzania, Angola, Ethiopia, and Côte d'Ivoire.

Each short-listed country was then evaluated for its EV readiness and its potential for partnership with India. The evaluation used seven quantifiable parameters, with data sourced from reputable international and government institutions to ensure objectivity and comparability.

Table 3: Assessment Parameters

Parameter	Description	Source
Per capita electricity consumption	Proxy for energy infrastructure and grid capacity needed to support EV deployment	**International Energy Agency**
Policy environment	Presence (or absence) of (1) national EV policies or targets, and (2) EV incentives *Note: Each metric is scored as 0 (absent) or 1 (present), summed to a total of 2, and converted to a 0–1 logarithmic scale.*	**Energy for Growth Hub**
Trade with India	Indication of established economic links for joint ventures and existing bilateral trade relationships for smooth exchange of knowledge, technology, and investments *Note: This measure looks at total goods trade between India and the top 10 countries for FY 2023–2024.*	**Department of Commerce, Government of India**
EV readiness	Evaluation of factors such as charging infrastructure, regulations, and technical readiness for EV adoption	EV Readiness and Impact Index, **Energy for Growth Hub**
Market potential	Evaluation of countries based on economic size, population, and consumer demand *Note: Original scores out of 100 are scaled to 0–1.*	Market Potential Index, **globalEDGE/ Michigan State University**

Parameter	Description	Source
Emerging sources of critical minerals	Consideration of critical mineral availability, including cobalt, lithium, nickel, and rare earth elements (REEs) that play a pivotal role in EV manufacturing *Note 1: Each mineral reserve present in a country is assigned a score of 1. The cumulative score (maximum 6) is scaled to 0–1.* *Note 2: Though there are multiple steps involved in the supply chain between a mineral deposit and EV battery manufacturing, this parameter is included to account for potential India-Africa trade on critical minerals supply chains.*	**African Union's African Mineral Development Council (AMDC)**
Recent exchanges with India	Consideration of recent collaborations or engagements with India on e-mobility or critical minerals. *Note: Countries are scored as 1 (engaged) or 0 (no engagement).*	Government and private sector reports

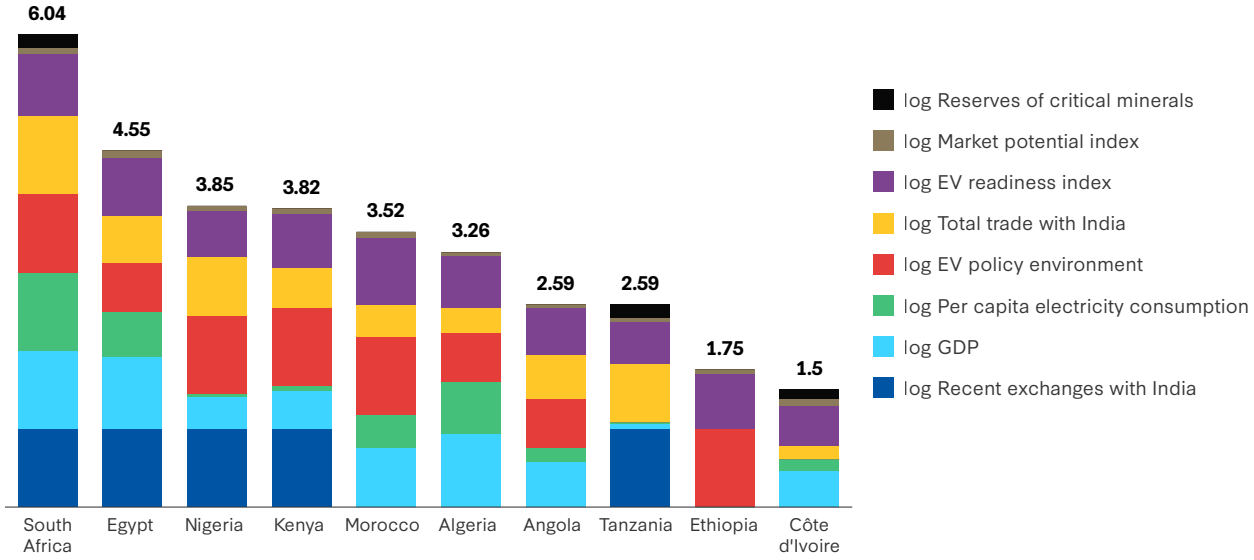
Source: CSIS Chair on India and Emerging Asia Economics.

All parameters were consolidated and normalized using a logarithmic scale between 0-1. Using "log" transformations normalizes data by compressing large values and reducing skewed ones, thus ensuring comparability and preventing extreme values from disproportionately influencing the analysis. The score from each parameter was then summed to create a final country score ranging from 0 to 8.

RESULTS

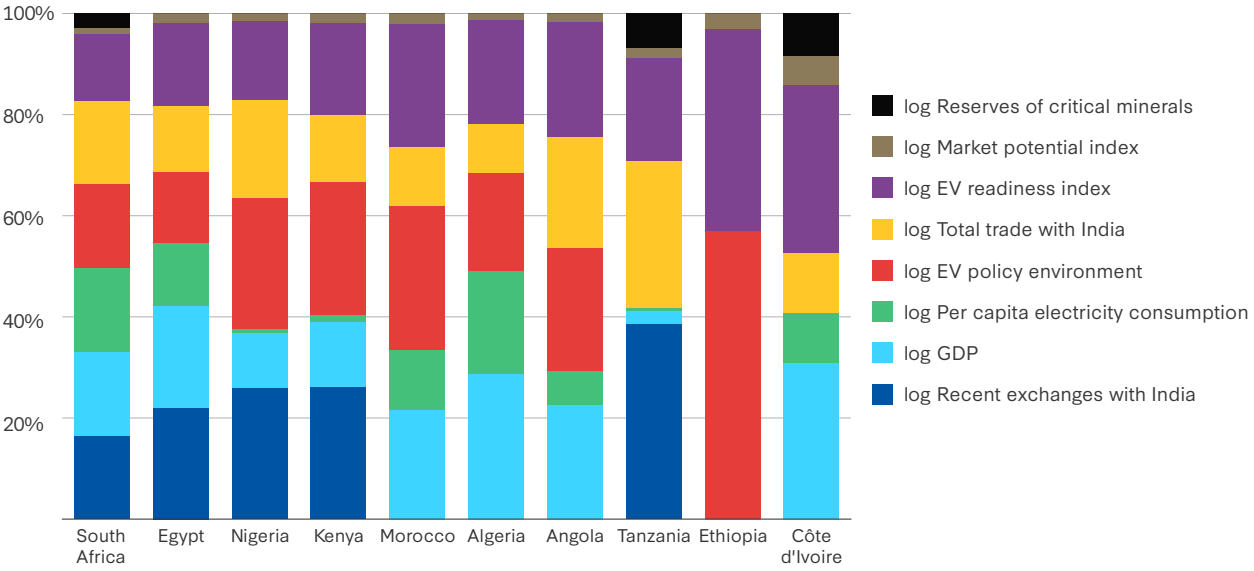
The framework was applied to the 10 African countries previously identified, with the consolidated scores reflecting each country's overall suitability for collaboration on the e-mobility transition (see Table 6 in the appendix for individual country scores across the seven parameters).

Figure 5a: Composite Score of Key Parameters by Country



Source: CSIS Chair on India and Emerging Asia Economics.

Figure 5b: Relative Weights of Each Parameter by Country



Note: This bar chart illustrates the relative weight of each parameter for every country, expressed as a percentage of their total consolidated score.

Source: CSIS Chair on India and Emerging Asia Economics.

Table 4: Composite Scores for Selected African Countries

Country	Total Score	Preliminary Assessment
South Africa	6.04	South Africa ranks highest due to its strong GDP, high per capita electricity consumption, and concrete EV readiness. The country also benefits from significant reserves of critical minerals and an existing robust trade volume with India.
Egypt	4.55	Egypt performs well due to a moderate GDP and good energy targets. However, the country lags in EV readiness and critical minerals reserves, impacting its overall score. With investments in EV infrastructure, Egypt could improve its position.
Nigeria	3.85	Nigeria scores well based on its large GDP and potential for growth but suffers from low per capita electricity consumption and limited EV readiness. Enhancing Nigeria's electricity grid and EV infrastructure would help boost its score.
Kenya	3.82	Moderate GDP and electricity consumption contribute positively to Kenya's overall score. However, the country's EV readiness is lower compared to the top performers. Greater investment in EV infrastructure is needed to increase its score.
Morocco	3.52	Morocco demonstrates strong energy targets and EV market potential, but supply chain hurdles may emerge due to limited reserves of critical minerals and low EV readiness. Morocco's focus on clean energy and infrastructure development could help improve its standing.
Algeria	3.25	Algeria exhibits a relatively stable economy but faces challenges in electricity consumption and EV readiness. The country would benefit from greater energy diversification and energy sector reforms to foster growth in the EV industry.
Tanzania	2.59	Tanzania scores moderately due to its relative abundance of natural resources and strong market potential. However, challenges in infrastructure development and EV readiness hold back its overall score, which can be addressed through streamlined policy support and targeted financial incentives.
Angola	2.59	Angola has a modest GDP but has low per capita electricity availability and lacks EV readiness. Development in energy and infrastructure would increase its competitiveness in the EV space.
Ethiopia	1.75	Ethiopia exhibits significantly lower electricity consumption and minimal EV infrastructure, despite its growing economy. However, Ethiopia's national energy targets show promise for future development, particularly in renewables.
Côte d'Ivoire	1.50	Côte d'Ivoire exhibits decent GDP growth and some market potential but lacks energy infrastructure and EV readiness. Key investments in clean energy and mobility infrastructure could improve its score.

Source: CSIS Chair on India and Emerging Asia Economics.

PROFILES FOR SHORT-LISTED COUNTRIES

Based on the comprehensive selection framework, the top four countries short-listed for this phase of strengthening collaboration are South Africa, Egypt, Nigeria, and Kenya. An overview of the current landscape of each country is provided below.

SOUTH AFRICA

South Africa is the **largest** automotive manufacturing hub in sub-Saharan Africa for global OEMs like Toyota, Ford, and Volkswagen. Indian OEM Mahindra and Mahindra has been operating in South Africa for over three decades and **signed** an MOU in 2025 to explore auto manufacturing operations in the country. While no EVs are currently **manufactured** domestically, South Africa's 2023 **Electric Vehicle White Paper**, from the country's Department of Trade, Industry, and Competition (DTIC), focused on developing the EV industry.

- **E-mobility landscape:** EVs have faced economic penalties in South Africa, facing a 25 percent import tariff, compared to 18 percent on ICE vehicles, making EVs **less cost-competitive**. However, the 2025 budget from the South Africa's National Treasury **introduced** a $54 million incentive program to build domestic EV manufacturing. South Africa also plans to **introduce** a 150 percent tax incentive for electric and hydrogen vehicle production in March 2026. South African EV sales are growing rapidly, **experiencing** 80 percent growth in first-quarter sales in 2024 compared to 2023.
- **Climate goals and EV targets:** South Africa's climate goals, outlined in its **2021 NDC**, highlight that greening transportation is a key component of its broader climate action framework. As part of the Paris Agreement, South Africa has a relatively modest non-binding **commitment** to achieve 20 percent hybrid or EV penetration by 2030.

  The 2021 **Auto Sector Green Paper on New Electric Vehicles**, from South Africa's DTIC, ties the country's economic goals to climate imperatives in the domestic automotive industry. The paper prioritizes EVs to maintain access to key export markets and aims to boost EV adoption through a global framework such as the **Electric Vehicle Initiative**. The country has conditionally **signed COP26**'s **zero emissions by 2040** vehicle declaration.

- **Key stakeholders:** Collaboration and alignment among the key stakeholders in the South African automotive market is essential to drive the EV transition, with the government providing the policy framework and direction and the private sector bringing investment and technology.

  The DTIC **develops** central auto industry policy and new legislation on EVs, while the National Treasury **oversees** the funds for EV incentives and tax measures. South Africa's automotive industry, represented predominantly by the National Association of Automobile Manufacturers of South Africa (NAAMSA), advocates for reduced import duties and transparent policies to **encourage** EV adoption (Table 7 in the appendix for a detailed stakeholder map).

EGYPT

The most **populous** country in North Africa, Egypt has massive potential for EV growth and adoption. The Egyptian government has begun **cultivating** its EV industry through a mix of import policy, supply- and demand-side subsidies, and partnerships with foreign companies. Egypt has over **7,213 registered EVs** as of 2024.

- **E-mobility landscape:** Egypt offers several fiscal incentives related to e-mobility, including **special import duty rates** for EVs, charging stations, and components. The country has also **introduced** special electricity tariffs to reduce operational costs for EVs, although this rate has increased for public charging. Furthermore, Egypt has pushed for investments in startups, domestic manufacturing, and EV infrastructure. As a result, as of late 2024, the country was home to **19 automotive manufacturing plants**, as well as the **Suez Canal Economic Zone**, an area to provide essential support to the industry. The country aims to produce **25,000 vehicles** per year through an memorandum of understanding (MOU) between the state-owned El Nasr Automotive and Dongfeng Motor Group. In addition, the country **entered** a joint manufacturing scheme with the United Arab Emirates (UAE), Jordan, and Bahrain, to build assembly lines in Egypt for the UAE's M Glory Holding automotive manufacturer.
- **Climate goals and EVs:** In 2022, Egypt **released** its National Climate Change Strategy 2050 and **revised** its NDC the following year. While its transportation focus is shifting from private passenger and freight vehicles to mass transit, the country is still making efforts to encourage the domestic manufacturing of EVs. Though Egypt does not have a set EV target, electrifying transportation aligns with its broader climate and emissions reduction strategies. Its NDC pledge is to reduce emissions in the transportation sector by **7 percent** by 2030.
- **Key stakeholders:** Egypt's EV environment is governed by its line ministries, including the Ministry of Public Business Sector and the Ministry of Trade and Industry, through import policies—most notably the used car and EV import rules—and other industrial incentives (see Table 7 in the appendix for a detailed stakeholder map).

NIGERIA

Nigeria is a **major** oil producer and is heavily **reliant** on the import of used ICE vehicles. The country is committed to transitioning to cleaner vehicles, emphasized by its 2023 **removal** of historic fuel subsidies and its **commitment** to achieve net carbon neutrality by 2060.

- **E-mobility landscape:** Since the successful repeal of historic fuel subsidies in 2023—which had been announced but not implemented in 2020, and only temporarily implemented in 2016—the Nigerian government has released several related reforms and incentives. The government **eliminated** all import tariffs on EVs in early 2024, compared to the 35 percent tariff on other vehicles, to increase the cost competitiveness of EVs. **Nigeria's Action Plan for Development of Electric Vehicles**, issued in May 2023, delineates a strategy to facilitate domestic manufacturing of EVs, including several incentives for localized EV assembly, aiming for 30 percent of all EVs to be locally produced by 2033. The plan also outlines the country's asset financing scheme to provide capital funding for Nigerian automotive and auto-component manufacturers.

  Local and foreign entities are working together to invest in expanding Nigeria's EV ecosystem. Nigerian Oando Clean Energy Limited, for example, is **collaborating** with the Chinese bus builder Yutong to deploy 12,000 electric buses by 2030, along with the associated charging infrastructure.

- **Climate goals and EVs:** Nigeria's long-term strategy is prioritizing clean transportation, and it has woven EV adoption into its climate commitments. Nigeria aims for **100 percent** EV

penetration by 2060. Critical to Nigeria's climate strategy is **transitioning** to clean fuels and weaning off oil. Nigeria's NDC targets aim for EVs to account for **60 percent** of the total vehicle stock by 2050, and 100 percent by 2060.

- **Key stakeholders:** At the national level, the National Automotive Design and Development Council (NADDC), under Nigeria's Federal Ministry of Industry, Trade, and Investment (FMITI), is the **nodal agency** for EVs. While the NADDC developed Nigeria's automotive development plan, FMITI deploys incentives and subsidies for local EV manufacturing and adoption. At the subnational level, the Lagosian government is **leading** the charge for municipal electric transit, **positioning** itself as the testbed for EV projects in Nigeria.

  Domestic auto manufacturers also play a critical role. Companies like IVM and Jet Motor Company are among the largest indigenous African EV companies. Historically, these companies have also played an important role in the EV sector. For instance, in 2020, Jet Motor Company set out to become the country's first domestic auto manufacturer to produce a 100 percent indigenous EV, raising **$9 million** in research capital from a number of international investors (see Table 7 in the appendix for a detailed stakeholder map).

KENYA

Kenya **leads** renewable energy generation in Africa, with over 90 percent coming from geothermal, hydropower, wind, and solar power. Kenya's transportation sector is shifting quickly from ICE vehicles to EVs. While the EV market is new, it is rising, with **over 4,193 EV units** registered as of December 2024, a five-fold growth in EV registrations since 2022. While this is a small percentage of Kenya's fleet of 2 million vehicles, it **represents** significant growth in EV uptake.

- **E-mobility landscape:** There is national buy-in to support the EV transition through Kenya's **Draft National Green Fiscal Incentives Policy Framework** and **Draft National Electric Mobility Plan**, announced in 2022 and 2024, respectively. The government has also implemented several policies and subsidies to accelerate EV adoption, **including** zero VAT ratings for electric bicycles, motorcycles, buses, and lithium-ion batteries, as well as import duty exemptions for some electric motorcycles.

  Through specific electricity tariffs and subsidies, the **estimated** operating cost for operating EVs is up to eight times lower than that of ICE passenger vehicles, as well as for commercial and fleet ICE vehicles. The Kenyan government and startups are **actively investing** in charging infrastructure, with the government planning to install 1,000 EV charging stations by 2027. However, investments in the sector still **lag**. In addition to public sector and development financing, the sector needs active **private sector investments** to support innovation and manufacturing. Without these investments, emissions are expected to be between **4 and 31 times larger** by 2050, compared to the 2010 baseline.

- **Climate goals and EVs:** Kenya's EV transition is part of its NDC to reduce carbon emissions by **one-third** by 2030. While energy demand in the country is growing, carbon-based energy sources have been diminishing, with **90 percent** of all energy being sourced from renewable energy as of 2022. During COP26, Kenya **signed** the zero-emission vehicle declaration and joined

the **Accelerating to Zero Coalition**, **supporting** the group's multinational goal of ensuring all new cars are zero emission in leading markets by 2035, and globally by 2040.

- **Key stakeholders:** The Ministry of Transport and the Ministry of Energy jointly spearhead the Draft National Electric Mobility Plan, and the Ministry of Finance looks after deploying incentives and tax benefits for EV adoption. State utilities, namely **Kenya Power**, KenGen, and the Kenyan Power & Lighting Company, are prioritizing EVs in their investments to build EV charging stations and introduce new business models to increase EV adoption.

  The United Nations Environment Programme, headquartered in Nairobi, is also a key player, **supporting** E2W/E3W pilots and rollout plans (see Table 7 in the appendix for a detailed stakeholder map).

COLLABORATION POTENTIAL BETWEEN INDIA AND AFRICA

While South Africa and India already have robust, well-connected auto manufacturing sectors, both countries can deepen their EV transition and manufacturing goals through decisive government support, knowledge sharing, and private sector collaboration. Partnership between Egypt and India can be strengthened through bilateral and multilateral platforms focused on EV manufacturing. Similarly, India-Nigeria relations, particularly on EVs, show significant potential for cooperation on targeted policy and manufacturing interventions. Kenya and India also have immense potential to accelerate EV manufacturing and the e-mobility transition, leveraging their respective renewable energy capacities.

The EMBRACE Platform: Electric Mobility Bridge for Regional Africa-India Cooperation and Exchange

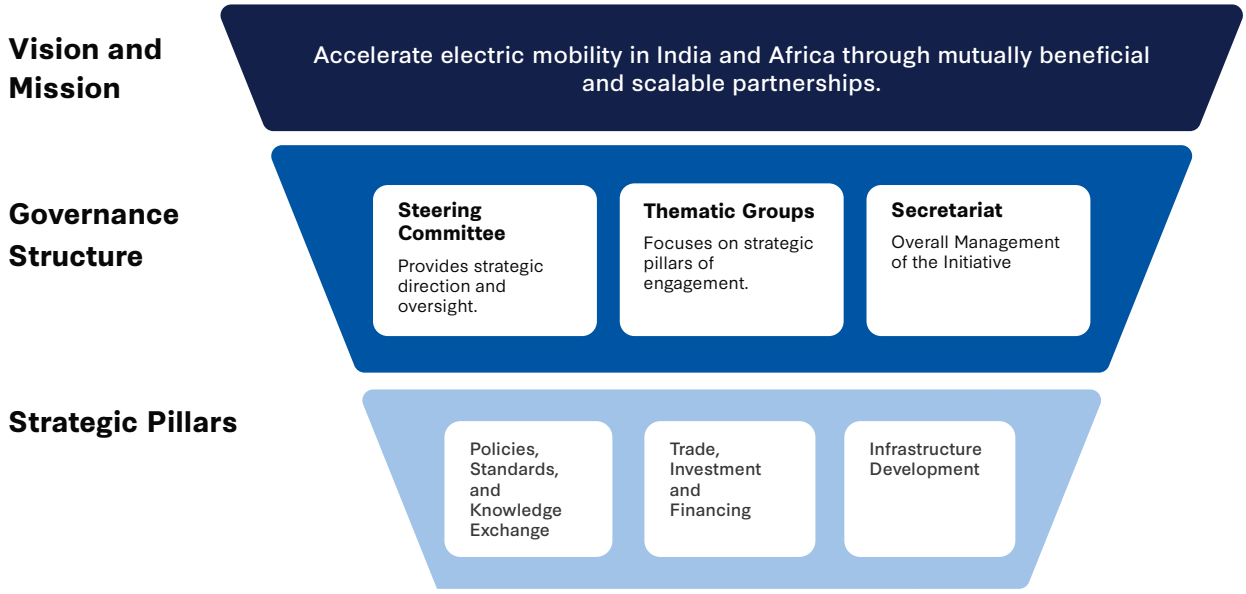
India's engagement with Africa on e-mobility presents a strategic opportunity to advance shared economic and sustainability goals. As countries transition to e-mobility, there is a clear need to create dedicated platforms that facilitate knowledge sharing, policy alignment, and coordinated action across borders. Such mechanisms foster trust, translate dialogue into actionable strategies, and strengthen collaboration across the Global South.

Envisioned as the **Electric Mobility Bridge for Regional Africa-India Cooperation and Exchange (EMBRACE) Platform**, this strategy brings together policymakers, industry leaders, financiers, and technical experts to accelerate the e-mobility transition. By enabling structured discussions on infrastructure, policy, and trade, the EMBRACE Platform supports informed policymaking, develops resilient and inclusive supply chains, and ensures partner countries benefit from both climate and development gains.

ARCHITECTURE AND AREAS OF COLLABORATION

At its core, EMBRACE aims to facilitate dialogue between policymakers and stakeholders, focusing particularly on supply chain resilience, innovation, and investment in EVs, batteries, and critical minerals. The initiative also emphasizes sustainable economic growth while promoting circular, low-emission transportation solutions aligned with long-term climate goals.

Figure 6: EMBRACE Platform Architecture



Source: CSIS Chair on India and Emerging Asia Economics.

The EMBRACE Platform has the following mission and structure:

- **Vision and mission:** Accelerate electric mobility in India and Africa through mutually beneficial and scalable partnerships among key stakeholders.
- **Governance structure:**
  - *Steering Committee:* The steering committee provides strategic direction and oversight; key participants include policymakers, multilateral and bilateral institutions, and philanthropic organizations.
  - *Thematic Working Groups:* The working groups focus on strategic pillars of engagement; key participants include global experts, researchers, civil society organizations, automotive associations, and industry representatives.
  - *Secretariat:* The secretariat ensures overall management of the initiative, including country engagement.

STRATEGIC PILLARS

Seamless collaboration that facilitates knowledge exchange, reduces trade barriers, and improves economies of scale is essential to strengthen India-Africa collaboration aimed at accelerating electric mobility. This section presents key areas of collaboration under each strategic pillar that can be prioritized alongside the institutionalization of the EMBRACE Platform:

- **Policies, standards, and knowledge exchange:** By ensuring alignment on the most crucial policies through the sharing of best practices, India and countries in Africa can implement innovative solutions to accelerate the EV transition.
  - Design supply-side incentives and regulations to strengthen the manufacturing ecosystem.

- Identify and implement innovative frameworks such as India's e-bus **procurement** framework to electrify public transportation.
- Harmonize standards for EV charging and manufacturing to create an integrated market.
- Identify avenues for knowledge exchange on critical and emerging technologies related to EV manufacturing, battery cell chemistry and manufacturing, and critical minerals processing.

- **Trade, investment, and financing:** With a focus on trade, investment, and financing, India and countries in Africa can create a better enabling environment to facilitate private capital flow and investment into EV and critical minerals infrastructure and supply chains.
  - Establish joint funding mechanisms and risk-sharing facilities to mobilize resources.
  - Integrate critical mineral value chains, particularly refining, downstream manufacturing, and recycling, including batteries.
  - Define opportunities and mechanisms to enhance market access, leveraging the growing potential and rapid urbanization of both regions.
  - Develop skilling and capacity-building programs to support technology localization and domestic job creation.
  - Identify avenues for shared infrastructure development and technological innovation across partner countries, such as **battery-as-a-service models**, battery-swapping for **e-buses**, **E2Ws and E3Ws**, and **expanding** EV accessibility into rural areas.

- **Infrastructure development:** While the infrastructure for enabling EVs and streamlining critical minerals in India and Africa differs, collaborative efforts can help define best practices for the design, deployment, and scaling of both upstream and downstream infrastructure, optimizing for local contexts, cost-efficiency, and long-term impact.
  - Promote collaborative infrastructure planning frameworks to share best practices.
  - Identify avenues to facilitate infrastructure development in alignment with OEMs expanding into both markets.
  - Link skilling programs with infrastructure development to create more local jobs and build workforce capacity.
  - Jointly explore and pilot infrastructure innovations to reduce costs and accelerate market readiness.

The main mechanism of engagement should be through regular convenings, and peer-to-peer exchanges involving policymakers in government and leaders and experts from both industry and academia, helping these groups to share and consult on best practices and new innovations.

On policy exchange, to cement the learnings from these consultative dialogues, frameworks for collaborative research should emerge such as site visits, university partnerships, and cross-border deputization programs.

On facilitating investment, to further the outcomes derived from the discussions, India and countries in Africa should aim to develop joint funding mechanisms and risk-sharing facilities, work with the private sector to draw in talent and technology, foster industry collaboration on manufacturing and minerals processing to diversify and move up supply chains, and focus on critical infrastructure such as charging, retrofitting, and recycling.

Increased collaboration through the EMBRACE Platform among countries in the Global South holds the potential to significantly accelerate the development of resilient and inclusive EV ecosystems. Through bilateral and multilateral ties, countries can unlock new market and investment opportunities, foster job creation, and bolster regional supply chains. These countries can create more locally attuned policy frameworks through knowledge exchange and codevelop context-specific solutions for the Global South. Development of supportive frameworks to enable policy, technology, investment, and capacity-building partnerships can create multifold opportunities for long-term industrial and technological development in the EV sector. ■

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Appendix

Table 5: Country Policy Tracker

Country	Key Initiatives & National Strategies	EV Targets	Regulatory Policies	Incentives	Investments & Financing	Infrastructure	Joint Action, MOUs, or Partnerships
South Africa focuses heavily on green transportation to reduce demand, increase operational efficiency, and use alternative low-carbon fuels, but it does not explicitly focus on EVs. The **EV White Paper**, published by the Department of Trade, Industry, and Competition in 2023, outlines South Africa's plan for developing and expanding domestic EV manufacturing and supply chains, but does not delineate explicit targets, investments, or approved policies. South Africa has **approved** incentives for domestic EV production and aims to **create** 40 solar-powered EV charging stations annually.	**Green Transport Strategy** **Electric Vehicle White Paper**	Convert 5 percent of public fleets to cleaner fuels by 2025, with 2 percent annual increases thereafter		✓		✓	
Egypt has rolled out substantial support to accelerate EV adoption. The incentives include **reduced** customs on importing EV manufacturing equipment and components, as well as lower fees on cars with at least 10 percent locally sourced components. To increase manufacturing, Egypt **entered** a joint manufacturing scheme with Jordan, the UAE, and Bahrain. Egypt has also **banned** import of any used cars, including ICE vehicles and EVs.	**National Energy Efficiency Action Plan II** (2018/2019–2021/2022)	**Ban on traditional petrol/diesel cars by 2040**		✓	✓	✓	✓

Country	Key Initiatives & National Strategies	EV Targets	Regulatory Policies	Incentives	Investments & Financing	Infrastructure	Joint Action, MOUs, or Partnerships
Algeria has **focused** on low-emissions fuels over EVs for decarbonizing the transportation sector. The country has set the goal of converting **1.2 million ICE vehicles** into low-emissions vehicles. The country has also banned the import of three-year-old used ICE vehicles but has set no direct targets for EVs. Algeria has nascent efforts in EVs, including a non-binding goal to install **30,000 EV stations** by 2030, but limited progress otherwise.	**The National Energy Management Program for the transportation sector by 2030**	**Converting 1.2 million ICE vehicles to clean fuels by 2030**	✓			✓	
Nigeria has a comprehensive EV transition strategy through the Nigerian Energy Transition and the Automotive Industry Development Plan, with lofty EV adoption and manufacturing goals. It has **implemented** many supply-side incentives to boost EV adoption, including a revised tariff structure for EV production and import, as well as tax holidays and accelerated capital allowances for assemblers. For **consumers**, there are three-year tax holidays for cab and courier companies, accelerated loans for domestically made EVs, and the **removal** of fossil fuel subsidies to make EVs more competitive.	**Nigerian Energy Transition Plan**	**EVs to be 60% of market by 2030, 100% by 2060**		✓		✓	
	Nigerian Automotive Industry Development Plan	**30 percent of local production to be EVs by 2033**					

Country	Key Initiatives & National Strategies	EV Targets	Regulatory Policies	Incentives	Investments & Financing	Infrastructure	Joint Action, MOUs, or Partnerships
Ethiopia does not have a strategic plan for EV adoption. However, it has made great strides toward its goal of replacing 1.5 million ICE vehicles with EVs. Ethiopia **banned** the import of non-EVs, as a currency stabilization measure amid rising fuel imports and costs and to help implement progressive EV policy. It has also **implemented** blanket tax reductions on all EVs, eliminating all excise, value-added, and surtaxes while drastically reducing customs taxes, **making** EVs far more affordable for the average Ethiopian.	No explicit national policy or roadmap	**Replace 1.5 million ICE vehicles with EVs**	✓	✓			
Morocco does not have a national strategic plan for EV adoption but has built the groundwork needed to accelerate its transition and meet its goal to have half a million EVs on the road by 2030. Morocco has **introduced** VAT reduction for importers/distributors of "ecological cars" and **enforced** Euro 6 emission standards nationwide. It is continuing to increase the number of e-chargers (600 as of 2022) to meet their its goals, **aiming** to build 2,500 new chargers by 2026.	No explicit national policy or roadmap	**2,000 E-buses; 250,000 E2Ws/ E3Ws; and 285,000 E4Ws by 2030** **EVs to make up 60 percent of automobile exports by 2030**	✓	✓			✓

Country	Key Initiatives & National Strategies	EV Targets	Regulatory Policies	Incentives	Investments & Financing	Infrastructure	Joint Action, MOUs, or Partnerships
Kenya outlined its goal of making EVs 5 percent of all vehicle sales by 2025 in its National Energy Efficiency and Conservation Strategy. The draft National Electric Mobility Policy outlines its strategy and pipeline of regulatory and policy reforms to accelerate EV adoption and meet its NDC commitments. It has **set** minimums for e-chargers in parking spaces for multi-dwelling, commercial, and public buildings and is **planning** to institute cheaper tariffs for e-charging stations. Kenya has also **reduced** excise duties and VAT on some EVs.	**National Energy Efficiency Conservation Strategies** **National Electric Mobility Policy** (2025) (Draft)	**5 percent of all vehicles sales be EVs by 2025**	✓	✓			
Angola has a draft National Strategy for Electric Mobility and has defined policies to boost EV adoption. Currently, Angola has **imposed** 50 percent tax and import duty restrictions for EVs.	**National Strategy for Electric Mobility**	N/A		✓			
Cote d'Ivoire has nascent public sector investments in EVs. It has not yet implemented a strategic roadmap. However, it has **plans** to build an electric bus rapid transit project across the country's urban center, Abidjan.	No explicit national policy or roadmap	N/A				✓	
Tanzania has an emerging policy environment to accelerate EV adoption and is in the initial stages of building a national policy framework for EVs. It has **introduced** tax reductions for E4Ws and buses.	**Proposed Framework for Electric Vehicles**	N/A		✓			

Table 6: Ranking Framework of the Top 10 African Countries by GDP

Country	GDP (billion $)	log GDP	log Per capita electricity	log Policy	log Total trade	log EV readiness index	log Market potential index	log Reserves of critical minerals	log Recent exchanges with India	Total country score
South Africa	403.05	1	1	1	1	0.8	0.06	0.18	1	6.04
Egypt	380.04	0.92	0.57	0.63	0.60	0.74	0.09	0	1	4.55
Nigeria	199.72	0.42	0.03	1	0.75	0.6	0.06	0	1	3.85
Kenya	116.32	0.49	0.06	1	0.50	0.7	0.07	0	1	3.82
Morocco	157.09	0.76	0.42	1	0.41	0.85	0.08	0	0	3.58
Algeria	260.13	0.94	0.66	0.63	0.32	0.67	0.05	0	0	3.26
Angola	113.29	0.59	0.17	0.63	0.57	0.59	0.04	0	0	2.59
Tanzania	79.87	0.07	0.02	0	0.75	0.53	0.05	0.18	1	2.59
Ethiopia	145.03	0	0	1	0	0.7	0.05	0	0	1.75
Côte d'Ivoire	86.99	0.47	0.15	0	0.18	0.5	0.09	0.13	0	1.50

Table 7: Country Policy Tracker

Key Stakeholder Group	India	South Africa	Egypt	Kenya	Nigeria
Government & Policy Makers	▪ Ministry of Heavy Industries ▪ Ministry of Road Transport and Highways ▪ Ministry of Power ▪ Ministry of New and Renewable Energy ▪ Ministry of External Affairs ▪ State governments	▪ Department of Trade, Industry, and Competition ▪ Department of Transport ▪ South African National Treasury	▪ Ministry of Public Business Sector ▪ Ministry of Trade and Industry ▪ Supreme Council for the Automotive Industry Development Program	▪ Ministry of Transport ▪ Ministry of Energy ▪ Ministry of Finance	▪ Federal Ministry of Industry, Trade, and Investment ▪ Lagos State Government
Regulatory & Policy Agencies	▪ NITI Aayog ▪ Bureau of Energy Efficiency ▪ Bureau of Indian Standards ▪ Automotive Research Association of India	▪ Automotive Supply Chain Competitiveness Initiative ▪ International Trade Administration Commission of South Africa ▪ Presidential Climate Commission	▪ Egyptian Cabinet Information and Decision Support Center		▪ Nigeria Energy Transition Office ▪ National Automotive Design and Development Council
Manufacturers			▪ El-Nasr Automotive Manufacturing Company (state-owned) ▪ Aboul Fotouh Egypt		

Key Stakeholder Group	India	South Africa	Egypt	Kenya	Nigeria
Original Equipment Manufacturers (OEMs)	▪ Passenger cars: Tata Motors, Mahindra & Mahindra, MG Motor India, Hyundai, Maruti Suzuki, BYD, Volkswagen, Tesla (planned), VinFast (planned). ▪ 2- and 3-wheelers: Ola Electric, Ather Energy, Hero Electric, TVS Motor, Bajaj Auto, Okinawa Autotech. Mahindra Electric, Piaggio, Atul Auto. ▪ Commercial & Fleet EVs: Ashok Leyland, Olectra Greentech, JBM Group	▪ Passenger cars: BMW, Ford, IZUZU, Mercedes Benz, Nissan, Toyota, Volkswagen ▪ 2- and 3-heelers: BMW Motorrad, Honda, KTM, Mahindra, Piaggo, Bajaj Commercial and Fleet EVs: Bell Equipment, Daimler Trucks, FAW, Fuso, Hino, IVECO, Man Automotive, Marcopolo, Tata, Scania, UD Trucks, Powerstar, Sinotruk, Volvo	▪ Passenger cars: Stellantis, Egyptian German Automotive Company, GB Corp., General Motors, Kasrawy Group (JAC Egypt), Nissan EgyptCommercial and Fleet EVs: Gorica Egypt, Geyushi Motors, Kastour EgyptComponents: IDACO	▪ Passenger cars: Hyundai, Volkswagen, Peugot, Izusu, Toyota, Honda, FAW, IVECO ▪ 2- and 3-wheelers: Spiro, Roam Electric, Kiri EV ▪ Commercial and Fleet EVs: BasiGo	▪ Passenger cars: Innoson Vehicle Manufacturing, Peugeot, Nissan, Hyndai, Ford, GIC, Roxette ▪ 2- and 3-wheelers: Yamaha, TVS Nigeria, Hero, Elesco ▪ Commercial and Fleet EVs: Nord Automobiles, NEV motors
Battery & Component Manufacturers	▪ Battery cells & packs: Amara Raja, Exide, Tata Chemicals, Godi Energy. ▪ Power electronics, motors, and controllers: Bharat Electronics, Lucas TVS, Sun Mobility (for battery-swapping solutions).	▪ Recycling: Cwenga LiB	▪ Batteries: United Batteries Company ▪ Recycling: El-Nisr (lead acid and recycling)		▪ Cloud Energy ▪ Recycling: BPL Nigeria
Financing Institutions	▪ Small Industries Development Bank of India ▪ Exim Bank of India	▪ Afrexim Bank ▪ South African Reserve Bank ▪ Development Bank of South Africa ▪ Industrial Development Corporation	▪ Afexim Bank ▪ Central Bank of Egypt ▪ National Bank of Egypt ▪ Banque Misr ▪ Banque de Caire	▪ Afrexim Bank ▪ Central Bank of Kenya	▪ Afrexim Bank ▪ Central Bank of Nigeria ▪ Nigeria Export Import Bank

Key Stakeholder Group	India	South Africa	Egypt	Kenya	Nigeria
Multi-lateral and Bi-lateral Agencies	▪ United Nations Environment Program, African Development Bank, African Union, World Bank, International Solar Alliance, Center for Disaster Resilience Initiatives				
Charging Infrastructure Providers	▪ Charging station providers: Tata Power EZ Charge, Statiq, Ather Grid, Bolt.Earth, Servotech, EVRE, Jio-bp, ABB India, Delta Electronics India, Fortum ▪ Aggregators & tech platforms: Statiq, ElectricPe, ChargeGrid ▪ Utilities & oil/petroleum companies: Indian Oil, Hindustan Petroleum Corporation Limited, Bharat Petroleum Corporation Limited (collaborating for charging stations)	▪ Charging station providers: Rubicon, Zero Carbon Charge, GridCars, Aeversa ▪ Aggregators & tech platforms: Audi South Africa, ChargeNet SA, Chargify ▪ Utilities: Eskom	▪ Charging station providers: Sha7enm Elsewedy Electric, Ikarus ▪ Aggregators & tech Platforms: Revolta ▪ Utilities: Hassan Allam, Infinity, Misr Petroleum, Gastec	▪ Utilities: Kenya Power, Ken Gen, Kenya Power and Lighting Company	▪ Charging Station providers: Nigus International, Shafa Energy ▪ Aggregators & tech platforms: EVC Point, WattEV, E-Charge Nigeria ▪ Utilities: New Energies Ltd (subsidiary of Nigeria National Petroleum Company)
Consumers & End Users	▪ Individual buyers (urban and rural), fleet operators, logistics companies, shared mobility providers				
Others, including: ▪ Automotive Associations ▪ Research & Academic Institutions	▪ Society of Indian Automobile Manufacturers ▪ Federation of Indian Chambers of Commerce & Industry ▪ Confederation of Indian Industry	▪ National Association of Automobile Manufacturers of South Africa		▪ Kenya Motor Industry Association ▪ Kenya Association of Manufacturers ▪ E Mobility Association of Kenya	▪ Nigerian Automotive Manufacturers Association ▪ Electric Mobility Promoters Association of Nigeria