



Ghana's Automotive Market and Electric Vehicle (EV) Assembly Potential



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Executive Summary

This report assesses the opportunities and challenges in developing Ghana's Electric Vehicle (EV) sub-sector considering the EV Policy that the Government of Ghana recently launched. Areas of focus include a SWOT analysis of the EV market in Ghana and a review of the entire value chain: that is, opportunities to form strategic supplier relationships with global manufacturers for assembling electric two- and three-wheelers, four-wheelers (plug-ins and battery electrics), and electric commercial vehicles (buses, coaches) and building EV charging infrastructure on public-private partnership basis. It includes recommendations, which industry stakeholders can integrate the findings into their ongoing work strategies and project plans.

State of play of Ghana's vehicle market

- **Ghana imports about 100,000 vehicles annually, of which 90% are used cars.** The major supplier countries for these cars are The United States, Japan, and Germany. Data from the Driver Vehicle and Licensing Authority (DVLA) indicates that Ghana registered an average of 78,000 light vehicles annually from 2012 to 2021. This comprises private motor vehicles up to 2000 cubic capacity (cc) or 2 litres, commercial motor vehicles up to 2000cc, private motor vehicles above 2000cc and commercial motor vehicles above 2000cc.
- **Ghana registered an average of 18,000 trucks and buses from 2012 to 2021.** This comprised buses and coaches of all kinds, rigid cargo trucks up to 16 tons, rigid cargo trucks from 16 to 22 tons, rigid cargo trucks above 22 tons, articulator trucks up to 24 tons, articulator trucks from 24 to 32 tons, articulator trucks above 32 tons, agricultural equipment including combine harvesters, and construction equipment.
- **Ghana's electric vehicle (EV) baseline report indicates that from January 2017 to December 2021, the country imported 17,660 electric vehicles,** of which 9,431 were motorised two- and three-wheelers (E2&3W). DVLA records that over 92% of BEVs registered were from Original Equipment Manufacturers (OEM) in China. Ghana Revenue Authority (GRA) data from 2021 shows that standard hybrid electric (HEV) vehicles represent the majority, with 91.5%, followed by PHEVs (5.1%) and BEVs (3.3%). In the near to medium term, Ghana's market will be geared more toward HEVs and PHEVs than full BEVs due to the limited charging infrastructure.
- **Ghana has categorised its auto assembly into four segments based on the place of assembly or manufacture:** Semi-knocked-down (SKD), enhanced SKD, completely knocked down (CKD) and fully built units (FBUs). All the current operations within the industry are largely in the SKD segment of the market, with over 11 global and local car manufacturers (OEMS) assembling in Ghana or announcing the same. The entry of these OEMs bodes well for creating significant positive spillovers into local manufacturing and the metals sector in the medium to long term if catalysed by deliberate policies to move from SKDs to FBUs.
- **The total number of cars assembled locally is projected to be about 26,000 for the local market and another 46,000 for exports to regional markets under the African Continental Free Trade Area (AfCFTA),** bringing the total to 72,000 by 2033. It would comprise 57% of total new registered cars and 100% of announced 75,500 local OEM car assembly capacity.

Ghana's EV market policy environment

- **Ghana's EV policy will likely catalyse additional investments into the EV market.** The document shows clear objectives, goals and phases of implementation. However, it is not linked to the 2019 automotive policy in terms of promoting linkages. Nevertheless, the policy makes mention of leveraging Ghana's recent notable discoveries of critical (green) minerals, such as lithium and graphite, in substantial commercial volumes to produce value-added processes to position Ghana as a prominent centre for the manufacturing of batteries for EVs, although further details are not provided.
- **The success of EV adoption in the country is largely dependent on good and well-connected charging infrastructure across the country.** To ensure this happens, Ghana must employ an investor-friendly concept to drive the penetration of charging infrastructure, hence electric vehicle adoption. Under the Drive Electric Initiative, Ghana has adopted a public-private partnership, given the unique role the private sector is envisaged to play in deploying charging infrastructure across the country. But this is at a nascent stage.
- **Five (5) publicly available charging stations are currently open to the public.** These are all operated by the private sector. All chargers are currently at 11 kilowatts (kW) (level 2), and one 60KWh dual (CCS2 & GB/T) gun Level 3 Direct Current (DC) fast charger is located at the industrial area in the Dizengoff complex.
- **The Energy Commission, working with the Ghana Standards Authority (GSA), has adapted forty-eight (48) International Electrotechnical Committee (IEC), ISO, and IEEE standards to streamline the charging sector in Ghana and ensure safety and quality installation, operation, and conformity with acceptable national standards that are within the international best practice.**
- **Constraints to mainstreaming and formalising local EV assembly include the limited market size in Ghana and West Africa and the need for charging infrastructure.** On the incentive front, the government, in the 2024 budget, introduced some incentives to support the country's nascent EV sub-sector. Specifically, import duties on electric vehicles for public transportation for eight years have been waived, as are import duties on semi-knocked down and completely knocked down Electric vehicles imported by registered EV assembly companies in Ghana. The extent of this catalysing local EV assembly is yet to be known—a follow-up survey with the 11 OEMs is required at the end of this year.

Options for developing a vibrant EV sub-sector in Ghana

- **OEMs could form strategic supplier relationships with global manufacturers to assemble electric two-and three-wheelers for export to regional markets such as Togo, Burkina Faso, Niger, Mali and Guinea.** The opportunity for four-wheeler (plug-ins and battery electrics) assembly in Ghana is limited due to market size and the cost of reconfiguring production by OEMs.
- **There are also opportunities to assemble electric commercial vehicles (buses, coaches) for the West African market.** In February 2024, the incumbent government's presidential running mate indicated that Ghana was working on a policy to use EVs for public transport and would order 100 electric buses for the intercity Metro Mass Transit system.
- **Limited charging infrastructure remains the major drawback of the Electric Vehicle industry and needs to be addressed.** The availability of charging infrastructure would increase the willingness to switch to electric vehicles.

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- **New, evolving business models include battery swapping stations.** This model heavily supports the 2&3w sectors of the market. Ghana's current battery swap stations are all operated by Kofa Technologies, a bike assembly and battery swap company that is leveraging bikes to build an extensive network of battery swaps that feed its bikes and other bikes.
- **South Africa and Morocco's experience in global auto supply chains presents them with ecosystem advantages** [comparative advantage and economies of scale and scope] for EV manufacturing or assembly for the African market. Ghana has the potential to assemble battery packs for two- and three-wheelers for domestic use and export to regional markets.
- **The discovery of lithium in commercial quantities provides opportunities for the manufacture of precursor cells and lithium-ion batteries in Ghana.** As China has demonstrated over the past twenty years, a good mix of industrial, trade, and energy policies is required to unlock Ghana's battery manufacturing potential.

Policy recommendations

1. **Stakeholders (JET Programme Team, Ministry of Trade and Industry and the Automotive Development Centre) must engage and show OEMs the market opportunities to form strategic supplier relationships with global manufacturers in China and India to assemble electric two-and three-wheelers** for local use and export to regional markets such as Togo, Burkina Faso, Niger, Mali and Guinea. Ghana has the potential to assemble battery packs for two- and three-wheelers for domestic use and export to regional markets.
2. **Ghana must deploy industrial, trade and energy policies to unlock Ghana's battery manufacturing potential;** China has demonstrated this over the past 20 years. The report shows that the discovery of lithium and other minerals in commercial quantities provides opportunities to manufacture pre-cursor cells and lithium-ion batteries in Ghana. However, Ghana must have a clear green minerals value-added implementation plan (not just a policy) that makes a viable business case for producing lithium-ion components for EVs for local use and export.
3. **New PPP models and incentives for charging infrastructure are needed to catalyse the uptake of EVs.** Infrastructure constraints, especially inadequate public charging infrastructure, long charging times and unreliable power supply, are significant barriers to widespread adoption. Stakeholders (JET Programme Team, Ministry of Trade and Industry and the Automotive Development Centre) could work to promote the provision of charging infrastructure by the private sector at transport terminals in key towns and cities and along highways and major roads—using fuel and rest stations.
4. **Promote public education and awareness of not only the environmental benefits of EVs but also the potential to deepen the development of the supply chain, especially local manufacture of battery packs for two—and three-wheelers in Ghana.** Luckily, the country has already signalled in its EV policy that Phase 1 (the Preparatory Phase) of implementation from 2024 to 2026 would address the challenges and barriers to EV uptake.

1 Introduction

1.1 Purpose and scope

One of the linchpins of Ghana's recent industrial policy is for the country to become the hub for manufacturing and assembling automobiles in the West African sub-region. In 2019, the government launched the Ghana Automotive Development Policy (GADP), the strategic vision to anchor this sector. GADP will support job creation by “establishing an asset-based vehicle financing scheme and bolstering Ghana's balance of payments through competitive import substitution and export market development” —Figures 1 and 2. The GADP gives impetus to vehicle assembly and automotive components manufacturing as a strategic anchor industry in Ghana as part of the Ten Point Plan for industrial development.

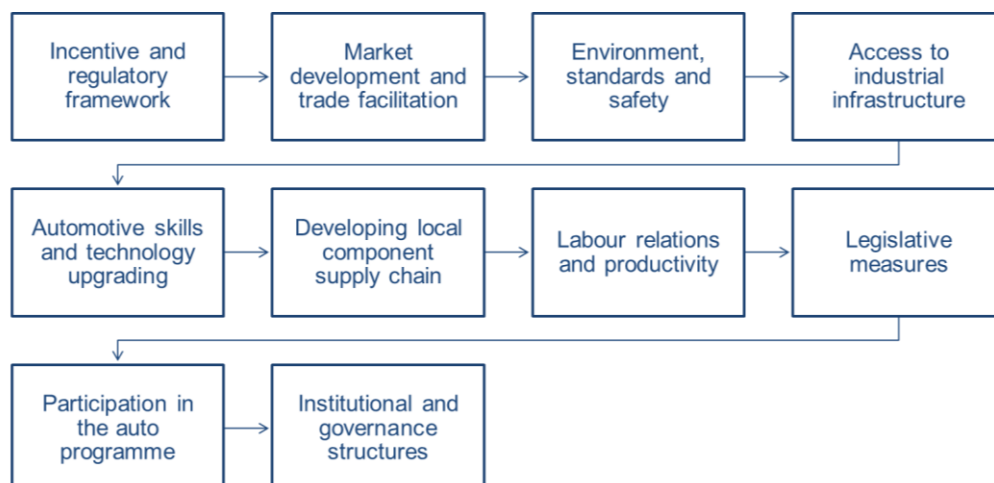
Since its introduction¹, **Ghana has attracted several local and international car manufacturers (11 OEMs) who have set up or are setting up assembly plants in the country.** These companies and investments are anchored on taking advantage of Ghana's skilled workforce, tax incentives, and the West African region's growing demand for reliable new vehicles. Ghana's automotive market's total assembly capacity is **75,500 cars annually, all internal combustion engines (ICEs).**

Figure 1 Strategic objectives of the auto policy



- To **establish a fully integrated and competitive industrial hub** for automotive assembling in collaboration with the private sector – global, regional and domestic;
- To **generate highly skilled jobs** in automotive assembly and the manufacture of components and parts, with spillover effects into other sectors of the economy;
- To **establish an asset-based vehicle financing scheme** for locally assembled vehicles to ensure affordability for vehicle buyers;
- To **improve balance of payments** through competitive import substitution and export market development;
- To **improve vehicle safety and environmental standards**; and
- To **transform the quality of the national road transport fleet** and safeguard the natural environment.

Figure 2 Policy thematic areas of the auto policy



¹ <https://ghanaautodevcentre.org/ghana-automotive-development-policy-gadp/>

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The industry continues to benefit from strong right-to-win fundamentals and government support through policy and tax incentives to support the building of manufacturing and assembly plants as part of its agenda to encourage domestic production and regional exports.

While these OEMs have set up a base to take advantage of the market opportunities, **Ghana, as part of its commitment to help address the global climate change problem, has recently introduced an electric vehicle policy to encourage decarbonisation in the transport sector.** This is also premised on Ghana's updated Nationally Determined Contributions (NDCs) under the Paris Agreement and the recently published National Energy Transition Framework. The energy and transport sectors are widely recognised as crucial for mitigating emissions globally and in Ghana. Ghana's energy sector accounts for 46% of the country's greenhouse gas (GHG) emissions in 2019.² Within this, mobile combustion emissions accounted for 34% and 15% of overall national emissions. Transport emissions, predominantly from road transport, have increased by 47% compared to 2016 due to growing vehicle ownership and the associated traffic congestion in cities and peri-urban areas.³ This also means that lower respiratory infections⁴ linked to air pollution have increased. They are among the top five causes of death in the country, with an estimated 28,000 Ghanaians dying prematurely from air pollution in 2020.⁵ According to a 2021 Lancet study, such air pollution-related deaths cost Ghana 0.95% of its gross domestic product (GDP).⁶ Hence, it is imperative to promote the transition of the transport sector.

This report assesses the opportunities and challenges in developing Ghana's Electric Vehicle (EV) segment considering the EV Policy that the Government of Ghana recently launched. Areas of focus include a SWOT analysis of the EV market in Ghana and a review of the entire value chain: that is, opportunities to form strategic supplier relationships with global manufacturers for assembling electric two and three-wheelers, four-wheelers (plug-ins and battery electrics), and electric commercial vehicles (buses, coaches) and building EV charging infrastructure on public-private partnership basis. It includes recommendations that industry stakeholders can integrate into their ongoing work strategies and project plans.

1.2 Report structure

- **Section 2** delves into the State of Play of Ghana's Vehicle Market. This includes the latest statistics on Light vehicles, Trucks and buses, and Electric cars.
- **Section 3** assesses Ghana's EV market policy environment. First, we review the EV Policy and its synergies with automotive and other industrial policies. Then, we examine fiscal incentives for EVs in the 2024 budget and the regulatory landscape in detail. We also examine the constraints to mainstreaming and formalising local EV assembly in Ghana.
- **Section 4** looks at some strategic options for developing a vibrant EV sub-sector in Ghana and the trade-offs involved. Emphasis is placed on strategic supplier relationships with global manufacturers and building EV charging infrastructure on public-private partnerships.

² https://unfccc.int/sites/default/files/resource/gh_nir5_15052022_final.pdf

³ [ibid](#)

⁴ <https://www.cdc.gov/globalhealth/countries/ghana/default.htm#death>

⁵ <https://www.cleanairfund.org/geography/ghana/>

⁶ [https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(22\)00090-0/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(22)00090-0/fulltext)

2 State of Play of Ghana's Vehicle Market

Ghana imports about 100,000 vehicles annually, of which 90% are used cars. The United States, Japan, and Germany are major supplier countries for these cars.⁷

2.1 Light vehicles

Data from the Driver Vehicle and Licensing Authority (DVLA) indicates that Ghana registered an average of 78,000 light vehicles annually from 2012 to 2021. This comprises private motor vehicles up to 2000 cubic capacity (cc)/2 litres, commercial motor vehicles up to 2000 cc, private motor vehicles above 2000 cc and commercial motor vehicles above 2000 cc (Table 1). Private motor vehicles up to 2000 cubic capacity (cc), such as sedans —1.6 litre Toyota Corolla, 1.2 litre Kia Morning — form a sizeable chunk of this segment, accounting for 46% of all light vehicles imported into the country. This is followed by private motor vehicles above 2000cc with a 30% market share— examples include SUVs such as Kia Sorento, Land Rover Freelander, and Hyundai Santa Fe. Commercial vehicles up to 2000 cc account for 23% of the market, with the remaining ones above 2000cc taking up 1% market share (Table 1).

Table 1 Total number of light vehicles registered in Ghana by category

Year	Private motor vehicles up to 2000 cubic capacity (cc)	Commercial motor vehicles up to 2000 cc	Private motor vehicles above 2000 cc	Commercial motor vehicles above 2000 cc	Gross total
2012	30,294	23,181	22,886	763	77,124
2013	35,099	29,971	29,074	969	95,113
2014	36,253	16,933	22,465	749	76,400
2015	27,073	12,215	20,822	694	60,804
2016	26,391	12,800	22,760	758	62,709
2017	32,619	12,873	21,607	746	67,845
2018	37,142	14,582	22,742	1,209	75,675
2019	35,858	15,800	19,922	230	71,810
2020	41,767	18,844	23,425	239	84,275
2021	54,949	19,488	30,259	253	104,949
TOTAL	357,445	176,687	235,962	6,610	776,704
% TOTAL	46%	23%	30%	1%	100%

Data: DVLA | Note: The above statistics exclude vehicles registered by security services such as the Ghana Armed Forces, the Ghana Police Service, and the Prison Service.

2.2 Trucks and buses

Ghana registered an average of 18,000 trucks and buses from 2012 to 2021. This comprised buses and coaches of all kinds, rigid cargo trucks up to 16 tons, rigid cargo trucks from 16 to 22 tons, rigid cargo trucks above 22tons, articulator trucks up to 24 tons, articulator trucks from 24 to 32 tons, articulator trucks above 32 tons, agricultural equipment including combine harvesters, and construction equipment (Table 2). This sub-market is dominated by private and commercial buses

⁷ <https://www.trade.gov/country-commercial-guides/ghana-automotive-sector>

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and coaches with 49% of all registrations, followed by rigid cargo trucks, 17% and 11% articulators, with the rest being agricultural, construction, and mining equipment.

Table 2 Total number of trucks and buses registered in Ghana by category

Year	Private buses & coaches	Commercial buses & coaches	R/c trucks up to 16tons	R/c trucks from 16-22 tons	R/c trucks above 22 tons	Art trucks up to 24 tons	Art trucks above 24-32 tons	Art trucks above 32 tons	Tractor & equipment	Combine harvesters	Construction equipment	Mining equipment	Part. Id. Mark	Gross total
2012	4,290	6,950	3,497	2,609	2,796	78	374	856	957	0	0	0	0	22,407
2013	5,390	8,731	3,318	1,995	2,214	325	458	821	995	0	0	0	0	24,247
2014	3,631	5,882	2,398	1,562	1,363	246	808	240	1,181	0		0	0	17,311
2015	2,918	4,726	2,745	686	1,096	287	148	355	701	0	0	0	0	13,662
2016	2,316	3,752	3,820	1,143	1,632	320	3,307	2,168	423				38	18,919
2017	2,628	4,964	1,841	1,004	1,199	503	450	234	226	34	36	306	42	13,467
2018	2,341	6,820	3,247	2,586	2,325	1,712	973	671	403	13	344	253		21,688
2019	1,503	5,960	1,192	1,793	1,048	283	416	596	449	12	523	1,606	0	15,381
2020	1,800	6,055	535	2,374	1,329	160	620	935	387	11	797	83	0	15,086
2021	2,301	6,635	977	2,126	2,717	318	877	644	279	1,029	183	871	149	19,106
TOTAL	29,118	60,475	23,570	17,878	17,719	4,232	8,431	7,520	6,001	1,099	1,883	3,119	229	181,274
%	16%	33%	13%	10%	10%	2%	5%	4%	3%	1%	1%	2%	0%	100%

Data: DVLA | Note: The above statistics exclude vehicles registered by security services such as the Ghana Armed Forces, the Ghana Police Service, and the Prison Service.

- Buses & Coaches = Buses & Coaches of All Kinds
- R/C Trucks Up to 16tons = Rigid Cargo Trucks Up to 16 Tons
- R/C Trucks From 16 - 22 Tons = Rigid Cargo Trucks From 16 - 22tons
- R/C Trucks Above 22tons = Rigid Cargo Trucks Above 22 Tons
- Art Trucks Up to 24tons = Articulator Trucks Up to 24 Tons
- Art Trucks From 24-32tons = Articulator Trucks From 24-32 Tons
- Art Trucks Above 32 Tons = Articulator Trucks Above 32 Tons
- Agric Equip = Agricultural Equipment
- Combine Harvesters = Combine Harvesters
- Cons Equip = Construction Equipment

2.3 Electric cars

Electric cars typically come in three variants: battery electric vehicle (BEV), Plug-in hybrid (PHEV), and Hybrid (HEV) (Figure 3). PHEVs use batteries to power an electric motor and petrol or diesel fuel to power a conventional engine; the latter is the primary power source. For many, PHEVs are the stepping stone to going entirely (100%) electric.⁸ Examples include the Mitsubishi Outlander PHEV and Volvo XC60. BEVs, on the other hand, run entirely on batteries that power the electric motor. These cars (batteries) can be recharged at home using a domestic socket, dedicated home charge point, or a public charging network.⁹ As they are fully electric, there are no hazardous tailpipe emissions. Examples include the Nissan Leaf, Tesla Model S and BYD Atto 3. Lastly, HEVs are powered by electricity and petrol or diesel engines, but unlike PHEVs, the batteries are the primary

⁸ <https://www.rac.co.uk/drive/electric-cars/choosing/types-of-electric-vehicles-evs-explained/>

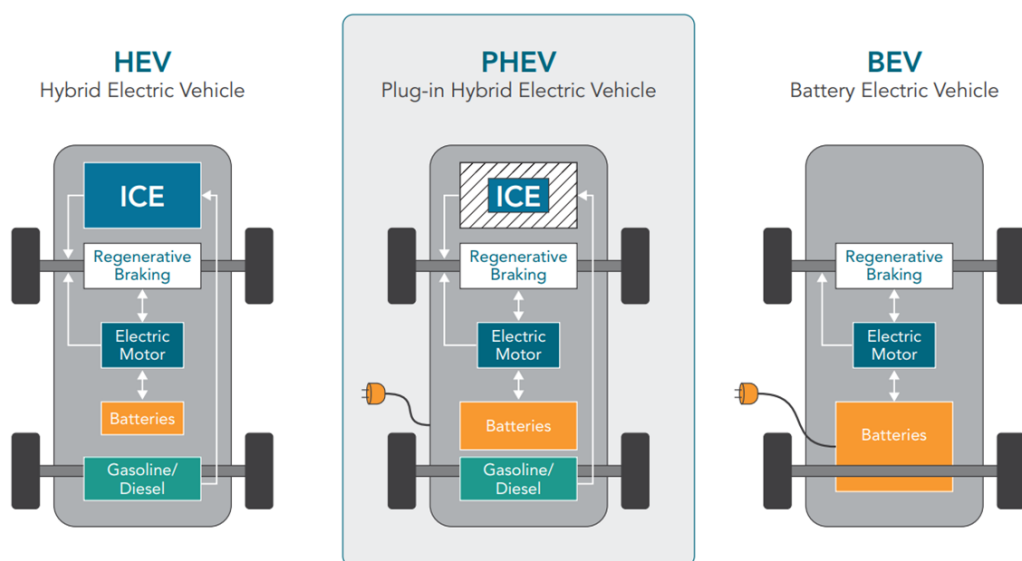
⁹ <https://octopusev.com/ev-hub/types-of-electric-vehicles-explained>

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power source. HEVs cannot be plugged into the mains.¹⁰ They produce less emissions than a conventional petrol or diesel car. Examples include the Toyota Prius and Hyundai Ioniq Hybrid.¹¹

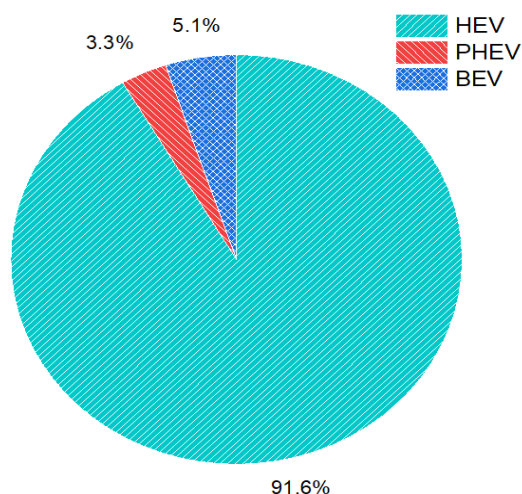
According to the International Trade Centre cited in Ghana's electric vehicles (EV) baseline report, the country had 17,660 electric vehicles imported from January 2017 to December 2021, of which there were 9,431 motorised two and three-wheelers (E2&3W)—Figure 4. DVLA records show that over 92% of BEVs registered were from Original Equipment Manufacturers (OEM) in China. The Ghana Revenue Authority (GRA) data from 2021 shows that standard hybrid electric vehicles represent the majority, with 91.5%, followed by PHEV (5.1%) and BEV (3.3%).

Figure 3 Electric vehicle types/classifications



Source: Image courtesy of Gary Kendall, PhD.

Figure 4 Category of electric vehicles imported into Ghana from 2017 to 2022 from GRA



Source: Ghana EV Baseline Report, 2022

¹⁰ <https://www.seai.ie/technologies/electric-vehicles/what-is-an-electric-vehicle/types-of-electric-vehicle/>

¹¹ <https://www.rac.co.uk/drive/electric-cars/choosing/types-of-electric-vehicles-evs-explained/>

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The EV survey conducted indicated that almost 64% of EV drivers drive an EV to save money on fuel.

The top five (5) preferred brands of EVs among users are the Toyota Prius (33%), Tesla Model 3 (28%), Tesla Model Y (26%), Tesla Model S (24%), and Hyundai Kona EV (17%). With the current affinity for electricity as fuel due to high petrol and diesel prices, EVs are projected to increase significantly with the right policy and incentive tools. Almost 46% of EV owners travel between 1 and 50 kilometres (km) per day on errands, 38% travel between 51 km and 100 km, and 8% travel between 101 km and 150 km. **This is similar to the average daily distance travelled in Ghana.** Generally, most of the respondents do not travel more than 100 km a day, even those who use ICE vehicles.

2.4 Ghana's vehicle assembly market

Ghana has categorised its auto assembly into the following segments based on the place of assembly or manufacture:

- **Semi-Knocked-Down (SKD):** Car parts are partially assembled abroad. The final assembly of the products [car] is carried out in the importing country [Ghana], where the sale will occur.
- **Enhanced SKD:** The standard SKD process has been improved or customised in some way, which could involve using higher-quality components, adding advanced features, or optimising the assembly process.
- **Completely-Knocked-Down (CKD):** Vehicles are shipped to their destination [Ghana in this case] by the manufacturer in a disassembled or kit form as a collection of individual components and parts [such as the chassis, engine, transmission, body panels, and wheels] unlike the SKDs which are partially assembled.
- **Fully-Built-Units (FBUs):** Vehicles are manufactured, assembled, and completed at an in-country factory or production facility and are ready for sale as fully functional and fully assembled vehicles.

All the current operations within the industry are largely in the SKD segment of the market, with over 11 global and local car manufacturers (OEMs) assembling in Ghana or announcing the same (Figures 5 and 6). **The entry of these OEMs bodes well for creating significant positive spillovers into local manufacturing and the metals sector in the medium to long term if catalysed by deliberate policies to move from SKDs to FBUs.** International car manufacturers that have established manufacturing and assembling units for the local market in Ghana and exports to the sub-region include **Suzuki and Toyota (Toyota Tsusho Corporation), Volkswagen Group, Nissan (Nissan Motors Corporation) and Renault (Stallion Group).**¹²

- **Volkswagen** was the first automotive company to be registered under GADP. It opened a 5,000-per-year unit assembly plant in Accra in August 2020 and initially began assembling the Volkswagen Tiguan, Polo, Passat, and the Volkswagen Amarok using Semi Knocked Down (SKD) assembly kits.¹³
- **Nissan** has also set up a 31,000-vehicle-per-year assembly plant in Ghana through its local

¹² <https://thebftonline.com/2023/06/30/auto-devt-policy-spurs-industrys-growth/#>

¹³ <https://www.volkswagen-newsroom.com/en/press-releases/volkswagen-opens-vehicle-assembly-facility-in-ghana-6279>

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partner Japan Motors,¹⁴ where they have initially started assembling the Nissan Navara and Nissan Frontier pickup trucks. The Completely Knocked Down (CKD) kits made by the Tema plant are sourced from Nissan Africa's headquarters in South Africa, allowing the company to reap the benefits under the African Continental Free Trade Area (ACFTA).¹⁵

- In June 2021,¹⁶ **Toyota and Suzuki** established a 1,700-unit-per-annum unit assembly plant in Ghana through a partnership with Toyota Tsusho Corporation. The plant will assemble various models, including the Suzuki Alto, Suzuki Ciaz, and Toyota Hilux. This is the first time Toyota Tsusho has produced a Suzuki vehicle in Africa, a mixed production of the two brands.¹⁷
- **Stallion Group** has also partnered with French carmaker Renault to **establish** an assembly plant in Ghana to assemble models like the Renault Duster and Renault Logan.
- **Sinotruk** has an assembly plant under the GADP.¹⁸
- **Hyundai and KIA** also announced plans to establish assembly plants in Ghana, joining the likes of Toyota-Suzuki, Nissan, Volkswagen, and Sinotruck¹⁹.
- Indigenous company **Kantanka Automobile** assembles various vehicles, from sedans and SUVs, using locally sourced and foreign materials.
- Other vehicle Ghanaian startups, such as **SolarTaxi**, use the GADP for semi-knocked-down kits to assemble electric motorcycles. The company eventually hopes to move into assembling larger sedan and SUV EVs.²⁰

Figure 5 OEMs with presence in Ghana



Source: Authors construct

¹⁴ <https://africa.nissanmotornews.com/en-ZA/releases/release-52ceef740fc0095afb0845bf402da1b8-nissan-partner-approved-to-start-local-production-in-ghana?selectedTabId=releases>

¹⁵ <https://www.ntu.edu.sg/cas/news-events/news/details/new-car-assembly-plant-opens-in-ghana>

¹⁶ <https://www.autocarpro.in/news-international/renault-to-reduce-stake-in-nissan-from-43-to-15-113974>

¹⁷ https://www.toyota-tsusho.com/english/press/detail/230131_006172.html

¹⁸ <https://myjoyonline.com/sinotruk-begins-assembling-trucks-in-ghana-toyota-to-start-q4-2020/>

¹⁹ <https://m.chinatruks.com/news/8181.html>

²⁰ <https://www.howwemadeitinafrica.com/ghana-entrepreneur-bets-on-locally-assembled-electric-vehicles/146161/>

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Figure 6 Site visits to OEM factories

Nissan Assembly Plant at Tema, Ghana



Rana Motors (KIA Assembly Plant) at Amasaman, Ghana



Source: Ghana JET Programme

These companies and investments are anchored on taking advantage of Ghana's skilled workforce, tax incentives, and the West African region's growing demand for reliable new vehicles.

Some of the factors that support Ghana's right to win in automotives – as a hub for the West African market include:

- **Markets:** There are large domestic and regional markets, especially in West Africa, for assembly and exports under AfCFTA and ECOWAS protocols. These markets are driven by urbanisation (middle-class mobility needs and expanding economies). Limited regional competition has made Ghana the de-facto ECOWAS auto hub.
- **Tax incentives for assembly plants:** Clear, targeted tax incentives for companies are part of the drive to make Ghana a fully integrated and competitive industrial hub (despite the headwinds of the past three years, post-COVID-19). 5-year tax holiday: Imported new and used vehicles have a 64% effective import tax vs. 5% for firms importing SKDs.
- **Motor vehicle taxes:** penalties on overaged and higher-engine vehicles; 35% (from 10%) import tax on new and used cars between 1 and 5 years old, affecting overaged vehicles, salvaged and flooded vehicles, and new cars without a destination certificate.
- **Dedicated policy support and advocacy** through the Ghana Automotive Industry Development Centre and Automotive Assemblers Association of Ghana.
- **Logistical base:** the development and improvements to infrastructure such as ports (Tema Port and enclave)
- **Supply chain:** backwards integration into the integrated aluminium industry (more long-term aspiration to tap into structural advantages)
- **Local labour force:** comparatively low-cost labour subject to technical upgrading.

2.5 Future outlook

Available data from the Driver Vehicle and Licensing Authority (DVLA) shows that Ghana imports about 100,000 cars into the country yearly. This historical data indicates a 2.5% compounded annual growth rate (Table 2). Only about 10% of these cars are new, with a more significant proportion being second-hand or even accident cars. Regarding like-for-like local assembly, there is a baseline

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substitutable market potential of about 10,000 vehicles. Engagement with stakeholders during the Ghana Auto Mission in January 2024 indicates that about 5,000 cars are currently being assembled locally; this can grow by 20% every year due to the implementation of the auto policy. Likewise, we make a baseline assumption of 15,000 cars being assembled locally in Ghana and exported to other regional markets under the AfCFTA at a 15% annual growth rate.

Based on the above, **the total number of cars manufactured/assembled locally is projected to be about 26,000 for the local market and another 46,000 for exports to regional markets under the African Continental Free Trade Area (AfCFTA)**—Table 3. This brings the total number of cars manufactured/assembled locally to under 72,000 by 2033, which comprises 57% of total new registered cars and 100% of announced local OEM car assembly capacity.

Table 3 Baseline assumptions

Indicator	Factor
CAGR of vehicles registered in the country	2.50%
Baseline car imports	100,000
% Vehicles new	10%
% Vehicles imported	90%
% new cars entry rate due to auto policy	20%
% new cars for export growth rate	15%
Company	Announced plant capacity (vehicles/year)
Suzuki and Toyota (Toyota Tsusho Corporation)	1,700
Volkswagen Group	5,000
Nissan (Nissan Motors Corporation)	31,000
Renault (Stallion Group)	4,000
Hyundai & KIA	25,000
Sinotruck	1,500
Kantanka Automobile	7,300
Total	75,500

Source: Authors' estimates from various news sources

Table 4 Total new registered cars in Ghana and cars manufactured or assembled locally in Ghana

Year	Total new registered cars (A)	Cars manufactured/assembled locally for the Ghanaian market (B)	Cars manufactured/assembled locally for export to regional markets under AfCFTA [C]	Total cars manufactured/assembled locally [D = B+C]	Total cars manufactured/assembled locally (% of total new cars) [E=D/A]
2024	100,000	5,000		5,000	5%
2025	102,500	6,000	15,000	21,000	20%
2026	105,063	7,200	17,250	24,450	23%
2027	107,689	8,640	19,838	28,478	26%
2028	110,381	10,368	22,813	33,181	30%
2029	113,141	12,442	26,235	38,677	34%
2030	115,969	14,930	30,170	45,100	39%
2031	118,869	17,916	34,696	52,612	44%
2032	121,840	21,499	39,900	61,399	50%
2033	124,886	25,799	45,885	71,684	57%

Source: Authors' estimates

3 Ghana's EV Market Policy Environment

3.1 EV Policy

Ghana's EV policy document, launched at COP 28 in Dubai, has further paved the way for investment into the country's EV market. The document was drafted by key institutions and led by the Ministry of Transport. **It shows clear objectives, goals and phases of implementation** (Figure 8). The vision of the policy is to transition to EVs to achieve a sustainable adoption and utilisation of safe and affordable electric vehicles to reduce emissions and improve the citizenry's well-being.

Under Ghana's EV policy, the country seeks to create an **environment that enables the uptake of electric vehicles to reduce emissions, promote a cleaner environment, and improve the well-being of the citizenry**. To achieve these goals, the policy has identified three phases of implementation that are key to accelerating EV penetration across the country. The first implementation phase, starting in 2024 to 2026, would focus on addressing barriers to EV uptake, while the second phase, beginning in 2027 and ending in 2035, would ensure a higher uptake of EVs, leading to a projected penetration rate of 35%. Phase 3, from 2036 to 2045, will ensure deepened efforts to ensure no sale or importation of internal combustion engine (ICE) vehicles by 2045 in line with the Energy Transition Framework to phase out off-road fossil-fueled ICEs by 2040.

Figure 7 National EV policy implementation timelines



Source: Authors' construct

3.2 Fiscal incentives

In the 2024 budget²¹, **Ghana announced several incentives to support the country's nascent EV sub-sector**. Specifically, the following tax incentives have been introduced:

1. **Waiver** of import duties on import of electric vehicles for public transportation for 8 years

²¹ https://mofep.gov.gh/sites/default/files/budget-statements/2024%20Budget%20Statement_v2.pdf

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2. **Waiver import** duties on semi-knocked down and completely knocked down Electric vehicles imported by registered EV assembly companies in Ghana for 8 years.
3. **Extension** of zero rate of VAT on locally assembled vehicles for two more years

Additionally, Ghana in 2024 also sought to introduce an annual carbon levy on high-pollution vehicles and industrial emissions.²² It is only the third African country to introduce an explicit carbon tax, after South Africa and Mauritius.²³ The tax is intended to address harm associated with vehicle emissions and encourage a shift to cleaner alternatives.²⁴ The proposed vehicle emissions tax under the Emissions Levy Act, 2023²⁵ is one of several environmental fiscal reform measures being introduced by the government.

The proposed emissions tax is based on internal combustion engine capacities. Charges range from GHS75 (US\$6) for motorcycles and tricycles to GHS150 (US\$12) for motor vehicles, buses and coaches with up to 3-litre engines. A higher threshold of GHS300 (US\$24) applies for motor vehicles, buses and coaches above 3-litre engine capacity, as well as cargo trucks and articulated trucks. However, following extensive pushback²⁶ from various citizens, civic and consumer groups, the tax has been stopped for now.

3.3 Regulatory landscape

According to Boston Consulting Group (BCG), 40% to 50% of the energy for EVs will be supplied by public chargers in ten years. Although most EV owners will charge at home, the recent developments in charging mean that EV owners are likely to use fast chargers due to speed and convenience.

Data from Ghana's EV Baseline study shows that more than 50% of EV owners in Ghana charge their vehicles at home, 17% use public charging stations, and 33% use a combination of home and public charging—Figure 7. Although this data is not representative, it clearly shows an affinity towards home charging. Two-thirds of the electricity demand for EV charging is private, whether at home or in company parking lots. The success of EV adoption in the country largely depends on good and well-connected charging infrastructure. **To ensure this happens, Ghana must employ an investor-friendly concept to drive the penetration of charging infrastructure, hence electric vehicle adoption.** Under the Drive Electric Initiative, Ghana has adopted a public-private partnership, given the unique role the private sector is envisaged to play in the deployment of charging infrastructure across the country.

²² <https://gra.gov.gh/implementation-of-new-tax-laws-and-amendments/>

²³ <https://www.tandfonline.com/doi/pdf/10.1080/0376835X.2023.2171366>

²⁴ https://mofep.gov.gh/sites/default/files/budget-statements/2024%20Budget%20Statement_v2.pdf

²⁵ <https://gra.gov.gh/implementation-of-new-tax-laws-and-amendments/>

²⁶ <https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Inconsiderate-vehicle-emissions-tax-won-t-prevent-carbon-emission-Ben-Boakye-1914538>

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Figure 8 Example of EV charging station in Accra, Ghana



Source: Energy Commission Drive Electric Initiative

3.3.1 Standards

Five (5) publicly available charging stations are currently open to the public. These are all operated by the private sector, with all chargers currently at 11kw (level 2) and one 60KWh dual (CCS2 & GB/T) gun Level 3 Direct Current (DC) fast charger located at the industrial area in the Dizengoff complex. About five additional chargers are currently in progress at different stages of development, although not available for public use. **These projects are also spearheaded by private sector entities.**

To streamline the market and ensure a fair and competitive charging network led by the private sector, the Energy Commission, working with the Ghana Standards Authority (GSA) through a joint national technical committee of key institutions, has **adapted forty-eight (48) International Electrotechnical Committee (IEC), ISO and IEEE standards to streamline the charging sector in Ghana to ensure safety and quality installation, operation and conformity with acceptable national standards that are within the international best practice.** These standards enable the Energy Commission to guide and regulate the public charging sector. These regulations will guide the country's charging infrastructure. Ghana's adopted standards cover conductive charging systems, equipment, information exchange, charging cables, plugs, and battery swap systems stations, among others. Standards are available at the Ghana Standards Authority (GSA).

3.3.2 Regulations

Information gathered from the Energy Commission's Drive Electric Initiative indicates work is in progress to draft regulations for EV charging in Ghana to incorporate the standards adapted and set rules to guide an industry that is clearly being led by the private sector.

Regulations, as gathered from around the world, incorporate installation and operating standards and rules, permitting requirements, and location guidelines to:

1. **Ensure** conformity with international standards and regulations in the EV market.
2. **Establish** the requisite legal and regulatory frameworks for conformity.

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3. **Ensure** compatibility, guard against factors that affect the health and safety of customers, and
4. **Ensure** transfer of technology while attracting investment into the sector.

Regulations regarding EVs have taken various forms in various markets around the world. In the United States of America, EV charging standards and regulations vary from state to state, with California having some of the most stringent and comprehensive installation requirements. The Ministry of Power in India issued guidelines and standards for charging infrastructure for electric vehicles and an extensive battery swap policy to streamline the two- and three-wheeler market. In contrast to Ghana, India has a high population of 2&3 2-wheelers, with 2Ws accounting for 70% to 80% of electric vehicles.²⁷

3.4 Constraints to mainstreaming and formalising local EV assembly

Constraints to mainstreaming and formalising local EV assembly (especially BEVs) include the limited market size in Ghana and West Africa and the need for charging infrastructure. As the data shows, the total stock of 17,660 EVs is less than 2% of the total estimated stock of one million vehicles in Ghana. While this potential could grow further given the growing consumer interest, improvement in charging infrastructure would be a major enabler for mainstreaming them. The opportunity for four-wheeler (plug-ins and battery electrics) assembly in Ghana is also limited due costs of reconfiguring assembly lines by OEMs. Many of the 11 OEMs active in Ghana just set up their assembly lines in the last few years for ICEs for which capacity is yet to be fully utilised—the market demand is yet to be fully met and is unlikely to be until the early to mid-2030s. Thus, the limited EV market size may not be a strong incentive to spend extra resources reconfiguring assembly lines. **Nevertheless, some OEMs may decide to assemble electric two-and three-wheelers for export to regional markets such as Togo, Burkina Faso, Niger, Mali and Guinea.** This segment of the market is likely to grow much faster in the coming years.

On the incentive front, the government, in the 2024 budget, introduced some incentives to support the country's nascent EV sub-sector. Specifically, import duties on electric vehicles for public transportation for eight years have been waived, as are import duties on semi-knocked down and completely knocked down Electric vehicles imported by registered EV assembly companies in Ghana. The extent of this catalysing local EV assembly is yet to be known—a follow-up survey with the 11 OEMs is required at the end of this year.

²⁷ https://www.niti.gov.in/sites/default/files/2022-04/20220420_Battery_Swapping_Policy_Draft.pdf

4 Developing a Vibrant EV Sub-sector in Ghana

4.1 Strategic supplier relationships with global manufacturers

Ghana has the biggest potential to assemble battery packs and fully built two and three-wheelers for use domestically and export to regional markets. Ghanaian OEMs could form strategic supplier relationships with global manufacturers in China and India especially to set-up local assembly lines for these electric two-and three-wheelers for export to regional markets such as Togo, Burkina Faso, Niger, Mali and Guinea. As already stated in other sections of this report, the opportunity for four-wheeler (plug-ins and battery electrics) assembly in Ghana is limited due to market size and cost of reconfiguring production by some of the large OEMs.

There are also opportunities to assemble electric commercial vehicles (buses, coaches) for the West African market, however Ghana would be competing with Côte d'Ivoire in this rather limited market. In February 2024, the incumbent government's presidential running mate indicated that Ghana was working on a policy to use EVs for public transport and would order 100 electric buses for the intercity Metro Mass Transit system, although they did not state where these would come from.²⁸ Ghana's neighbour Côte d'Ivoire also has its automotive ambitions for West Africa focussing on minibuses and coaches. In January 2022, The Franco-Italian group Iveco launched a €70 million investment for an assembly unit in Abidjan, premised on meeting local production, and in the long term, the sub-regional market.²⁹ This is partnership with Société des Transports Abidjanais (Sotra), which has been in operation since 1960, and is now 60% owned by the Ivorian State and 40% by Iveco. It 1,000 vehicles (18 to 26-seat buses) per year production capacity and can manufacture different models—buses, ambulances, troop transport vehicles for the security forces, construction trucks.³⁰

The idea of bus assembly in Côte d'Ivoire had been on the drawing board since 2008³¹ but only materialised recently. Before Côte d'Ivoire's latest foray, **Ghana used to assemble buses as far back as the 1960s³² and 1970s under the Bedford and Neoplan brands.** Neoplan was the first bus manufacturing plant in West Africa, and was a joint venture between the Ghanaian Government and Gottlob Auwaeter GmbH & Co. of Germany.³³ Company has shut down operations several times in the past 40 years due to mismanagement and the lack of contracts.³⁴ It last assembled 450 DAF/VDL buses for the Metro Mass Transit Ltd, and there are plans to absorb the company into the government's flagship One District, One Factory initiative in a bid to resuscitate it.³⁵

²⁸ <https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Ghana-to-use-electric-vehicles-for-public-transport-Bawumia-1852577>

²⁹ https://www.ivecogroup.com/media/corporate_press_releases/2022/january/iveco_bus_renews_its_partnership_with_sotra

³⁰ <https://www.theafricareport.com/166240/cote-divoires-automotive-ambitions-in-west-africa/>

³¹ <https://www.reuters.com/article/idUSL2733301/>

³² <https://www.britishpathe.com/asset/144848/>

³³ <https://www.businessghana.com/site/directory/automobile-mechanics/5294/NEOPLAN-GHANA-LIMITED>

³⁴ <https://www.graphic.com.gh/news/general-news/neoplan-ghana-ltd-shuts-down-january-31.html>

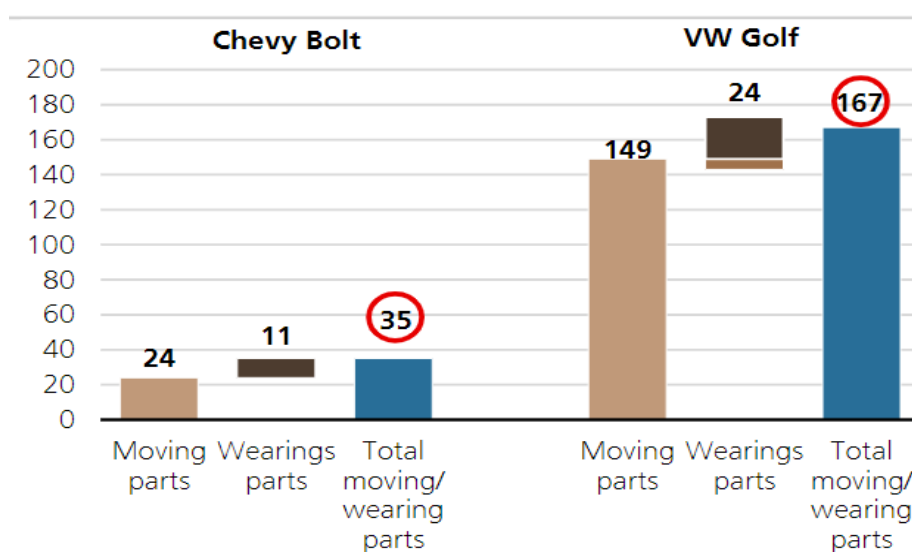
³⁵ <https://siga.gov.gh/neoplan-can-be-profitable-hon-asamoah-boateng/>

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Other OEMs with interest in setting up assembly plants in Côte d'Ivoire include Renault and Ashok Leyland. Côte d'Ivoire seeks to create an industrial zone that is specially dedicated to the automobile sector and bring together spare part manufacturers the country's second port in San Pedro.

The adoption of EVs profoundly impact the automotive supply chain.³⁶ While ICE vehicles have over 100+ moving parts including engine, batteries, clutch and transmission systems, EVs are less complicated mechanically although the latter more electronics driven. The electric motors powering EVs have far fewer components than a traditional ICE. A 2017 report by the UBS Group in which they compared the Chevrolet Bolt's (EV) engine to a four-cylinder ICE and found that the ICE had 167 moving parts in the power train compared with 35 for the electric motor (Figure 9).³⁷

Figure 9 Number of parts in the powertrain



Source: UBS: p.5

4.2 Building EV charging infrastructure on public-private partnership and other basis

4.2.1 E-mobility

E-mobility is a nexus between transport and electricity. For the first time, many countries are strategising using this strong interlinkage between these two key sectors of their economy towards their climate target. In Europe and other well-developed markets, governments have taken the lead in developing a vibrant EV market by establishing charging infrastructure, **offering large incentives to drive penetration**, and the **private ownership of charging stations**.

The EV industry in Ghana is quite young, with startups that require scale, funding, and increased public sector support. A private-sector-led EV industry requires a well-defined regulatory space and incentives to encourage public-private sector participation and streamline the market.

³⁶ <https://www.pwc.com/us/en/industrial-products/publications/assets/pwc-merge-ahead-electric-vehicles-supply-chain.pdf>

³⁷ <https://neo.ubs.com/shared/d1ZTxnvF2k/>

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The Energy Commission, under the Drive Electric Initiative, has been promoting a public-private partnership to enhance the penetration of electric vehicles in Ghana. The accessibility of charging stations in suitable locations across Ghana is a major factor that will motivate and incentivise people to use electric vehicles in Ghana. As such, encouraging the private sector to participate is key to its growth and a vibrant auto sector. To ensure awareness of the key requirements, a **public charging forum**³⁸ was organised to bring stakeholders from the energy, petroleum, oil and gas sectors, automobile companies, and other international agencies and the private sector on board to share and discuss relevant ideas regarding charging infrastructure.

The forum ushered in a wave of interest from the private sector and more established markets like the United Kingdom, Spain and the Netherlands to discuss infrastructure, policy and other conditions for EV Deployment, technology and business, the need for international collaboration as well as lessons from the global north to enhance EV deployment in Ghana.

Charging infrastructure has been the main drawback of the Electric Vehicle industry and needs attention. The availability of charging infrastructure would increase the willingness to switch to electric vehicles. According to the IEA³⁹, there are **five public charging infrastructure business models**: *roadside charging, en-route charging, destination charging, shared home or work charging and battery swapping*.

Ghana's currently available public charging stations lean towards en-route and roadside, with few people charging from home. To develop a vibrant auto sector with the potential of attracting more businesses in the future, there is the need to increase the various charging types and the number of charging stations. This would require cooperation between stakeholders at every level in the development of charging infrastructure, such as stakeholders involved in public charge point installations, private business participants, policymakers, engineers, energy suppliers, local authorities, and renewable energy contractors who provide mini-large solar grids at selected public locations. In that way, there can be a switch between power supply when the national grid is down for maintenance.

According to Urban Foresight, the Scottish government is responsible for more than half of the charging stations in Dundee, United Kingdom, and this is strategically funded by the local council and other players. **The opposite happens in Ghana and other global south economies, where the private sector takes action and leads in these sectors.** For example, Dundee City in Scotland has set a goal of installing over 30,000 charging spots around the city by 2030.⁴⁰ This goal has already gained traction with the installation of over 1,000 charging stations and is being driven by the local government. This notable growth across Europe with the fast-charging market is expected to grow 75 – 195-fold by 2030. The German government, for instance, is targeting 5 million battery electric vehicles on the road in Germany, with 32% fast charging by 2030. The United Kingdom government has unveiled its plans for a future where all new petrol and diesel vehicles will be phased out by 2035. Despite the recent slowdown in EV market growth, the adoption of widespread decarbonisation policies is expected to continue supporting positive market fundamentals.

³⁸ <https://www.energycom.gov.gh/newsite/index.php/initiatives/drive-electric-initiative-main/dei-gallery/1st-public-charging-forum>

³⁹ <https://www.iea.org/reports/global-ev-outlook-2023/trends-in-charging-infrastructure>

⁴⁰ <https://lgiu.org/blog-article/learning-from-dundee-city-councils-innovative-approach-to-the-electric-vehicle-ev-transition/>

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Ghana's policy clearly states an EV penetration of 35% by 2035, so there is a need to **increase the number of charging stations to at least 1 for every 100 cars. There is a business case for Ghana's charging sector and potential investment in deploying charging stations across the country. To achieve this, the government must set a clear EV deployment strategy with incentives and a policy target for charging infrastructure deployment.**

4.2.2 Battery Swaps

One of the five public charging models being adopted in Ghana is the battery swapping station. This is A model that heavily supports the 2&3w sectors of the market. Ghana's current battery swap stations⁴¹ are all operated by **Kofa Technologies**, a bike assembly and battery swap company that leverages bikes to build an extensive network of battery swaps that feed its bikes and other bikes— Figure 10. Battery swap technology is a huge game changer in the global south, with an increased 2&3-wheeler population, as seen in India, Rwanda, and Kenya, among others. With over 50% of Ghana's EVs in this sector, an increase in the battery-swapping model will likely enhance the sector's growth.

Figure 10 Example of battery swapping system in operation in Accra



Source: Energy Commission Drive Electric Initiative

4.3 EV and battery manufacturing opportunities

EV manufacturing in Africa

Several African countries are looking to take some share of the burgeoning EV and battery manufacturing market. Key countries with existing assembly and or manufacturing includes South Africa, Kenya, Rwanda, and Morocco. DRC and Zambia seek to develop an integrated value chain to

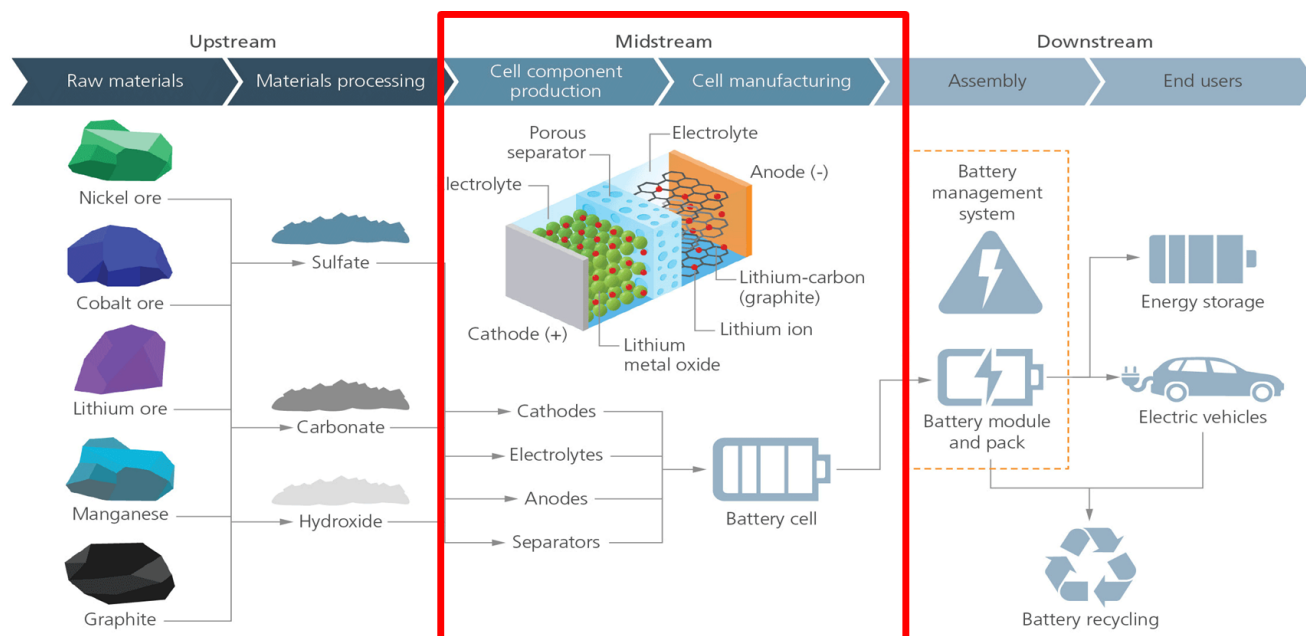
⁴¹ <https://www.energycom.gov.gh/newsite/index.php/initiatives/drive-electric-initiative-main/battery-swap-stations>

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produce electric vehicles batteries among them and have signed an MoU with the United States to that effect. Nevertheless, **South Africa and Morocco's experience in global auto supply chains presents them with ecosystem advantages [comparative advantage as well as economies of scale and scope] for EV manufacturing or assembly for the African market. Ghana is a much smaller market in West Africa for full BEV assembly; there is a market however for assembling battery packs for two and three-wheelers for use domestically and export to regional markets.** Regionalisation is the way to go when it comes to EVs as “most OEMs think of locations as regions rather than countries or entire continents”.

However, the discovery of lithium in commercial quantities provides opportunities for the manufacture of pre-cursor cells and lithium-ion batteries in Ghana—Figure 10. The cost of batteries is the primary factor behind the high price of EVs. It is reported that the battery cost contributes as much up to 60% of the total medium BEV cost.⁴² The economic value addition chain for raw materials moves in six stages: **mining** (where the minerals are extracted from the earth) to **metals** (the mineral concentrates are processed by smelting, refining and other techniques to create industry-grade metals), **precursors** (processed metals are turned into chemical materials that is a forerunner to making a battery cathode), **cell production** (the cathodes are put together with an anode, separator and electrolyte into an aluminium case to make a battery cell), **cell assembly** (dozens of cells are assembled into a battery pack), and **electric vehicles** (battery packs are combined with many other components to create an electric vehicle).⁴³

Figure 11 Medium term opportunity for Ghana in CRMs lies in battery cell assembly and manufacturing



Source: L.E.K. research and analysis

⁴² <https://www.fleetnews.co.uk/news/latest-fleet-news/electric-fleet-news/2022/12/28/cost-of-minerals-vital-for-electric-vehicle-batteries-soars> and <https://www.mdpi.com/2032-6653/12/1/21>

⁴³ https://www.boell.de/sites/default/files/2023-11/e-paper_value_addition_in_the_context_of_mineral_processing.pdf

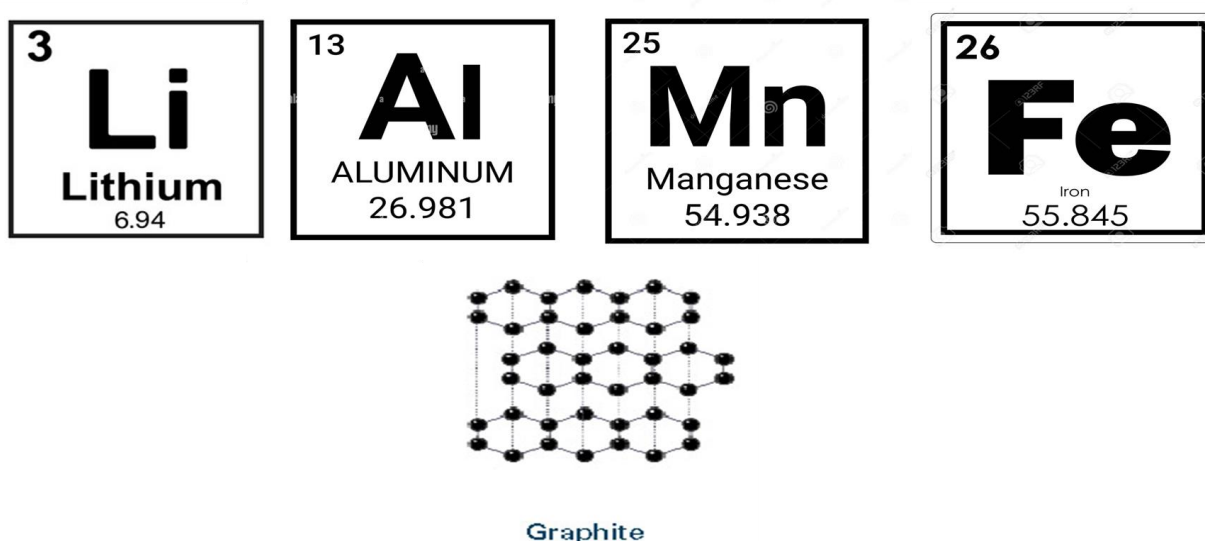
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Since 2022, over 12 African countries, including Zimbabwe, DRC, Zambia, Namibia and Ghana, have imposed outright export bans or restricted exports on various CRMs to force companies to add value locally. For example, in Ghana's case with the recently discovered lithium, the government wants local value addition beyond exporting spodumene concentrate (SC6 or 5.5- i.e., 6% lithium oxide and 5.5% lithium oxide). It has tasked Atlantic Lithium (an Australian-based⁴⁴ and London AIM-listed mining company⁴⁵) to undertake a feasibility study into building a downstream lithium chemical conversion plant. **If Atlantic cannot establish a chemical plant, it must provide its lithium to any chemical plant established by third parties in Ghana.**

Historically, Ghana has also mined **bauxite but had no alumina refinery**, so the bauxite is shipped in raw form to China and other places to make alumina and aluminium—this is very low value addition.⁴⁶ The alumina is then imported to feed the main VALCO smelter at Tema. The smelter operates at 20-30% capacity due for several reasons including electricity tariffs and operational inefficiencies.⁴⁷ There have been recent attempt to turn the tide around through incorporation of GIADEC as holding company to seek for a strategic investor for the smelter. Ghana also mines and exports **manganese** in raw form although this could be used to produce steel locally. **Graphite** has also been discovered although mineral resource estimates and production schedules yet to be announced (Figure 11).

A good mix of industrial, trade and energy policies are required to unlock Ghana's battery manufacturing potential as China has demonstrated over the past 20 years (see Box 1).

Figure 12 Ghana's critical minerals endowment



Source: Authors construct

⁴⁴ <https://www.atlanticlithium.com.au/about-1>

⁴⁵ <https://www.londonstockexchange.com/stock/ALL/atlantic-lithium-limited/company-page>

⁴⁶ https://www.gheiti.gov.gh/site/index.php?option=com_phocadownload&view=category&id=35:mining-oil-a-gas-reports&download=406:the-energy-transition-and-critical-minerals-in-ghana-diversification-opportunities-and-governance-challenges&Itemid=54

⁴⁷ <https://www.sciencedirect.com/science/article/pii/S2214629623003973>

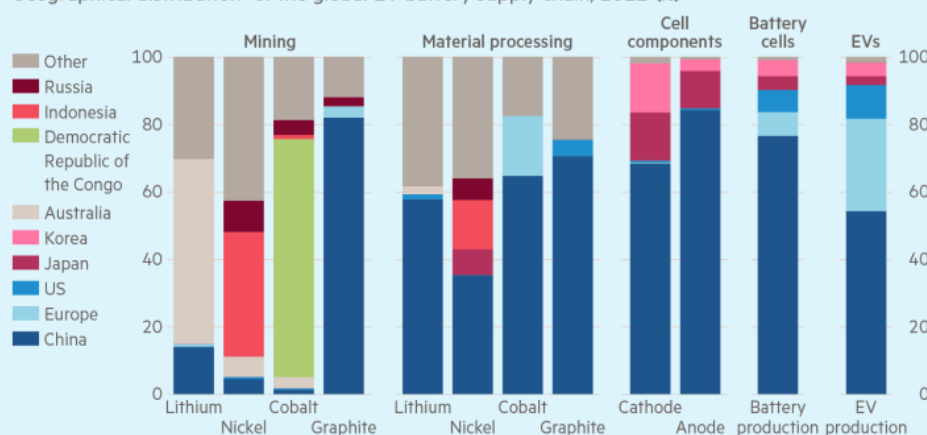
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Box 1 - How China is doing it – policy and enterprise is key

- Over the past 25 years, China's automakers have become [global experts](#) in electric vehicles. China also dominates the production and processing of most of the critical minerals (CRMs), material and component used to make them.
- China buys proportionately more electric vehicles than any other country.
- Chinese manufacturers have mastered electric vehicle and battery technologies. China has emerged as the world's largest market for cars, with its homegrown roster of brands such as BYD driving innovation both in battery technology and features related to the internet-connected car.
- Development of EVs in the west has been dominated by Tesla, a business built by a small cadre of driven entrepreneurs and spearheaded by Elon Musk. However, the rise of the sector in China was a matter of state industrial policy: help reduce China's heavy dependence on oil imports, reduce the country's worsening air pollution, and focus on energy and technological self-sufficiency (largely under President Xi Jinping)
- China's BYD, backed by US investor Warren Buffett, seeks to be in the top three brands in Europe by the end of the decade and number one "if they can" - Michael Shu, European chief of leading Chinese automaker BYD.

China dominates the downstream electric vehicle battery supply chain

Geographical distribution* of the global EV battery supply chain, 2022 (%)



* Refers to the country where the production occurs
 Percentages for mining and EV output based on actual production. All other percentages are based on production capacity
 Source: IEA
 © FT

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The Chinese carmakers planning to shake up the European market

BYD, Nio, Chery and others want to use their expertise in electric vehicles to take advantage of the continent's coming ban on the sale of new petrol and diesel cars

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