Electric Vehicles

MARKET INTELLIGENCE REPORT

2024

SOUTH AFRICA UKPACT

GreenCape

Market Intelligence Report 2024

ELECTRIC VEHICLES

GreenCape

GreenCape is a non-profit organisation that works at the interface of business, government, and academia to identify and remove barriers to economically viable green economy infrastructure solutions. Working in developing countries, GreenCape catalyses the replication and large-scale uptake of these solutions to enable each country and its citizens to prosper.

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List of abbreviations and acronyms

AfCFTA	African Continental Free Trade Agreement
AGOA	African Growth and Opportunity Act
BMS	Battery Management System
BRT	Bus Rapid Transit
CAPEX	Capital Expenditure
DoT	Department of Transport
dtic	Department of Trade, Industry and Competition (since 2019)
eFuels	Carbon neutral synthetic fuels produced from green hydrogen & carbon capture
EU	European Union
EV	Electric Vehicle
GABS	Golden Arrow Bus Services
GEF	Global Environment Facility
GHG	Greenhouse Gas Emissions
GTS	Green Transport Strategy
ICE	Internal Combustion Engine
km	Kilometre
km/hr	Kilometre per hour
kWh	Kilowatt hour
LDV	Light Delivery Vehicle
MW	Megawatt
NAACAM	National Association of Automotive Component and Allied Manufacturers
NAAMSA	National Association of Automobile Manufacturers of South Africa
NATIS	National Traffic Information System
OEM	Original Equipment Manufacturer
OPEX	Operational Expenditure
PV	Photovoltaic
MIR	Market Intelligence Report
UK	United Kingdom
USA	United States of America
USD	United States Dollar

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EXECUTIVE SUMMARY

This market intelligence report (MIR) is written for investors, original equipment manufacturers (OEMs), component and manufacturing equipment suppliers, and technical advisors. It highlights the investment opportunities in the electric vehicle (EV) market in South Africa.

This MIR focuses on the investment opportunities in the electric mobility value chain as this technology has shown evidence of a viable business case in last-mile delivery, public transportation, freight and logistics, and private passenger transportation. Data in support of the business case for the electrification of these sectors has been provided in this MIR to aid investment decisions.

Crude oil refining capacity in South Africa has been declining over time which creates supply chain vulnerability concerns due to an over reliance on liquid fuel imports. Global geo-political factors negatively influence the price of imported fuel which impacts local energy security, inflation rates, and economic growth.

The EV transition in South Africa is an opportunity to develop localised energy security for transportation and has the potential to stimulate new green industries. This MIR outlines the viable investment opportunities that exist and are emerging over the next decade in the EV value chain in South Africa.

There are several emerging opportunities in the South African EV industry for local and international investors looking to enter the South African market. The four key market opportunities that have been identified as attractive sectors for investment in the EV market in South Africa are: electric micro-mobility for last-mile delivery, electrification of public transportation, electrification of freight and logistics, and local manufacturing of electric private passenger vehicles as shown in Table 1.

Table 1: Investment opportunities in the EV sector in South Africa

OPPORTUNITY: ELECTRIC MICRO-MOBILITY FOR LAST-MILE DELIVERY				
ANNUAL MARKET SIZE	**KEY DRIVERS**	**BARRIERS**	**TERM**	**MACROECONOMIC CONTEXT**
50 000 electric micro-vehicles vehicles valued at between **R2 billion** (electric bicycles), **R4.5 billion** (electric motorcycles) and **R7.5 billion** (electric three-wheelers)	• Cost competitiveness of electric micro-vehicles for last-mile delivery due to rising fuel prices • Feasibility of local assembly of electric two and three-wheelers and existing component supply chains	• High capital expenditure (CAPEX) cost • Limited battery range and public charging infrastructure • Limited cargo load capacity • Regulatory barriers around which roads they can be used on	Current	Growth of the e-commerce industry in South Africa has increased the demand for last-mile delivery services for which smaller, more energy efficient vehicles are required primarily due to rising fuel costs

OPPORTUNITY: ELECTRIFICATION OF PUBLIC TRANSPORTATION				
ANNUAL MARKET SIZE	**KEY DRIVERS**	**BARRIERS**	**TERM**	**MACROECONOMIC CONTEXT**
900 electric buses a year valued at **R6.3 billion** and 2 400 electric minibuses a year valued at **R3.6 billion**	• Growing cost competitiveness of electric buses and minibus taxis for public transportation due to rising fuel prices • Feasibility of local assembly of electric buses and minibus taxis and existing component supply chains • Fiscal constraints that limit the growth of public transport subsidies by national government, stimulates demand for operational cost saving interventions	• High CAPEX cost • Limited financing mechanisms for electric buses and minibus taxis • Limited availability of charging infrastructure at public transport interchanges, depots and ranks • Energy security concerns around loadshedding[1]	Medium-term (3 to 5 years)	The decline of passenger rail services in South Africa and the deregulation of informal minibus taxi services has increased the demand for road-based public transportation

1 Loadshedding is a controlled demand reduction mechanism implemented by Eskom to protect the national electricity power system from a total blackout.

Table 1: Investment opportunities in the EV sector in South Africa

OPPORTUNITY				
ELECTRIFICATION OF FREIGHT AND LOGISTICS				
ANNUAL MARKET SIZE	KEY DRIVERS	BARRIERS	TERM	MACROECONOMIC CONTEXT
3 600 electric trucks a year valued at **R25.2 billion** and 47 000 electric LDVs a year valued at **R37.6 billion**	• Growing cost competitiveness of electric trucks and light delivery vehicles (LDVs) for freight and logistics due to rising fuel prices • Feasibility of local assembly of electric trucks and LDVs and existing component supply chains	• High CAPEX cost • Limited financing mechanisms for electric trucks and LDVs • Limited availability of charging infrastructure at logistics hubs and depots • Energy security concerns around loadshedding and limited charging infrastructure	Medium-term (3 to 5 years)	The decline of freight rail services in South Africa and the deregulation of road freight transport

Table 1: Investment opportunities in the EV sector in South Africa

OPPORTUNITY				
LOCAL MANUFACTURING OF ELECTRIC PRIVATE PASSENGER VEHICLES				
ANNUAL MARKET SIZE	KEY DRIVERS	BARRIERS	TERM	MACROECONOMIC CONTEXT
620 000 vehicles valued at **R620 billion** a year	• Investors are looking to diversify global supply chains away from established manufacturing hubs in Asia • Competitive cost of labour and currency exchange rate which favours manufacturing for export • Duty free export market access to the USA through African Growth and Opportunity Act (AGOA), preferential trade agreements with the UK and the European Union (EU) and duty free export market access to the African Union (AU) through the African Continental Free Trade Area (AfCFTA) • Availability of key minerals in the battery cell manufacturing value chain to develop battery precursor inputs	• Energy security concerns around loadshedding • Ports and logistics bottlenecks	Medium-term (3 to 5 years)	Global bans on the sale of new internal combustion engine (ICE) vehicles in key South African automotive export markets

Figure 1 shows an indicative comparison of these identified market opportunities according to the growth potential and ability to overcome market entry barriers. The local manufacturing of electric private passenger vehicles has the largest annual market size and market growth potential compared to the other highlighted opportunities. The sector with the smallest market size is electric micro-mobility for last-mile delivery, however, this sector has the highest ease of market entry of the highlighted investment opportunities.

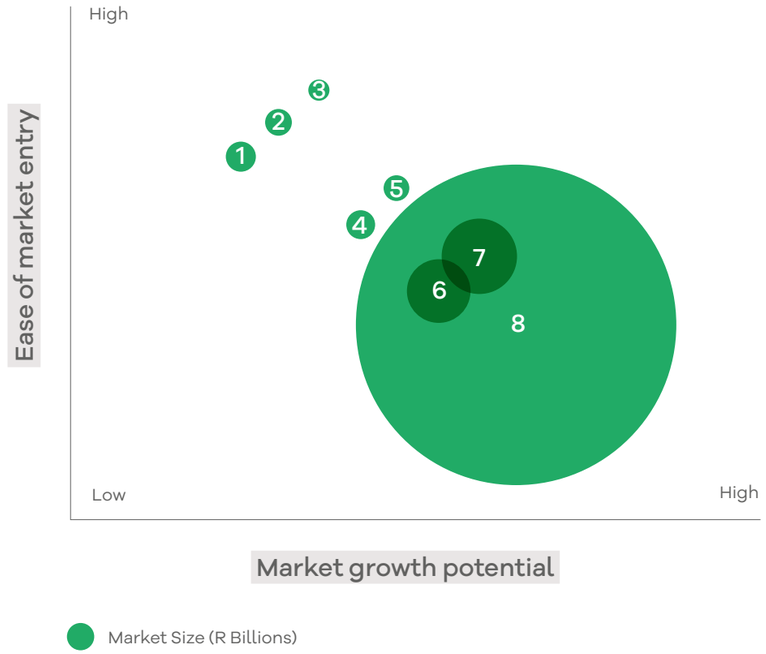


Figure 1: EV market opportunities according to the growth potential and ability to overcome market entry barriers

LEGEND		
NUMBER	**MARKET SEGMENT**	**MARKET SIZE**
1	Electric three-wheeler	R7.5 billion
2	Electric motorcycle	R4.5 billion
3	Electric bicycle	R2 billion
4	Electric bus	R6.3 billion
5	Electric minibus	R3.6 billion
6	Electric trucks	R25.2 billion
7	Electric LDVs	R37.6 billion
8	Electric private passenger vehicles	R620 billion

WHAT'S NEW?

Since the 2023 EV MIR, there have been several important developments in the sector.

With regards to EV policy development, 2023 was a significant year for South Africa. The Department of Trade, Industry and Competition (dtic) released the Electric Vehicle White Paper in December 2023 (dtic 2023). The key insight from this policy document relevant to this MIR is that the focus of government incentives and financial support will be directed towards the automotive manufacturing industry to support local EV production in the medium-term with the first battery EVs expected to be manufactured in South Africa as early as 2026. The Department of Transport (DoT) also released the Electric Vehicles Regulations Framework for public comment in 2023 (DoT 2023), which is an important step towards formalising regulations and standards that will be important for the growth of the EV industry in South Africa. A key aspect of EV regulation in the short- to medium-term will be the standardisation of charging hardware in the South African market. The adoption of the North American charging standard by OEMs in the USA has largely been an industry-led initiative with little government intervention. EV OEMs in South Africa will likely adopt a similar industry led approach to that which has been implemented in North America.

To encourage the local production of EVs in South Africa, the government will introduce an investment allowance for new investments, beginning 1 March 2026. This will allow producers to claim 150% of qualifying investment spending on electric and hydrogen-powered vehicles in the first year. The incentive will be implemented in addition to the existing industrial support mechanisms under the Automotive Production Development Programme. Government has also reprioritized R964 million over the medium-term to support the transition to EVs.

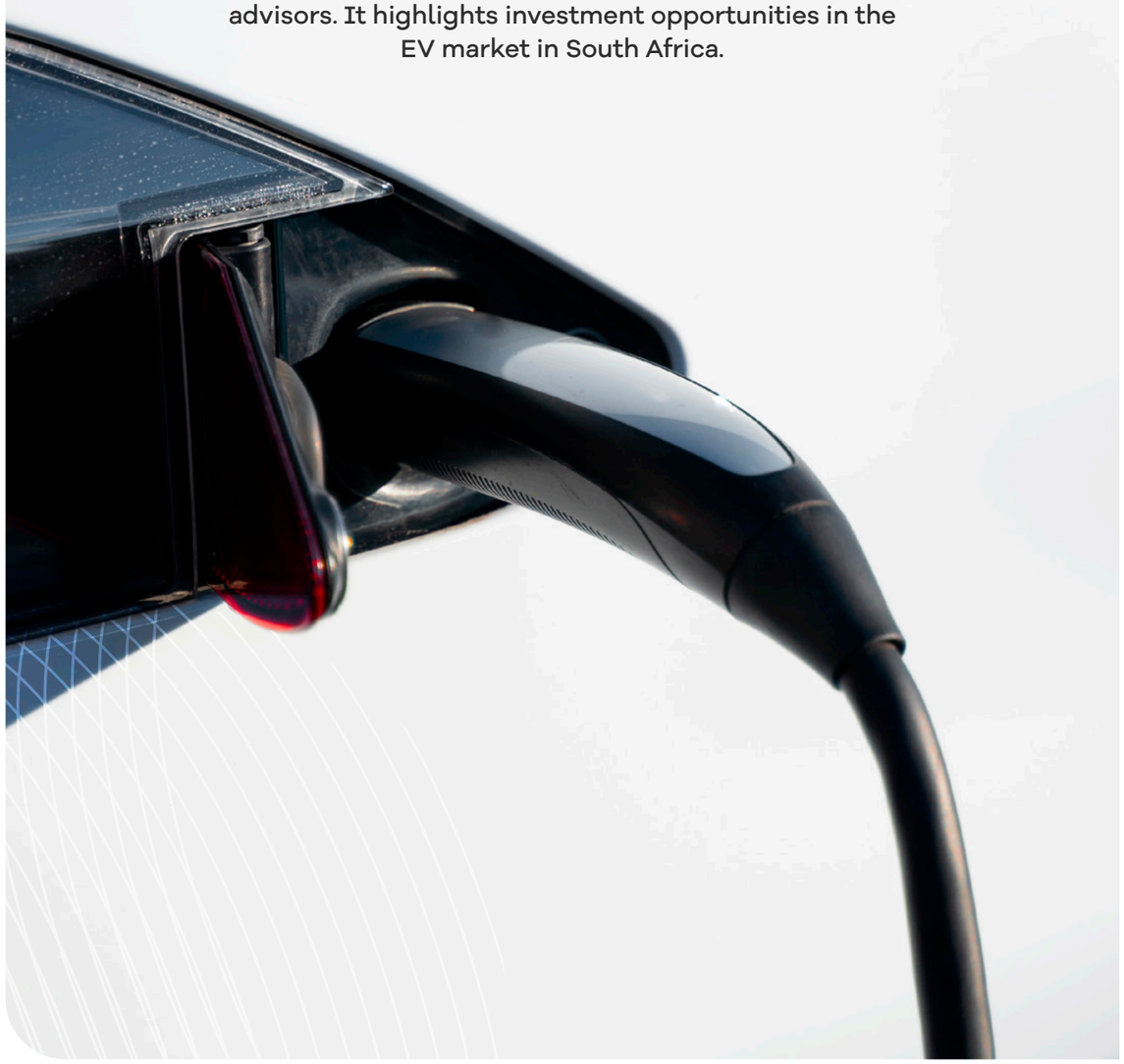
This year we've updated our 2024 MIRs to create new hybrid reports. In order to make our printed reports shorter, and to keep up with policy changes, we've moved the sector overview and policy sections, which were traditional chapters in our MIRs, online. These sections will now be updated in real time and can be accessed by clicking on the button below. Our PDF reports and printed booklets have been shortened to focus more directly on the emerging opportunities in the sector. We hope these changes improve your reading experience.

ACCESS ONLINE CONTENT

1

INTRODUCTION AND PURPOSE

This MIR is written for investors, OEMs, component and manufacturing equipment suppliers, and technical advisors. It highlights investment opportunities in the EV market in South Africa.



There is a growing trend of EV adoption in the South African market due to an increase in operational cost competitiveness. Battery EV sales in South Africa grew by 85.46% from 502 vehicles sold in 2022 to 931 vehicles sold in 2023. Most notably, sales of electric trucks and LDVs have been recorded in official statistics for the first time. This shows that the EV market is diversifying away from being predominantly private passenger vehicle sales. Figure 2 shows the sales of EVs in the South African market in 2023 by model.

There are currently no EV models manufactured locally in South Africa which means that consumers are dependent on EV imports. Import duties on EVs are around 25% and ad valorem (luxury goods taxes) are applied to all vehicle imports into South Africa with a value of R600 000 or above. As all current EVs on the South African market are R700 000 and above in value, a luxury goods tax of 18% to 30% is applied on a sliding scale based on the value of the vehicle.

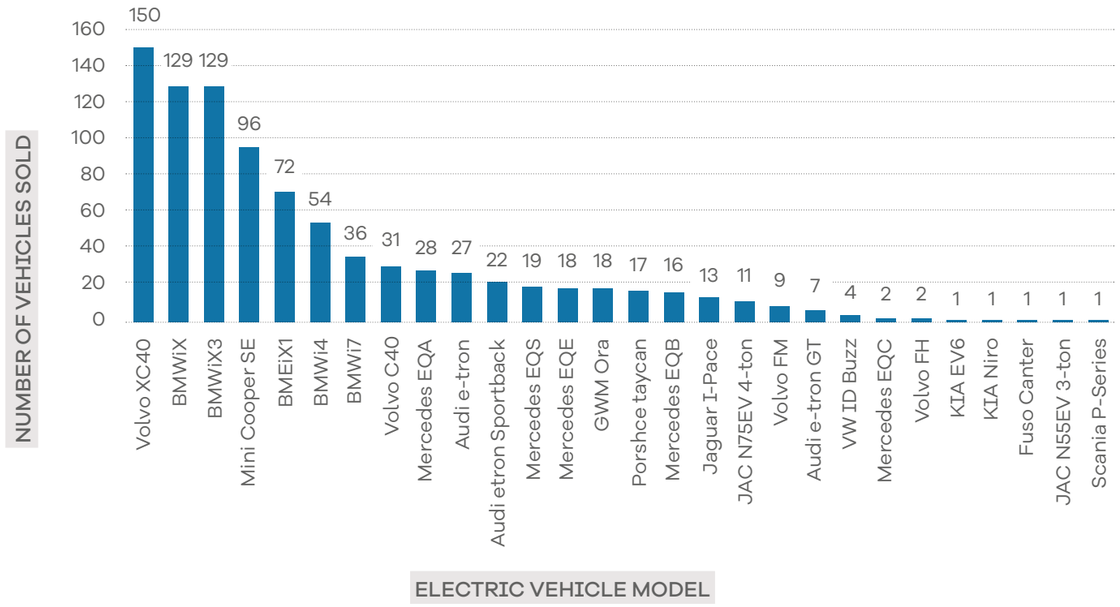


Figure 2: EV sales in South Africa by model in 2023
(Source: NAAMSA and Lightstone Auto 2023)

Figure 3 shows that there has been global growth in EV manufacturing with BYD and Tesla leading compared to emerging players. Tesla and BYD currently do not have a manufacturing presence in the South African market. The rising cost of fuel over the past few years has been a driving factor for strengthening the cost competitiveness and business case for EVs in the South African market. Figure 4 shows coastal fuel prices from 2020 to 2023.

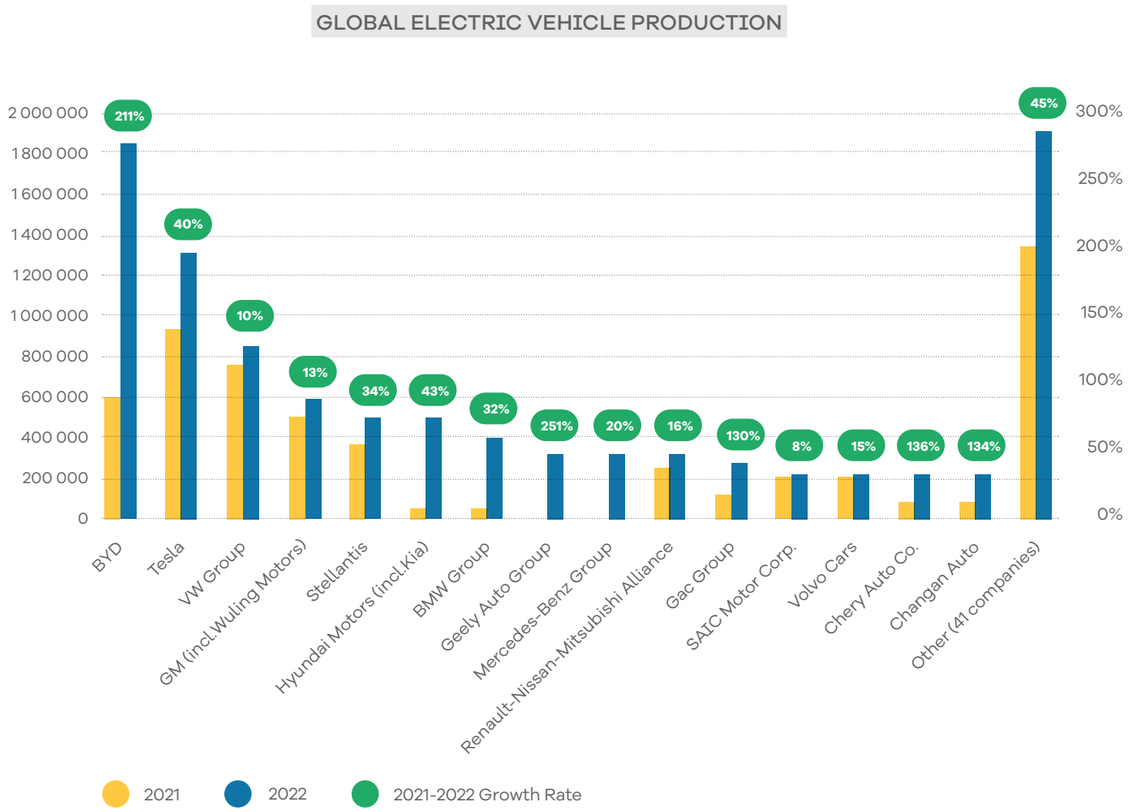


Figure 3: Global EV manufacturing production by OEM in 2023
(Source: EV Volumes 2023)

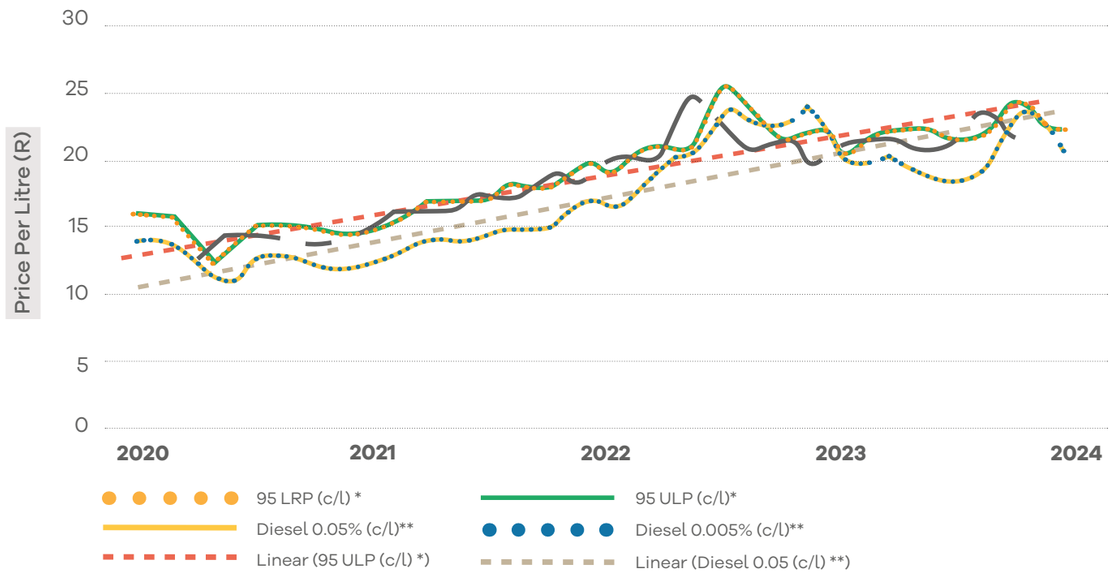


Figure 4: Coastal fuel price in South Africa 2020 to 2023
(Source: SAPIA 2023)

Figure 5 shows inland fuel prices are generally higher than coastal fuel prices which results in regional improvements to the business case for EV alternatives. The cost of diesel has increased and also been fluctuating significantly which has a considerable impact on the business case for last-mile delivery, public transportation, and freight and logistics which have been highlighted as investment opportunities in this MIR. Decarbonisation is also a driver of EV uptake in South Africa.

The South African Green Transport Strategy (GTS) aims to reduce South Africa's total transportation related greenhouse gas (GHG) emissions from 10.8% to 5% by 2050. The decarbonisation pathways that exist in the EV sector are depicted in Figure 6. The current biofuels blending regulatory framework (DMRE 2019) has not been able to stimulate the growth of the biofuels sector as anticipated. This is due to the regulations stating that biofuel blending is only mandatory where the fuel is available for blending. Biofuels produced from first generation energy crops such as sugarcane will have to be produced at a cost that is less than conventional fossil fuels to be viable without a government subsidy. This has yet to be commercially proven in the South African market at scale.

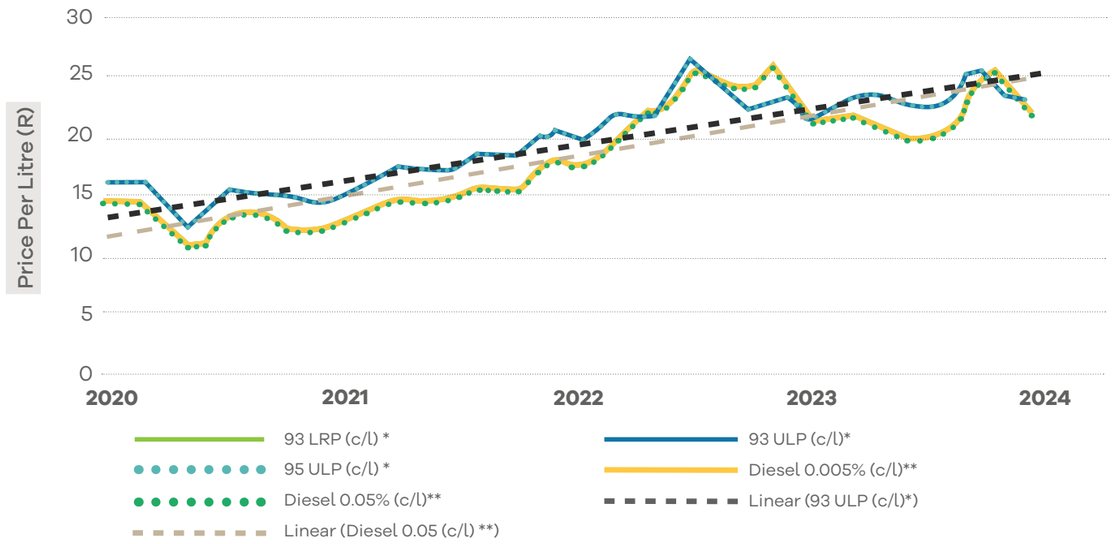


Figure 5: Inland fuel price in South Africa 2020 to 2023
(Source: SAPIA 2023)

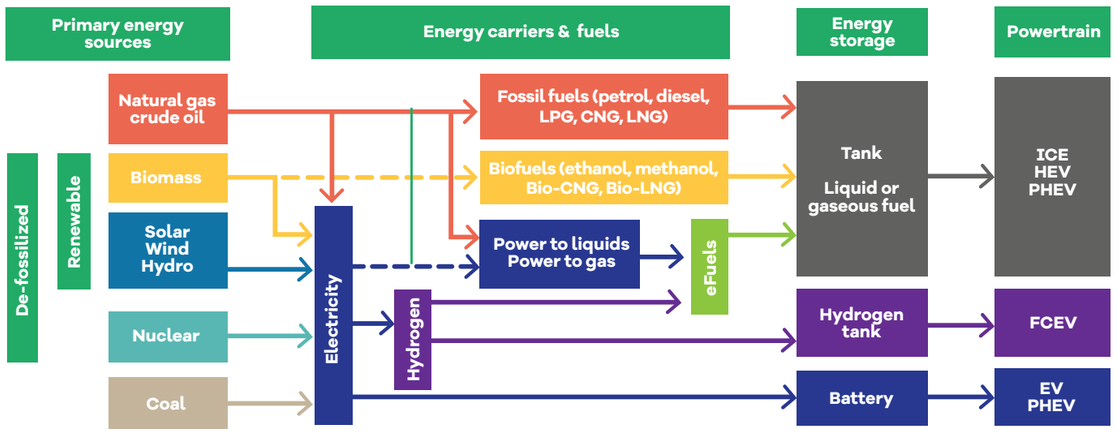


Figure 6: Transportation decarbonisation pathways to achieve the goals of the South African GTS

Figure 7 shows a comparison of decarbonisation pathways in the EV sector and how these technologies compare to each other with regards to refuelling method, energy source, energy cost, and net GHG emissions. Hydrogen fuel cell vehicles and carbon neutral synthetic fuels produced from green hydrogen and carbon capture (eFuels) are not yet price competitive with battery electric technology due to the high cost of producing green hydrogen and limited market availability of green hydrogen in the South African market at present. Sasol is currently piloting the production of eFuels for use as a sustainable aviation fuel at their facility in Secunda, Mpumalanga.

Hydrogen fuel cell vehicles are not commercially available in the South African market at present with a few pilot vehicles being tested by Toyota South Africa and Sasol as part of the South African Hydrogen Valley project (DSI 2021). In addition, BMW South Africa, Anglo American Platinum, and Sasol have signed a collaboration agreement to bring hydrogen fuel cell electric vehicles and hydrogen refuelling technology to South Africa. In the mining sector, Anglo American has piloted the first hydrogen fuel cell electric haulage truck in South Africa.

The driver for hydrogen fuel EVs in the mining sector is that fast refuelling times would allow for 24-hour operations with limited interruptions to productivity. Some mining companies are now considering the use of battery swap technology, particularly for underground mining vehicles, which provides a fast recharging time with the cost saving benefits of battery electric technology.

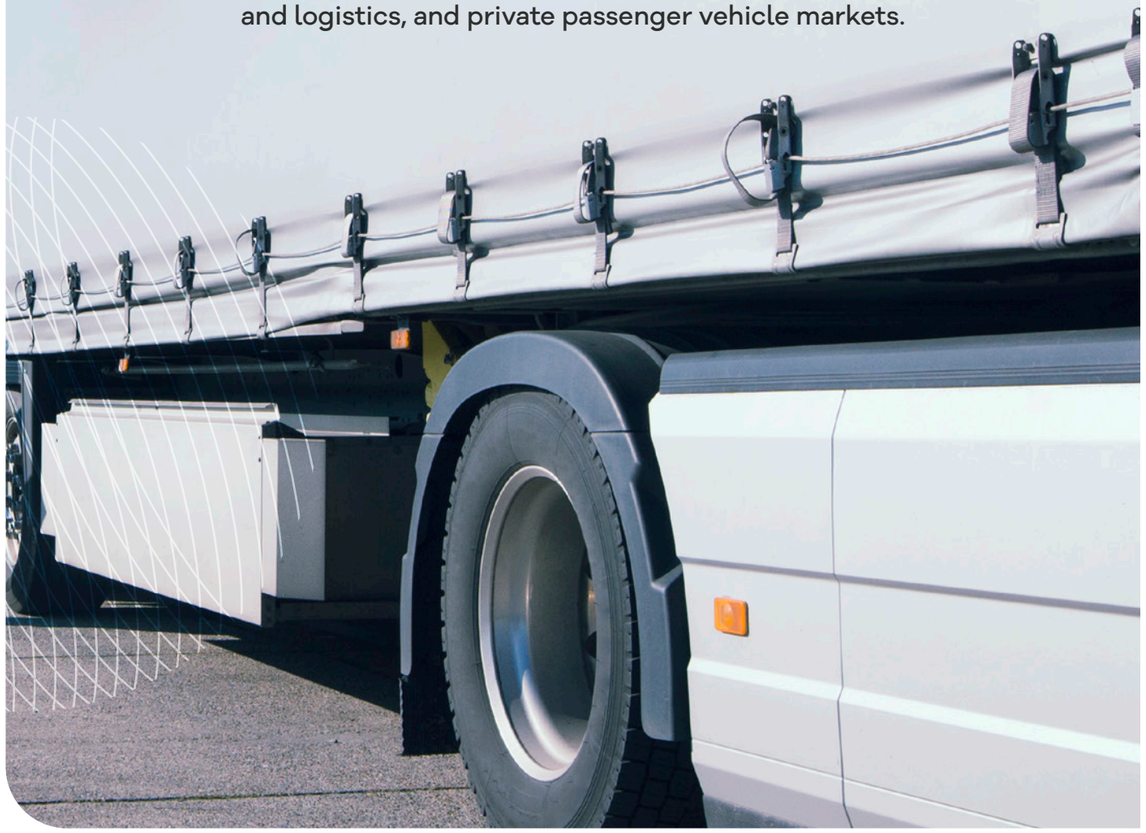
	ICE	Traditional hybrid	Plug-in-hybrid	Battery electric	Hydrogen fuel cell	Biofuels	eFuels
Refuelling method							
Energy source							
Energy cost							
Net emissions							

Figure 7: Comparison of net-zero mobility technologies compared to ICE, traditional hybrid, and plug-in hybrid technology

2

MARKET OPPORTUNITIES, DRIVERS, AND BARRIERS

There are several emerging opportunities in the South African EV market for local and international investors in last-mile delivery, public transportation, freight and logistics, and private passenger vehicle markets.



As indicated in the introduction, rising fuel prices since 2020 have contributed towards the increasing cost competitiveness of fleet electrification in South Africa. There are clear cost advantages in a number of market segments such as last-mile delivery, public transportation, and freight and logistics. Fleet managers in South Africa are looking for mechanisms to save on fuel costs and EV show a promising business case despite the higher CAPEX cost.

The four key market opportunities that have been identified as attractive sectors for investment in the EV industry in South Africa are: electric micro-mobility for last-mile delivery, electrification of public transportation, electrification of freight and logistics, and local manufacturing of electric private passenger vehicles.

2.1 Electric micro-mobility for last-mile delivery

Electric micro-mobility includes electric bicycles, scooters, mopeds, motorcycles, and three-wheelers and is growing in popularity as a low cost mobility solution for last-mile delivery services in the South African market. Table 2 presents data for different types of last mile delivery vehicles that underpin the operational business case for using an electric micro-vehicle for last-mile delivery compared to an ICE motorcycle. There is a more than 80% operational cost saving when using an electric bicycle or electric three-wheeler for last-mile delivery compared to an ICE motorcycle.

Electric motorcycles and mopeds have a higher energy consumption per 100 kilometres (km) than an electric bicycle or electric three-wheelers. There is an almost 76% saving in operational fuel cost when switching from an ICE motorcycle to an electric motorcycle or moped for last-mile delivery services. Many electric two- and three-wheelers are using battery swap technology. This means that charging hubs can be set up across demand zones to charge multiple battery packs at once, which can be swapped out as required by delivery drivers.

Table 2: Data in support of the business case for electric micro-mobility for last-mile delivery

TYPE OF ELECTRIC MICRO-VEHICLE	RANGE (KM)	AVERAGE PRICE	ENERGY CONSUMPTION PER 100 KM	COST OF ELECTRICITY	OPERATIONAL COST PER 100 KM	AVERAGE ANNUAL MILEAGE (KM)
Electric bicycle	120	R40 000	4 kWh	R2.30 per kWh	R9.20	36 500
Electric moped / motorcycle	120	R90 000	5.84 kWh	R2.30 per kWh	R13.43	36 500
Electric three-wheeler	120	R150 000	4 kWh	R2.30 per kWh	R9.20	36 500
TYPE OF ICE MICRO-VEHICLE	**RANGE**	**AVERAGE PRICE**	**ENERGY CONSUMPTION PER 100 KM**	**COST OF PETROL (AA 2023)**	**OPERATIONAL COST PER 100 KM**	**AVERAGE ANNUAL MILEAGE (KM)**
ICE motorcycle	400	R17 000	2.4 litres	R23.90/l	R57.36	36 500

2.1.1 MACROECONOMIC CONTEXT

The growth in the use of electric micro-mobility for last-mile delivery can be attributed to the e-commerce boom and the strong business case for the electrification of last-mile delivery, where smaller and more energy efficient vehicles are required to save operational costs. The value of e-commerce transactions in South Africa is expected to grow by 150% to R225 billion by 2025 (Thenga 2020).

The revenue generated by the e-commerce industry in South Africa reached United States Dollars (USD) 7.07 billion in 2022 and is projected to grow to USD 14.9 billion by 2027 (Venter 2022). The African last-mile delivery market is projected to grow at an annual compound growth rate of 8.45% between 2023 and 2030. The significant increase in the number of electric two- and three-wheelers used for last-mile delivery in South Africa over the past year is indicative of a market disruption.

Electric micro-vehicles are the lowest cost option for last-mile delivery drivers who are looking to save on operational fuel costs. For delivery drivers, operational fuel costs are generally high due to the high frequency, low cargo volume, and high mileage trips that are becoming more common as more consumers make use of digital e-commerce platforms. Food and grocery delivery in particular is becoming more demand responsive with the clothing and apparel market showing recent growth. Electric two- and three-wheelers have enough battery range (around 100 km to 120 km) to complete most urban delivery trips, at a lower operational cost than a large ICE LDV or passenger car.

2.1.2 MARKET SIZE

Engagement with industry has indicated that there is a current market size of 50 000 active delivery drivers in South Africa in the last-mile food and grocery delivery industry. As indicated, Frost and Sullivan has projected an annual compound growth rate of 8.45% for the African last-mile delivery industry between 2023 and 2030. Therefore, the projected market size for electric micro-mobility for last-mile delivery by 2030 is projected to be valued at R2 billion for electric bicycles, R4.5 billion for electric motorcycles, and R7.5 billion for electric three-wheelers. There are already at least a 1 000 electric cargo bicycles (with a market value of R40 million) serving the last-mile delivery sector in the Western Cape with a number of new pilot projects in Gauteng. Table 3 below shows the market size for electric micro-mobility for last-mile delivery in South Africa.

Table 3: Market size of electric two and three-wheelers in South Africa

MARKET SIZE PARAMETER	MARKET SIZE (NUMBER OF VEHICLES)	ELECTRIC BICYCLE MARKET SIZE UNIT COST (R40,000)	ENERGY CONSUMPTION PER 100 KM UNIT COST (R90,000)	ELECTRIC THREE-WHEELER MARKET SIZE
Annual market size	50 000	R2 billion	R4.5 billion	R7.5 billion
Estimated market size by 2030	90 000	R3.6 billion	R8.1 billion	R13.5 billion

The market is expected to extend well beyond South Africa. According to the International Council on Clean Transportation, in 2022, annual imports of two- and three-wheelers into the African market were estimated at three to four million units, with a current fleet of around 15 to 20 million vehicles. Electric two- and three-wheelers offer a great opportunity for low-cost e-mobility in Africa due to limited charging infrastructure to sustain larger EVs and low market penetration of private passenger vehicles.

2.1.3 MARKET DRIVERS

2.1.3.1 Cost competitiveness of electric micro-vehicles

Most commercial vehicle fleets replace their vehicles every five to eight years. If a commercial lifespan of eight years is used to compare electric two- and three-wheelers to an ICE motorcycle using an average annual mileage of 36 500 km per year, the business case emerges as depicted in Figure 8 drawing on the data presented in Table 2. There is a strong business case for electrification of last-mile delivery due to the high annual mileage and energy consumption of delivery fleets. The overall CAPEX plus OPEX costs of an electric micro-vehicle is lower over a period of eight years than a comparable ICE motorcycle. It is assumed that fuel prices will increase over time so the fuel price as of November 2023 was assumed as fixed.

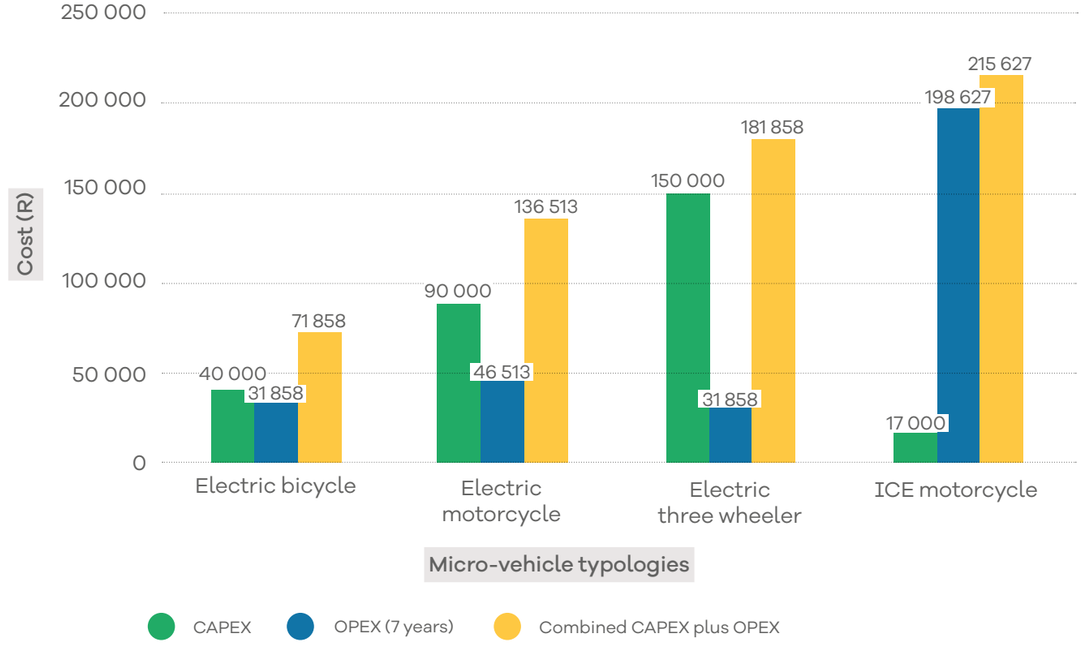


Figure 8: Business case for electric micro-mobility for last-mile delivery assuming a mileage of 36 500 km per year[3]

3 A 10% annual increase in the electricity price and petrol price was assumed when calculating the OPEX cost over seven years.

2.1.3.2
Feasibility of local assembly and existing component supply chain

Electric two- and three-wheelers are modular in design, which means that the complete knock-down kit can be imported and assembled locally. A local component supply chain for electric micro-vehicles currently exists in South Africa with significant potential for local component integration. MellowVans is an example of a local electric three-wheeler manufacturer that uses 70% local components in its vehicles. This means that the technology can be scaled rapidly to meet the growing demand of the last-mile delivery industry. Table 4 below details the availability of local components for electric two- and three-wheelers in the South African market.

Table 4: Electric micro-vehicle local component availability in the South African market

COMPONENT TYPE	AVAILABILITY IN SOUTH AFRICA
Lithium-ion cell manufacturing	No
Battery pack assembly	Yes
Composite materials	Yes
Steel components	Yes
Electric motor	No
Wiring harness	Yes
Seating	Yes
Tyres	Yes

2.1.4
MARKET BARRIERS

2.1.4.1
Limited battery range and public charging infrastructure

Electric micro-vehicles have a battery range that is limited to 100 km to 120 km on a full charge. This means that there is limited applicability for the use of electric two- and three-wheelers beyond short-distance, urban, last-mile deliveries. There are a limited number of public charging facilities available for last-mile food and grocery delivery drivers to access. Future planning for charging or battery swap stations could include rest stations, toilets, and ablution facilities for delivery drivers, as this currently not catered for, and such add-on services could potentially strengthen the business case for their development.

2.1.4.2
Limited cargo load capacity

The small cargo load capacity of electric two- and three-wheelers means that there is a limitation to the number of delivery orders that can be fulfilled at the same time. Table 5 compares the different cargo load capacities of an electric bicycle, electric motorcycle, electric three-wheeler, and ICE motorcycle. Electric motorcycles and electric three-wheelers have a higher load-bearing capacity compared to an electric bicycle and or ICE motorcycle due to the mass and lower centre of gravity of heavier electric micro-vehicles. In addition, electric three-wheelers can be used to transport larger items due to greater cargo volume of the vehicle, providing a volume of up to 1 200 litres of cargo space.

3 A 10% annual increase in the electricity price and petrol price was assumed when calculating the OPEX cost over seven years.

Table 5: Comparison of cargo load capacities for electric vs ICE micro-vehicles

TYPE OF MICRO-VEHICLE	CARGO LOAD CAPACITY (KILOGRAMS)	CARGO LOAD CAPACITY (LITRES)
Electric bicycle	120	120
Electric motorcycle	350	350
Electric three-wheeler	350	1 200
ICE motorcycle	150	150

2.1.4.3
Regulatory constraints

Electric two- and three-wheelers are not allowed on freeways and arterial roads which limits the scope of where these vehicles can be used. The National Road Traffic Amendment Bill (Minister of Transport 2020) defines an electric bicycle or tricycle as a pedal cycle if the bicycle or tricycle has operable pedals and or an electric motor with a total vehicle weight that does not exceed 30 kilograms. Secondly, the electric motor must not be capable of propelling the bicycle or tricycle unassisted at a speed exceeding 25 kilometres per hour (km/hr). Electric two- and three-wheelers which exceed this weight and speed limit may not be used on bicycle lanes in cities.

Currently, a rider is not required to have a valid driver's license to ride a bicycle or electric bicycle and is allowed to make use of the dedicated bicycle lanes. Electric bicycles that exceed 25 km/hr will have to obtain a motorcycle vehicle registration. Electric bicycles with a maximum design speed of more than 45 km/hr will be considered a motor vehicle and will require an appropriate motor vehicle driver's licence. This definition of what an electric bicycle is will dictate whether delivery drivers are able to use dedicated bicycle lanes in cities.

2.1.4.4
High CAPEX cost

The higher CAPEX of the electric two- or three-wheeler compared to an ICE motorcycle results in a financing barrier for delivery drivers looking to switch to an electric alternative. An emerging leasing or EV-as-a-service business model exists in the South African market to attempt to address this higher CAPEX barrier. There are a number of electric two- and three-wheeler start-ups in South Africa that are offering EV-as-a-service or leasing business models to service the growing e-commerce and last-mile food and grocery delivery industry. Some of these leasing services include delivery driver training in traffic safety and entrepreneurial capacity building. This model is assisting many young unemployed South Africans to enter the last-mile delivery industry, removing the high barrier to entry. However this model is not yet widespread and tends to focus on new entrants so high CAPEX remains a barrier for current owners of ICE delivery vehicles.

2.2 Electrification of public transportation

There is a business case for the electrification of public transportation, including both bus and minibus taxi services in the medium-term. EVs can assist public transport operators to save on operational costs, primarily fuel and maintenance costs, which would improve profitability. Table 6 presents data that underpin the business case for the electrification of public transportation in South Africa.

Table 6: Data in support of the business case for the electrification of public transportation

TYPE OF ELECTRIC PUBLIC TRANSPORT VEHICLE	RANGE (KM)	AVERAGE PRICE	ENERGY CONSUMPTION PER KM	COST OF ELECTRICITY	OPERATIONAL COST PER 100 KM	AVERAGE ANNUAL MILEAGE (KM)
Electric bus	300	R5.4 million to R8.1 million	0.99 kWh	R2.30/kWh	R227.70	60 000
Electric minibus	200 to 250	R1.5 million	0.5 kWh	R2.30/kWh	R115	72 000
TYPE OF ICE PUBLIC TRANSPORT VEHICLE	**RANGE (KM)**	**AVERAGE PRICE**	**ENERGY CONSUMPTION PER KM**	**COST OF DIESEL (AA 2023B)**	**OPERATIONAL COST PER 100 KM**	**AVERAGE ANNUAL MILEAGE (KM)**
ICE bus	600 to 800	R2.7 million	0.4 litres	R24.16/l	R966.40	60 000
ICE minibus	600 to 800	R680 900	0.10 litres	R24.16/l	R241.60	72 000

2.2.1 MACROECONOMIC CONTEXT

In 2010, rail passengers completed over 500 million trips, which declined to 19 million trips by 2022 (Statistics SA, 2023). This trend is the result of, among other challenges, increased incidents of theft, arson and vandalism of rail infrastructure and deteriorating safety and security of passengers using the commuter rail network. This has led to the growth of the minibus taxi industry which is to some extent unregulated and unsubsidised.

According to the 2020 South African Household Travel Survey (StatsSA 2020), only one third of households have access to a private car. This means that two thirds of the South African population are entirely reliant on public transport services (where this is available) and minibus taxi services. Therefore, the transition to electric mobility in South Africa could potentially involve the electrification of buses and minibus taxis in order to extend the socio-economic benefits of the EV transition to the greater population. Government procurement policies in favour of EV procurement (e.g. provincial and municipal EV strategies) have been implemented in some parts of South Africa by the Western Cape provincial government, the City of Cape Town, the Gauteng provincial government, the City of Tshwane, and the City of Johannesburg. The Global Environmental Facility (GEF) has funded an electric bus pilot project that is being managed by the Development Bank of Southern Africa and implemented by the South African National Energy Development Institute (SANEDI) (Venter 2024). This project will involve the procurement of 39 electric buses and the required charging infrastructure with total funding of USD 4.7 million received from the GEF. The beneficiaries of this project will be the City of Tshwane, which has been allocated 20 buses, and eThekwini Municipality, which has been allocated 19 electric buses.

2.2.2 MARKET SIZE

It is estimated that the CAPEX cost of an electric bus is two to three times the cost of a diesel bus (R2.7 million) and would be priced in the region of R5.4 million to R8.1 million. Official figures published by the Road Traffic Management Corporation of South Africa, indicate that there are 64 916 buses, bus trains, and midibuses actively operating on South African roads in 2023. This is shown in Figure 9 which presents the live population of buses since 2015 and projects it to 2030.

Engagements with bus operators who are actively considering the procurement of electric buses for their fleet indicate that an annual replacement rate of 6% of the diesel bus fleet is generally applied. This replacement rate is linked to the usage and age of the existing diesel bus fleet which has a usual lifespan of 15 to 20 years. The field test data from a Golden Arrow Bus Services (GABS) electric bus pilot indicates that even though electric buses are two to three times the CAPEX cost of diesel buses, the operational fuel cost savings by switching to electric buses means than there is a return on investment over the lifespan of the electric bus (15 to 20 years) (for more details see GreenCape 2023).

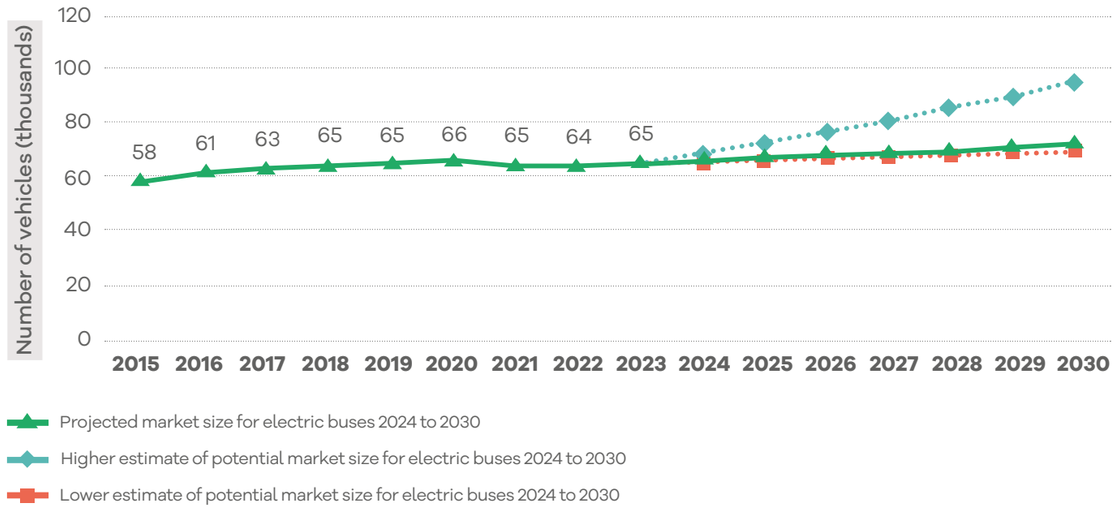
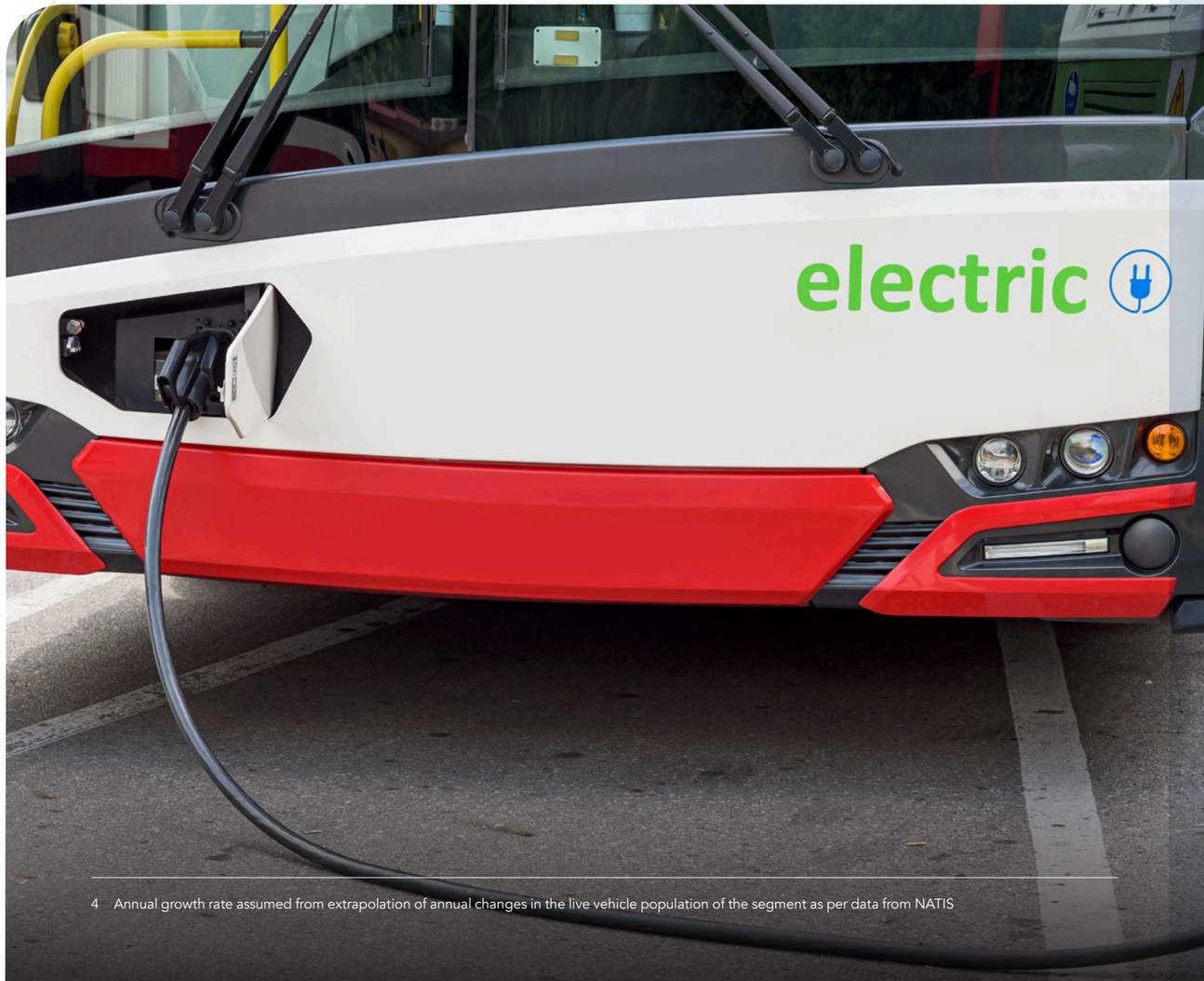


Figure 9: Live population of buses in South Africa 2015 to 2023 and projections to 2030
(Source: RTMC 2023, projections by the author[4])



4 Annual growth rate assumed from extrapolation of annual changes in the live vehicle population of the segment as per data from NATIS

There was a live population of 354 475 minibuses in South Africa in 2023 according to the National Traffic Information System (NATIS) (RTMC 2023). This is shown in Figure 10 which presents the live minibus population since 2015 and projects it to 2030.The current CAPEX cost of an electric minibus taxi is estimated at R1.5 million.

As indicated earlier, the South African minibus taxi industry is currently largely unregulated and receives no formal subsidy from the government with the exception of the minibus taxi recapitalisation programme.[5] The graph indicates that the market for minibuses is growing in South Africa despite an absence of growth during the COVID-19 period.

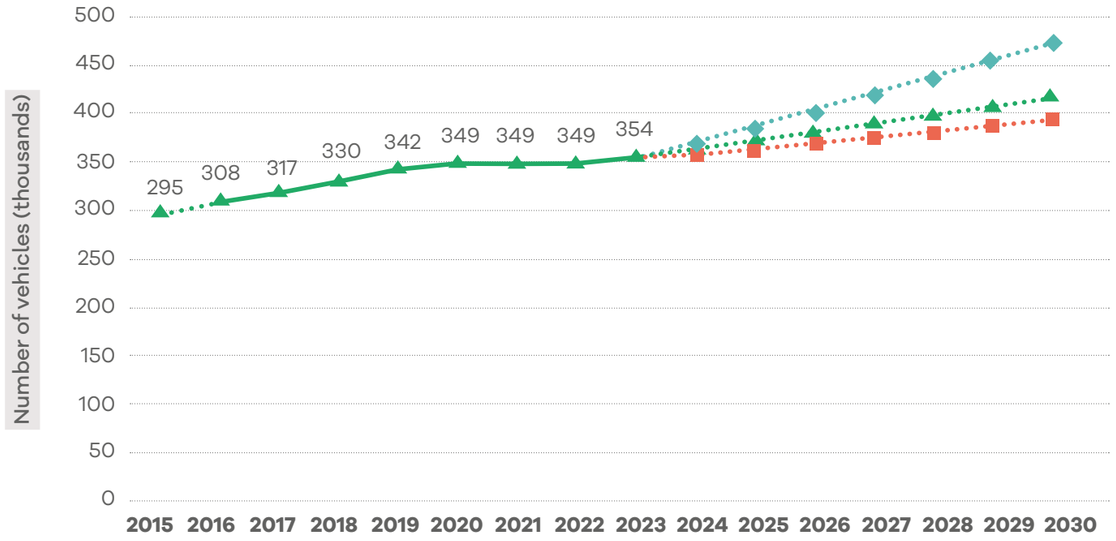


Figure 10: Live population of minibuses in South Africa 2015 to 2023 and projections to 2030. (Source: RTMC 2023, projections by the author)

The average monthly sales of new minibus taxis in South Africa in 2023 is around 180 to 200 vehicles a month or 2 160 to 2 400 a year (Transaction Capital 2023). At a value of R1.5 million per electric minibus taxi, this would be a minimum market potential value of R3.24 billion to R3.6 billion a year. This is down from a previous 600 new minibus taxis being financed a month or 7 200 a year (Pre-COVID-19). This would have been a maximum market potential value of R10.8 billion a year. Based on mileage and fuel consumption data for 2023 for an average ICE minibus (Transaction Capital 2023), and energy efficiency data per km for an electric minibus (Flx EV 2023), there is a commercial business case for the electrification of minibus taxis that travel at least 72 000 km a year. This is a market driver for the electrification of this sector.

Table 7 shows the estimated market size for electric buses and minibuses in the South African market in 2024 and 2030. This is a sizeable market for investment in electric public transport vehicles with existing bus and minibus body manufactures who could manufacture vehicle bodies locally using imported EV chassis.

Table 7: Electric bus and minibus market size

ELECTRIC BUS MARKET SIZE	ANNUAL MARKET SIZE (NUMBER OF VEHICLES)	MARKET SIZE
Estimated electric bus market size 2024	900	R6.3 billion
Estimated electric bus market size by 2030	1 000	R7 billion
ELECTRIC MINIBUS MARKET SIZE	**ANNUAL MARKET SIZE (NUMBER OF VEHICLES)**	**MARKET SIZE**
Estimated electric minibus market size 2024	2 400	R3.6 billion
Estimated electric minibus market size by 2030	2 800	R4.2 billion

5 The minibus taxi recapitalisation challenge aims to increase road safety by removing the unroadworthy taxi vehicles off the road via the scrapping process and utilising the scrapping allowance as a deposit to recapitalise with new compliant taxi vehicles (Taxi Recap 2023)

2.2.3 MARKET DRIVERS

2.2.3.1 Growing cost competitiveness due to rising fuel prices

Figure 11 indicates that there is a business case for the electrification of the public transport bus industry, with an estimated mileage of 60 000 km a year per bus (GABS 2023).

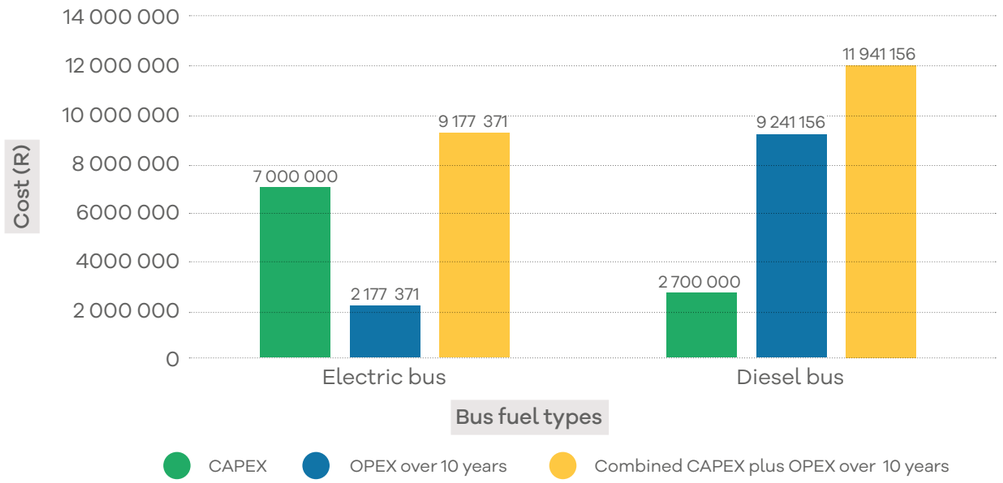


Figure 11: Live population of minibuses in South Africa 2015 to 2023 and projections to 2030.
(Source: RTMC 2023, projections by the author)[6]

Figure 12 indicates that there is business case for the electrification of the minibus taxi industry, with an estimated annual mileage of 72 000 km per taxi (Transaction Capital 2023).

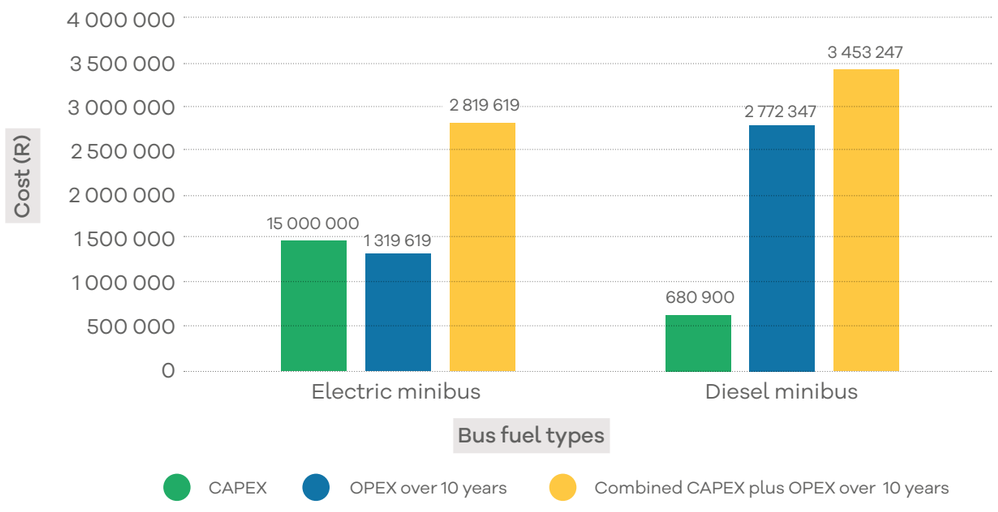


Figure 12: Business case for the electrification of minibus taxi fleets assuming a mileage of 72 000 km per year [7]

6 A 10% annual increase in the cost of electricity and diesel has been factored into the OPEX calculations

7 A 10% annual increase in the cost of electricity and diesel has been factored into the OPEX calculations

2.2.3.2 Fiscal constraints that limit the growth of public transport subsidies

The formal public transportation system in South Africa is a heavily subsidised industry with small operating margins. Rises in the fuel price negatively affect the profitability of the sector and increases in costs are often passed onto the commuter in the form of higher public transport fares. The Draft National Public Transport Subsidy Policy (DoT 2021a) that was released for comment in 2021 envisions a revised public transport subsidy strategy that would focus on subsiding the consumer directly rather than a particular mode of transport. This would be rolled out across all formal bus services, passenger rail, and minibus taxi services. This will be limited to poor households below a selected income threshold. Public transport operators can save on operational fuel costs by switching to EVs.

Figure 13 shows the indicative operating cost in Rands per km for the various public transport modes in South Africa compared to the government subsidy applied in Rands per km. This data was presented in the DoT's Draft National Public Transport Subsidy Policy report (DoT 2021b).

High speed rail, such as the Gautrain, has the highest operating cost as well as the highest government subsidy, followed by passenger rail services (Metrorail) with this mode also having the highest number of passengers per km. The minibus taxi industry has the lowest operational cost, lowest number of passengers per km with zero operational subsidy from government. The conventional bus and Bus Rapid Transit (BRT) sector has a medium number of passengers per km with a lower operational subsidy per km compared to rail.

The fuel cost savings from the use of electric buses and minibus taxis in the public transport industry can improve the operational cost per km of these transport modes. If the market share of passenger rail declines further in South Africa overtime, there will be an increased dependence on road-based transport. Constrained fiscal spending over the short- to medium-term by government means that an expansion of formal bus and BRT services is not likely. Electrifying and formalising the minibus taxi industry is expected to become more important in a socio-economic context in which only one third of households in South Africa have access to a private passenger vehicle.

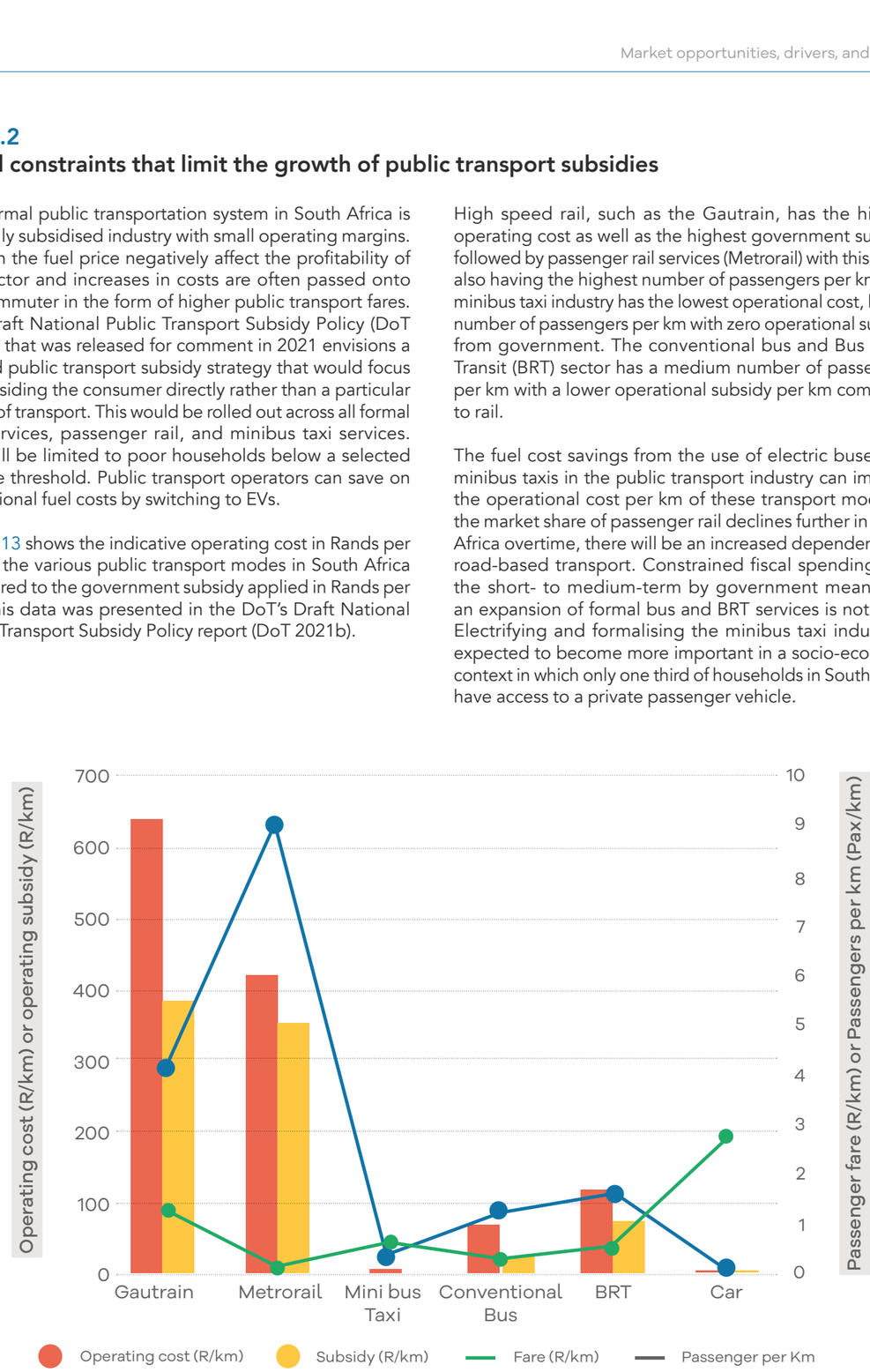


Figure 13: Comparison of various public transportation modes based on indicative unit costs, government subsidy received, passenger fare and passengers per kilometre
(Source: DoT 2021)

2.2.3.3
Feasibility of local assembly and existing component supply chain

Electric buses and minibuses are suitable for local assembly using imported electric chassis. South Africa has a long history of local bus body manufacturing due to previous local content requirements for the public transport industry. Bus bodies are no longer designated for public procurement of buses by the by the dtic. Government departments are however able to stipulate local content requirements for public procurement of buses at a departmental level.

Figure 14 shows the current status with regard to bus manufacturing in South Africa. As can be seen, South Africa already produces largely for domestic purposes with some export of buses.

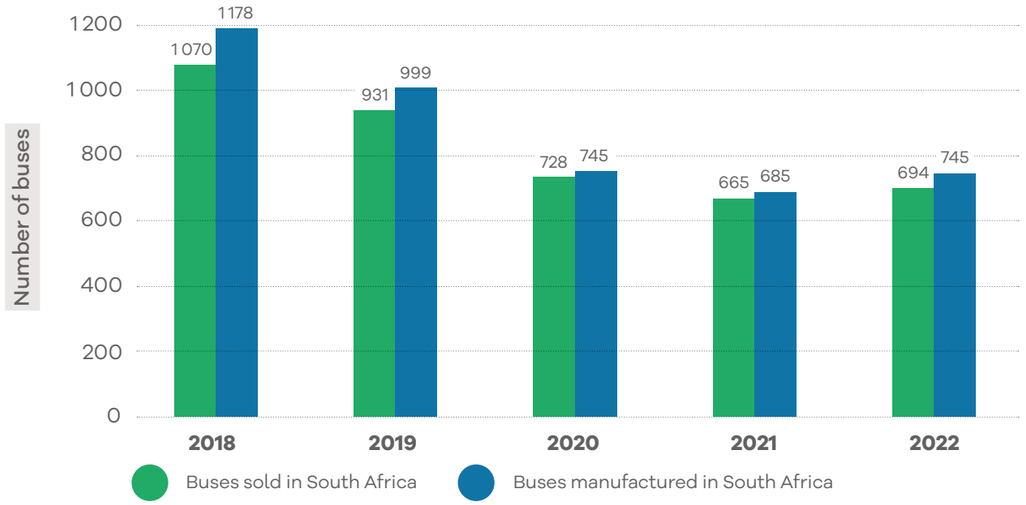


Figure 14: Number of buses sold compared to number of buses manufactured in South Africa from 2018 to 2022 (Source: AIEC 2023)

> Toyota's manufacturing facility in Durban currently has a production capacity of 18 000 minibus taxis a year with the HiAce Ses'fikile minibus taxi model having a 44% local component inclusion. It is estimated that Toyota South Africa's production was at 16 500 minibus taxis in 2023. Nissan also produces minibus taxis at its production facility is Rosslyn, Pretoria, however Nissan has a much smaller market share.

Table 8 shows the electric bus and minibus components which are already available in the local automotive manufacturing value chain in South Africa.

Table 8: Local component availability in the electric bus and minibus manufacturing industry

COMPONENT TYPE	AVAILABILITY IN SOUTH AFRICA
BMS	Yes
Lithium-ion cell manufacturing	No
Battery pack assembly	Yes
Composite materials	Yes
Steel components	Yes
Electric motor	No
Automotive glass	Yes
Wiring harness	Yes
Seating	Yes
Tyres	Yes

2.2.4
MARKET BARRIERS

2.2.4.1
Limited availability of financing mechanisms

Electric buses have a CAPEX cost of two to three times the cost of diesel buses which results in a high upfront CAPEX barrier which may prevent some public transport operators from transitioning to an electric fleet. There are currently a lack of funding mechanisms for the electric bus transition in South Africa and thus a role for innovative financing mechanisms such as electric bus leasing, EV-as-a-service, or Pay-As-You-Save models. This is a market opportunity for investors and financiers looking to benefit from the electrification of public transport through a financial mechanism.

2.2.4.2
Limited public charging infrastructure

There is a lack of charging infrastructure and renewable electricity to meet the demand of a (green) electric bus and minibus taxi fleet in South Africa. It is estimated that a fleet of 1 000 electric buses would require around 80 megawatts (MW) to 100 MW of renewable energy for charging. The public transport industry has set routes and operational schedules which creates the opportunity for off-peak charging at bus depots and minibus taxi ranks. Public transport depots and ranks are often located on municipal-owned land. As municipalities do not necessarily have the financial means to invest in charging infrastructure, mechanisms such as public-private partnerships and energy service contracts would be required to unlock private sector investment in renewable energy and charging infrastructure at these facilities.

2.2.4.3
Energy security

Increased levels of loadshedding in 2023 have increased energy security concerns around the electrification of public transportation fleets in South Africa. Public transport bus operators in South Africa who piloted electric buses in 2023 have invested in rooftop solar photovoltaic (PV) and solar carports as means of dealing with the growing concerns around loadshedding and have pushed for the use of renewable energy for charging as outlined in the South African GTS (DoT 2018.) Peak solar irradiation in South Africa coincides with the off-peak operational period for public transport which provides an ideal use case for renewable energy for electric bus and minibus charging. However, it is recognised that rooftop solar PV at bus depots and minibus taxi ranks will not be enough to provide energy security to support the EV transition in this sector.

2.3 Electrification of freight and logistics

There is a business case for switching from ICE trucks and LDVs to EVs in the medium-term. Table 9 presents data that underpin the business case for electrification of freight and logistics in South Africa.

Table 9: Data in support of the business case for the electrification of freight and logistics in South Africa

TYPE OF ELECTRIC HAULAGE VEHICLE	RANGE (KM)	AVERAGE PRICE	ENERGY CONSUMPTION PER KM	COST OF ENERGY	OPERATIONAL COST PER 100 KM	AVERAGE ANNUAL MILEAGE (KM) BUSINESS CASE
Electric heavy duty truck	200	R6 million	1.8 kWh	R2.30/kWh	R414	85 000
Electric LDV	250 to 280	R800 000	0.224 kWh	R2.30/kWh	R51.52	25 000
TYPE OF ICE HAULAGE VEHICLE	**RANGE (KM)**	**AVERAGE PRICE**	**ENERGY CONSUMPTION PER KM**	**COST OF ENERGY (PER LITRE)**	**OPERATIONAL COST PER 100 KM**	**AVERAGE ANNUAL MILEAGE (KM)**
ICE heavy duty truck	600 to 800	R1.5 million	0.4 litres	R24.16 (AA 2023b)	R966.40	85 000
ICE LDV	600 to 800	R500 000	0.075 litres	R23.90 (AA 2023a)	R179.25	25 000

2.3.1 MACROECONOMIC CONTEXT

A decline of freight rail services in South Africa is the result of decreased investment in infrastructure maintenance by Transnet[8] and criminal activity related to the theft of electric cables. This combined with the deregulation of road freight transportation has led to rapid growth of the trucking industry in South Africa for long distance freight transport. In 2012, Transnet generated revenue of R28 billion and spent R3.44 billion (12.4%) on railway maintenance. Since 2012, Transnet has significantly reduced this expenditure, spending only R2.7 billion (7.1%) on railway maintenance during the 2022 financial year while generating R38 billion in revenue. The prolonged maintenance expense cutbacks are a material contributor to the operator's deteriorating infrastructure. This has had a knock-on effect with regards to the shifting of freight transport from rail to road which has stimulated the market for heavy duty trucks. Figure 15 shows rail vs road freight volumes in South Africa between 2016 and 2022.

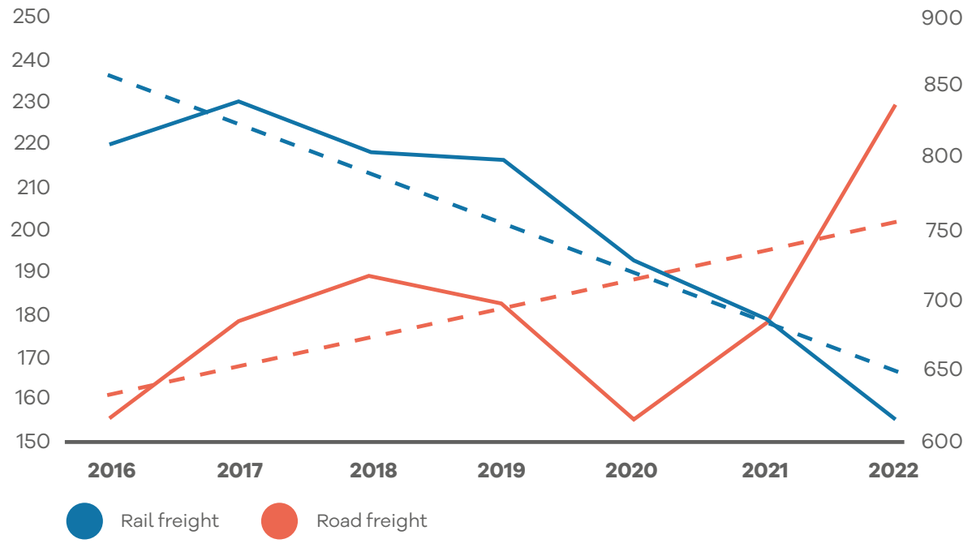


Figure 15: Rail vs. road freight volumes in South Africa over time (Source: Greyling 2023)

8 Transnet is the state owned rail, pipeline and ports authority in South Africa

2.3.2
MARKET SIZE

As of 2023, the number of heavy duty trucks registered in South Africa was 391 091 (NATIS, 2023). This is shown in Figure 16 which presents the live population of heavy duty trucks since 2015 and projects it to 2030. The current estimated cost of an electric truck is R6 million.

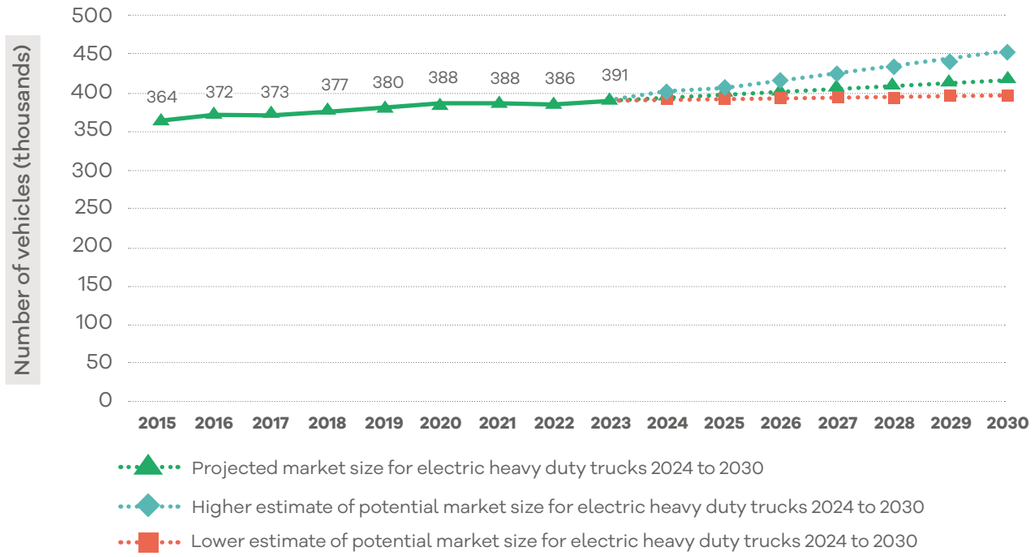
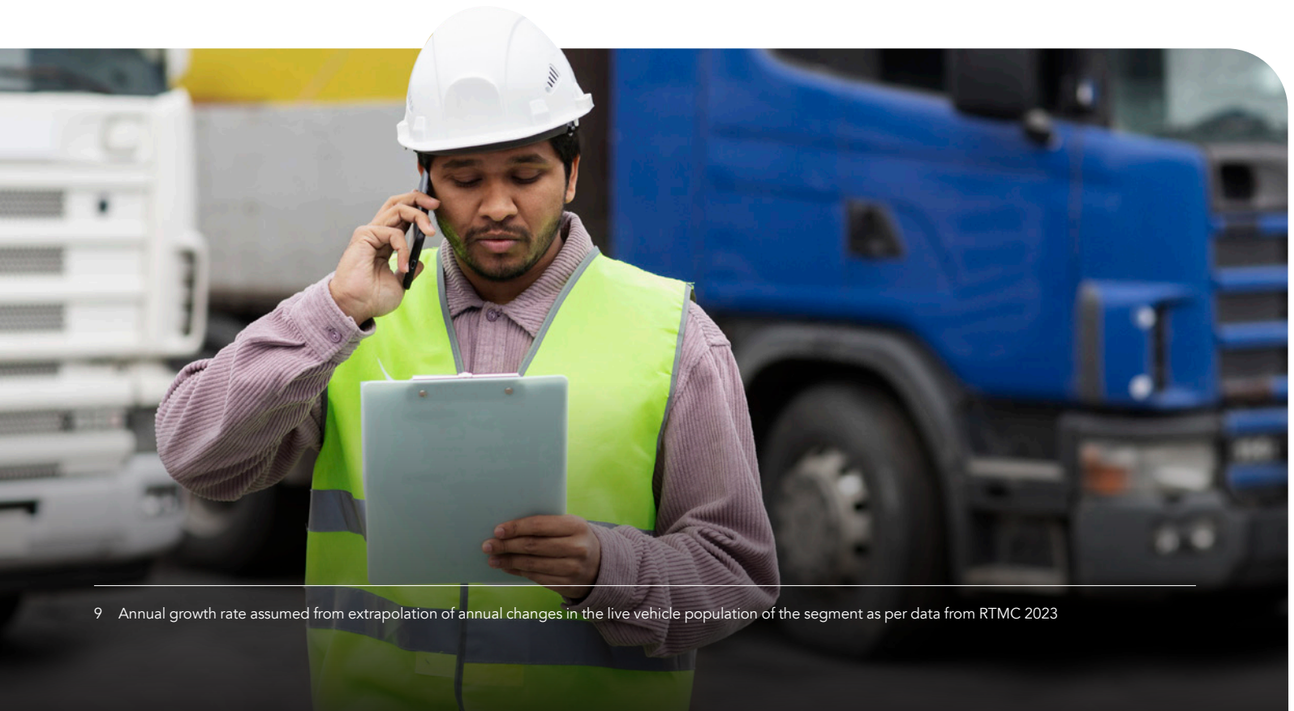


Figure 16: Live population heavy duty trucks and projected market size for 2024 to 2030[9]
(Source: RTMC 2023, projections by the author)



9 Annual growth rate assumed from extrapolation of annual changes in the live vehicle population of the segment as per data from RTMC 2023

As of 2023, the number of LDVs registered in South Africa was 2 693 721 (RTMC, 2023) as shown in Figure 17 which presents the live population of light delivery since 2015 and projects it to 2030. The current estimated cost of an electric LDV suitable for urban deliveries is R800 000.

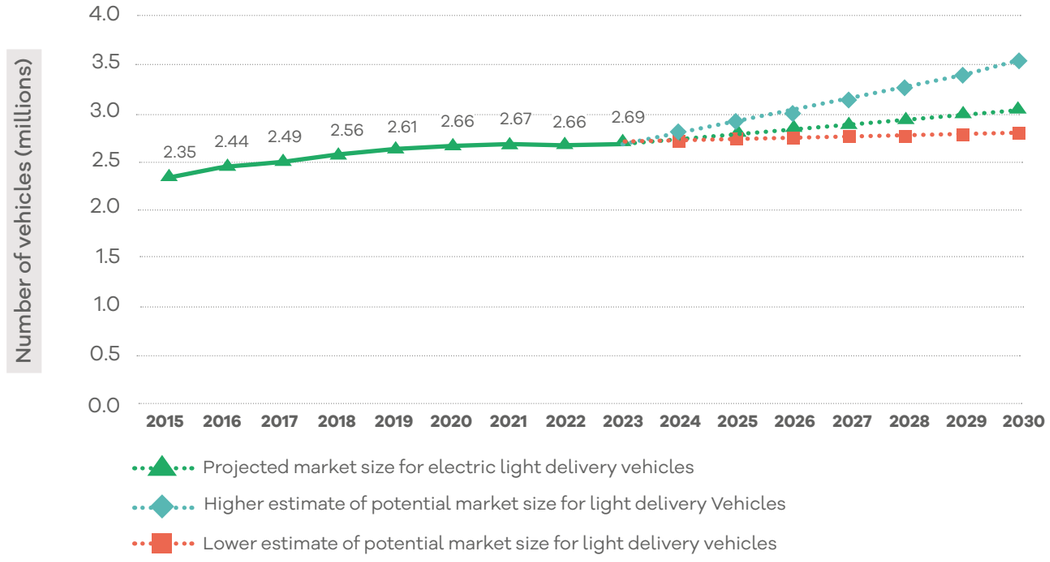


Figure 17: Projected market size for electric LDVs 2024 to 2030[10]
(Source: RTMC 2023, projections by the author.)

Table 10 shows the estimated market size for electric trucks and LDVs in South Africa.

Table 10: Market size for electric trucks and LDVs in South Africa

ELECTRIC TRUCK MARKET SIZE	ANNUAL MARKET SIZE (NUMBER OF VEHICLES)	MARKET SIZE
Electric truck market size 2024	3 600	R25.2 billion
Electric truck market size by 2030	3 800	R26.6 billion
ELECTRIC LDV MARKET SIZE	**ANNUAL MARKET SIZE (NUMBER OF VEHICLES)**	**MARKET SIZE**
Electric LDV market size 2024	47 000	R37.6 billion
Electric LDV market size 2030	52 000	R41.6 billion

10 Annual growth rate assumed from extrapolation of annual changes in the live vehicle population of the segment as per data from RTMC 2023.

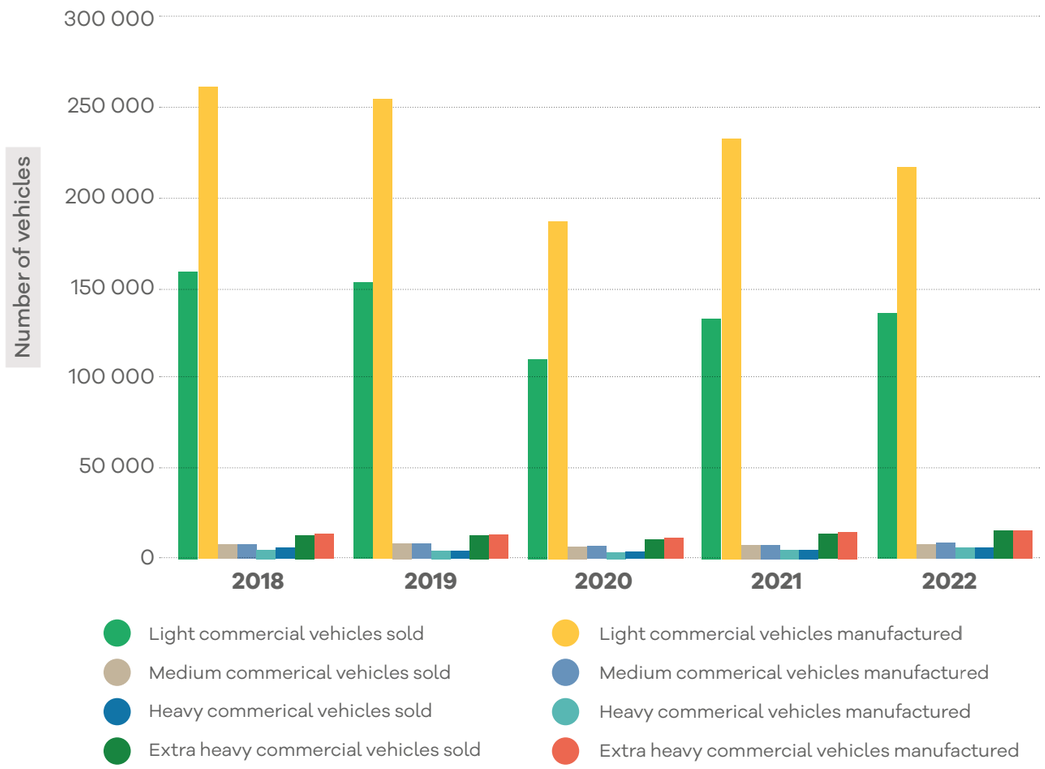


Figure 18: Number of commercial vehicles sold compared to number of commercial vehicles manufactured in South Africa 2018 to 2022 (Source: AIEC 2023)

2.3.3 MARKET DRIVERS

2.3.3.1 Growing cost competitiveness due to rising fuel prices

There is a strong business case for the electrification of LDVs in South Africa, when replacing petrol or diesel LDVs and the average annual mileage is around 25 000 km a year and above, as can be seen from Figure 19. At this annual mileage, the combined CAPEX plus operational cost is lower over a period of 10 years for an electric LDV compared to a comparable petrol ICE LDV.[11]

11 A 10% annual increase in the cost of electricity and petrol has been factored into the OPEX calculations

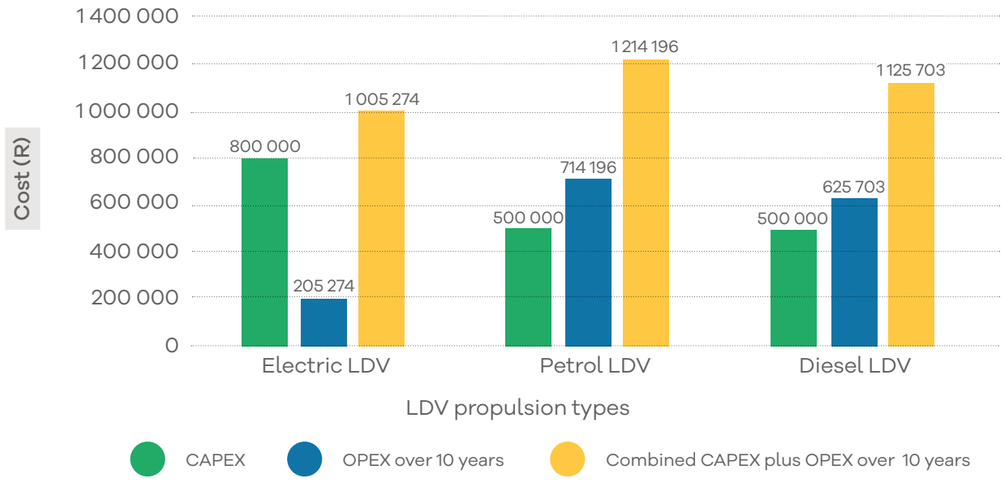


Figure 19: Business case for the electrification of LDVs in the case of petrol LDVs and assuming a mileage of 25 000 km per year[12]

For heavy duty electric trucks, a minimum annual mileage of 85 000 km a year is required for a strong business case as shown as depicted in Figure 20. At this annual mileage, the combined CAPEX plus operational cost of an electric heavy duty truck is lower over a ten-year period compared to a diesel ICE truck.

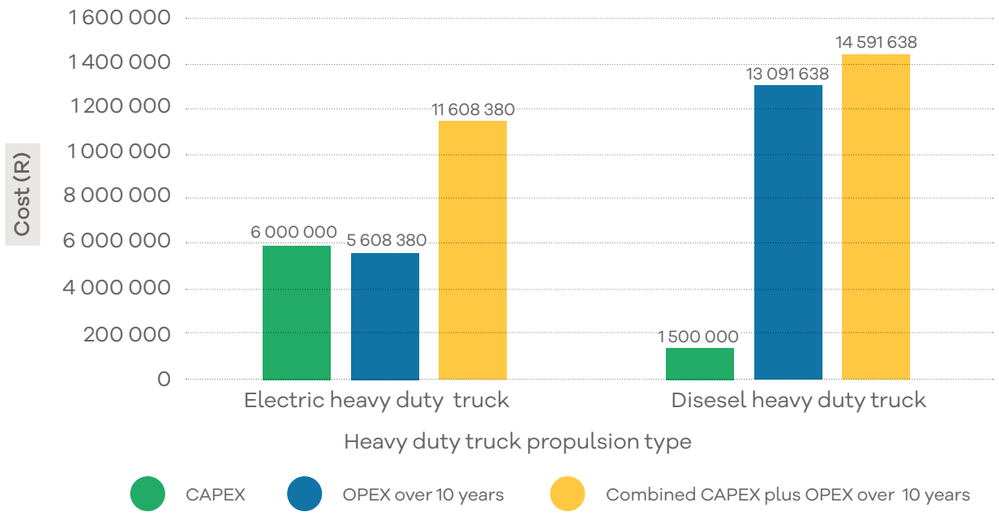


Figure 20: Business case for the electrification of heavy duty trucks assuming a mileage of 85 000 km per year

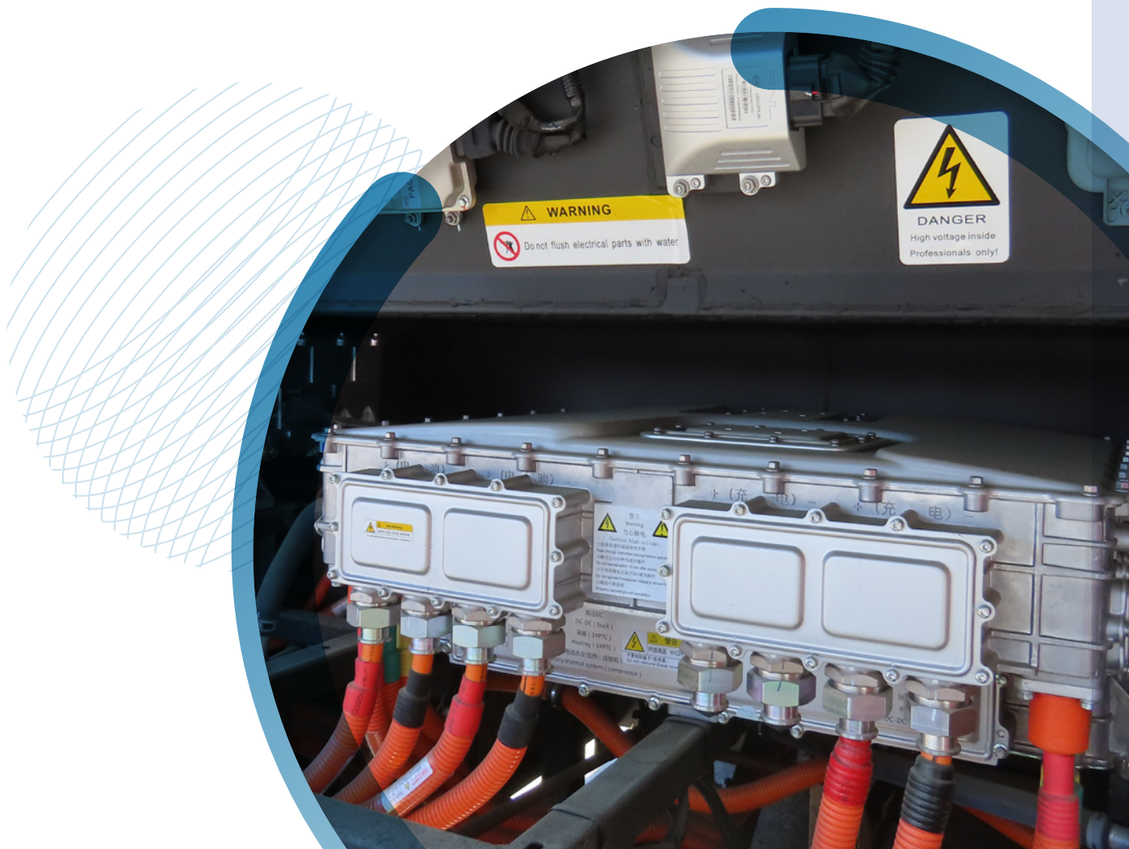
12 A 10% annual increase in the cost of electricity and diesel has been factored into the OPEX calculations

2.3.3.2
Feasibility of local assembly and existing component supply chain

South Africa has existing commercial vehicle body building manufacturing capacity that could be transitioned towards the manufacturing of electric commercial vehicles using imported electric truck chassis. The electric truck components that are currently available in the South African market are shown in Table 11.

Table 11: Local component availability in the electric truck and LDV manufacturing value chain

COMPONENT TYPE	AVAILABILITY IN SOUTH AFRICA
BMS	Yes
Lithium-ion cell manufacturing	No
Battery pack assembly	Yes
Composite materials	Yes
Steel components	Yes
Electric motor	No
Automotive glass	Yes
Wiring Harness	Yes
Seating	Yes
Tyres	Yes



2.3.4
MARKET BARRIERS

2.3.4.1
Limited availability of financing mechanisms

The main market barrier for the electrification of the road-based freight and logistics industry is the high upfront CAPEX cost of the electric heavy duty trucks and LDVs which are currently on the South African market. The technology is still new to the local market and will take some time to mature before retail prices begin to come down. These vehicles are also mostly imported and hence attract import duties and ad valorem taxes which contribute towards the high cost barrier. There has been significant movement in the South African market with regards to the implementation of EV-as-a-service, or leasing models for electric heavy duty trucks and LDVs, such as panel vans and pick-up trucks. This is a direct market response to the high CAPEX cost of acquiring these vehicles and the demand for fuel savings from the industry. However, this is still an emerging trend with limited financing mechanisms available for the electrification of road-based freight and logistics.

2.3.4.2
Limited charging infrastructure

The freight and logistics industry has unique operational requirements and will require its own EV charging infrastructure separate to what is being developed for the electric private passenger vehicle industry. The existing ICE trucking industry already makes use of its own dedicated refuelling stations along intercity road-freight corridors, and this will be mirrored with the EV transition. In Europe, a MW charging standard has emerged for the electric heavy duty trucking industry. With South Africa's current energy security situation, it is unlikely that this will be implemented locally in the short- to medium-term.

2.3.4.3
Energy security

Increased levels of loadshedding in 2023 have increased energy security concerns around the electrification of freight and logistics in South Africa. Fleet management companies who have piloted electric LDVs and heavy duty trucks in the South African market in 2023 have attempted to pair this deployment with rooftop solar PV and solar carports. Substantially more investment in large scale renewable energy and grid infrastructure will be required to support the growth of electric trucks and LDVs in the South African freight and logistics industry.

2.4 Local manufacturing of electric private passenger vehicles

There is a medium-term investment opportunity for the local manufacturing of EVs in South Africa. EV manufacturing has the largest economic impact with regards to investment and job creation in the EV value chain. The private passenger vehicle market is the largest vehicle market in South Africa and globally, and therefore is a strategic sector to focus on with regards to local EV manufacturing for local consumption and export. The dtic released the Electric Vehicle White Paper in December 2023 (dtic 2023), which proposes tax reductions and exemptions and government financial incentives to support the existing automotive manufacturing industry to enable the local manufacturing of EVs. The first battery EVs are expected to be manufactured in South Africa in 2026.

The strategic policy document has undergone significant stakeholder consultation and contains ten key policy goals and 16 unique and distinct policy actions that will be implemented between 2024 and 2035 to support of the development of cost-competitive EV productive capacity in South Africa (ten policy actions) and to support the development of a cost competitive local market for EVs (six policy actions): The ten policy actions in support of local productive capacity are quoted below (dtic 2023):

1. "An increase in levels of investment and funding, including the development of improved cost-effective incentive support to be announced through the publication of new Automotive Investment Scheme guidelines. The higher levels of investment funding are intended to catalyse investment in EV automotive assembly and component manufacturing;
2. Facilitation and development of an electric battery regional value chain, including raw material refining; battery active materials and component production; and cell manufacturing. This is to deepen the South African Development Community region's participation in the automotive value chain;
3. The introduction of a temporary reduction on import duties for batteries in vehicles produced and sold in the domestic market, to improve cost competitiveness;
4. Securing or maintaining duty-free export market access for vehicles and components produced in South Africa to support the resilience of the industry;
5. Leveraging research and development tax incentives to deepen domestic value addition;
6. Commercialising green hydrogen production in South Africa as a source of sustainable fuels;
7. Implementing energy reforms, including executing interim solutions for energy in partnership with industry;
8. Implementing reforms to network industries, including freight rail and ports;
9. Refurbishing the rail line between Gauteng and Ngqura to improve overall cost competitiveness; and
10. Developing an EV certification programme in collaboration with industry for skills development."

2.4.1
MACROECONOMIC CONTEXT

South Africa's key automotive export markets for private passenger vehicles in Europe and North America have either banned the sale of new ICE vehicles or are in the process of doing so. The EU is one key market that has banned the sale of new ICE vehicles by 2035, unless they run on carbon neutral e-fuels produced from green hydrogen or fossil-based sources with carbon capture. Figure 22[13] shows the countries which have announced some type of ICE vehicle ban.

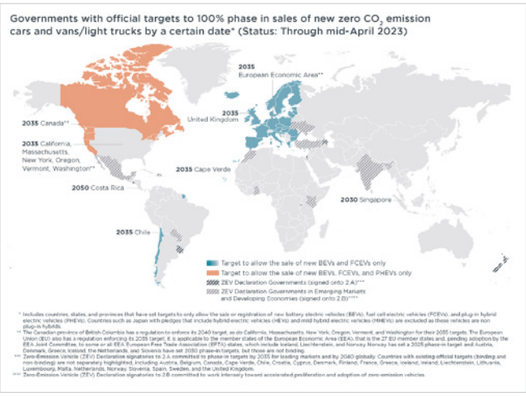


Figure 21: New ICE vehicle phase out targets by country as at October 2023
(Source: Zev Transition Council 2023)

VIEW ENLARGED MAP HERE

2.4.2 MARKET SIZE

The South African Automotive Masterplan (dtic 2018) aims for South Africa to achieve 1% of annual global automotive manufacturing output (mainly for export). According to the International Organisation of Motor Vehicle Manufacturers (2023), there were approximately 1.4 billion vehicles globally in 2023 with an annual private passenger vehicle production of 62 million vehicles. Therefore, a target of 1% of global automotive production would be 620 000 vehicles a year.

This apparent current market would be valued at R620 billion a year in electric private passenger vehicle production with an estimated unit value of R1 million for an electric passenger vehicle. The annual private passenger vehicle automotive production volume in South Africa in 2022 was 309 423. Assuming a 1% annual growth rate year on year from 2024 to 2030 in the global private passenger vehicle market, the projected global market size for private passenger vehicle manufacturing would be 66.5 million vehicles in 2030.

A local manufacturing market size of 1% of this global market would be 665 000 vehicles a year valued at R665 billion. Table 12 summarises the electric private passenger vehicle market size by number of vehicles and value.

Table 12: Electric private passenger vehicle market size

ELECTRIC PRIVATE PASSENGER VEHICLE MARKET SIZE	MARKET SIZE (NUMBER OF VEHICLES)	MARKET SIZE
Estimated market size in 2024 at 1% of global automotive production	620 000	R620 billion
Estimated market size in 2030 at 1% of global automotive production	665 000	R665 billion

Figure 22 shows the number of light passenger vehicles sold compared to those manufactured in South Africa from 2018 to 2022.

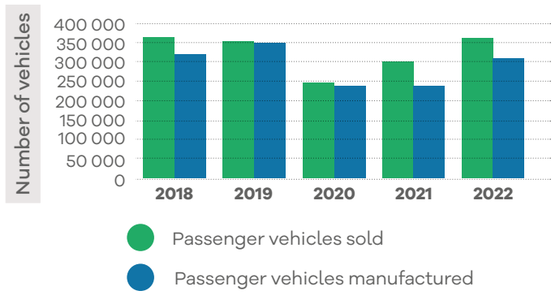


Figure 22: Number of light passenger vehicle sold compared to number of vehicles manufactured in South Africa 2018 to 2022

Figure 23 shows that global automotive production is centred in the Asia-Oceania region which is a driver towards the diversification of global supply chains as the industry transitions to EVs.

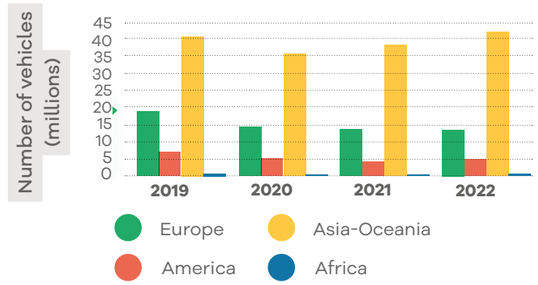


Figure 23: Global light passenger vehicle production by market of origin from 2019 to 2022.
(Source: International Organisation of Motor Vehicle Manufacturers 2023)

2.4.3 MARKET DRIVERS

There are a number of key drivers for the manufacturing of electric private passenger vehicles in South Africa. These include a global drive to diversify manufacturing away from established hubs in Asia, the competitive cost of labour and currency exchange rate which favours manufacturing for export, and the availability of key minerals, which are discussed in more detail below. The ten policy action points in the new Electric Vehicles White Paper (outlined earlier) are expected to play a stronger role in future.

2.4.3.1 Diversification of global supply chains away from established manufacturing hubs in Asia

Multi-national companies are looking to diversify their manufacturing supply chains due to lessons learned during the COVID-19 pandemic around over reliance on Chinese manufacturing, which created severe supply chain issues during periods of pandemic lockdown. According to published concepts and frameworks by Gartner, Bain & Co and AT Kearney, an evolving supply chain trend is the China Plus One Strategy which is a mechanism for strategic risk mitigation to balance cost efficiencies versus business continuity. The rationale for the adoption of this strategy by EVs OEMs is centred on three principles. First, the mitigation of risks such as production delays and potential IP theft. Second, the avoidance of additional costs related to US-China trade tariffs. Third, greater flexibility in adapting to demand variability across global markets. The benefits of this approach are reduced risk of component shortages, mitigation of potential disruptions in production schedules, tax savings from localised production versus import duties, and faster regional access to the African market. As South Africa has a well-established automotive manufacturing sector, such diversification is expected to open opportunities for growth should South Africa retain and enhance its attractiveness as an automotive manufacturing centre.

2.4.3.2 Competitive cost of labour and currency exchange rate which favours manufacturing for export

According to the International Labour Organisation's Global Wage Report 2022 to 2023 (ILO 2023), South Africa's average wage index is quite competitive compared to most emerging markets in the G20. Figure 24 below shows that only Saudi Arabia, Brazil, and Mexico have a lower average wage index than South Africa, which is a competitive advantage with regards to becoming a global manufacturing destination for electric private passenger vehicles. South Africa has a lower average wage index than China, Turkey, India, the Russian Federation, and Indonesia.

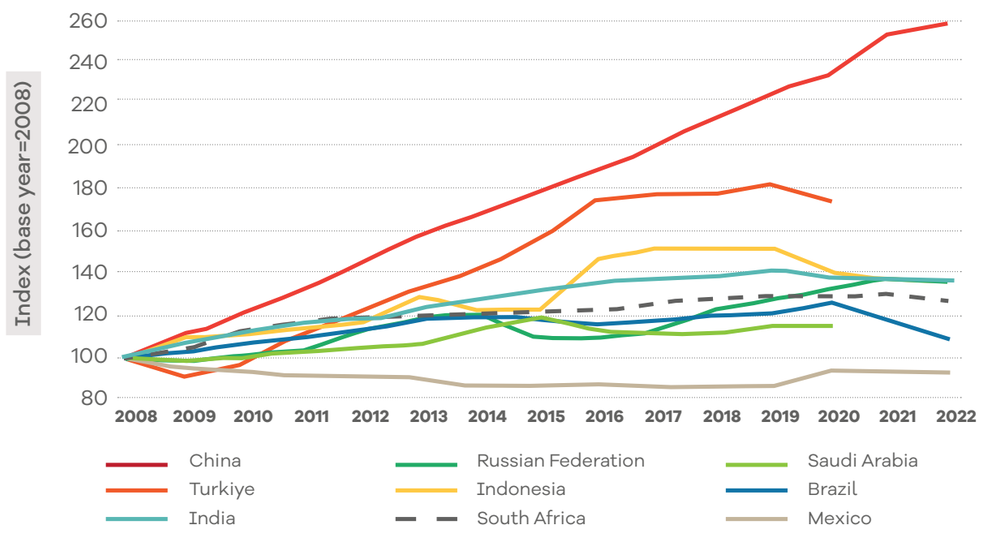


Figure 24: South Africa's average real wage index compared to other emerging economies in the G20
(Source: ILO 2023)

2.4.3.3
Duty free market access to key automotive export markets

South Africa has duty free access to the USA export market through the AGOA free trade agreement. It is an important stimulus for the creation of EV manufacturing supply chains in Africa through the market stimulation of a strong US market that is looking to diversify supply chains away from China. South Africa could leverage this global strategic advantage to develop a local EV manufacturing capacity. The AfCFTA can potentially also create the opportunity for regional trade and the establishment of regional supply chains. Figure 25 shows the impact of AGOA on the development of a regional automotive component supply chain in South Africa. Imports of copper, natural rubber, and ignition wiring are some of the major imports into South Africa from neighbouring African countries, which are used to manufacture automotive components exported to the USA under AGOA. According to the National Association of Automotive Component and Allied Manufacturers (NAACAM 2023) there was approximately R24 billion in automotive exports from South Africa to the USA in 2022. Many of these supply chains consisting of components such as tyres and copper wiring are also used in the EV manufacturing value chain and are currently exported to the USA under AGOA.

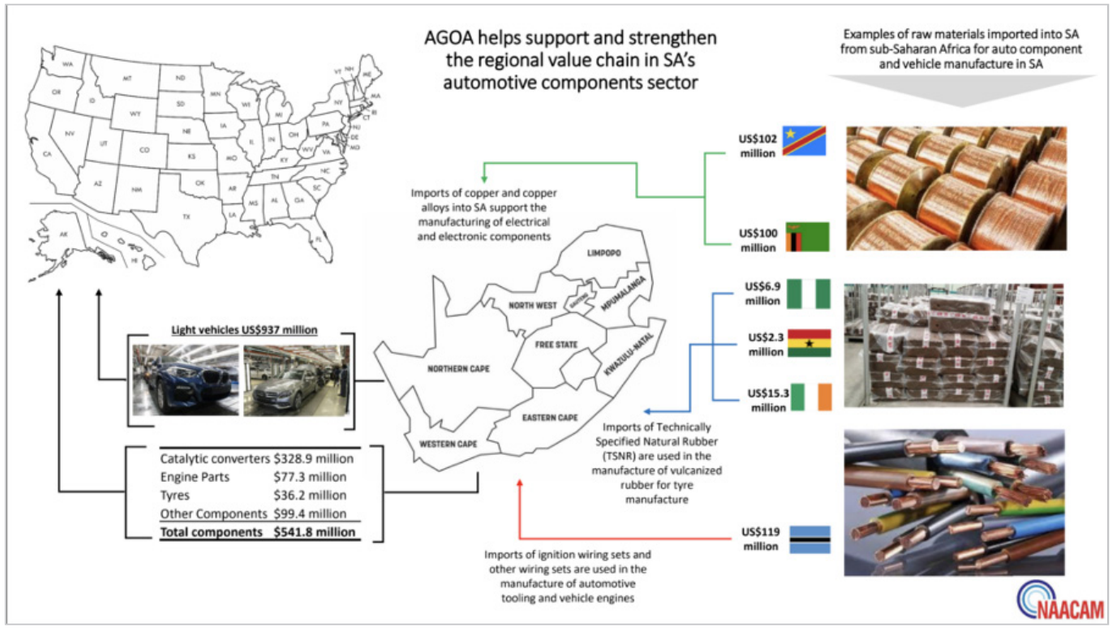
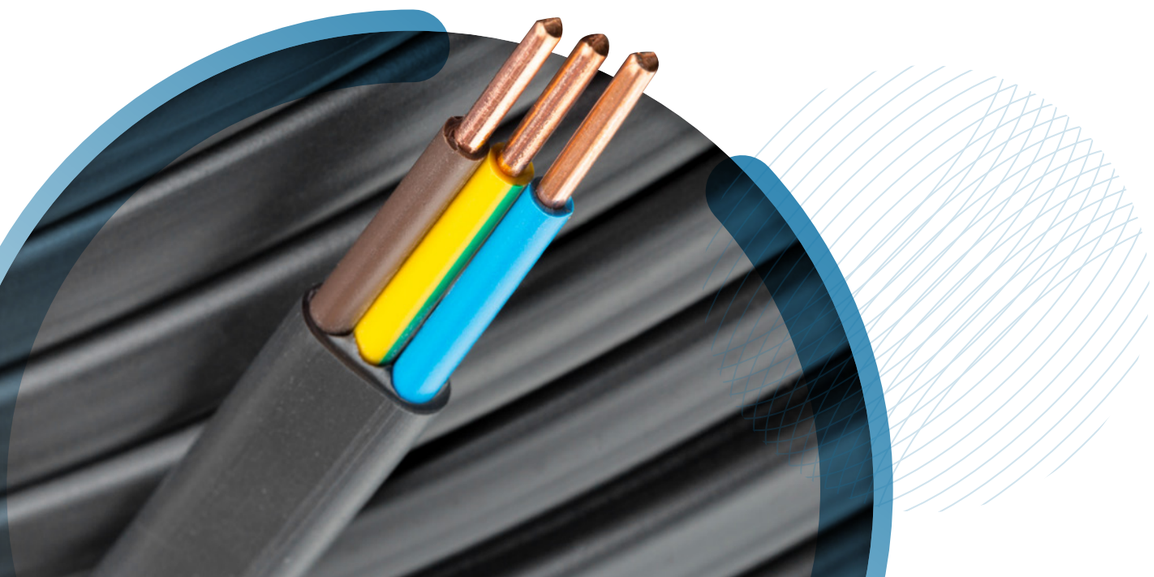


Figure 25: Impact of AGOA on the regional African automotive component value chain (Source: NAACAM, 2023)



2.4.4
MARKET BARRIERS

2.4.4.1
Energy security concerns due to loadshedding

The frequent instances of loadshedding during 2023 have had an impact on productivity and led to uncertainty with regard to energy security in large industries in South Africa. The manufacturing of electric private passenger vehicles in South Africa will require a stable electricity grid and large amounts of renewable energy as global automotive OEMs look to greening the production of the EV supply chain. South Africa has a growing investment opportunity for the development of large-scale renewable energy plants, such as wind and solar, to meet the future energy demands of the automotive manufacturing industry as it transitions towards the local manufacturing of electric private passenger vehicles. Significant investments in grid infrastructure will be required to bring these large-scale renewable energy projects online, particularly in the automotive hub of the Eastern Cape, which hosts the majority of automotive manufacturing in South Africa.

2.4.4.2
Port and logistics bottlenecks

Port and logistics bottlenecks have also contributed to lower efficiency with regards to the movement of resources and products in the industrial sector in South Africa in 2023. To alleviate congestion and delays, Transnet is looking at the potential privatisation of certain ports such as the port of Cape Town and developing public-private partnerships for the operation of other ports in South Africa such as the Port of Durban. The EV White Paper (dtic 2023) has listed an objective of refurbishing the rail line between Gauteng and Port of Ngqura, also known as the Port of Coega, to improve overall cost competitiveness and efficiency of freight rail logistics. This port is of significance in terms of automotive manufacturing as the Eastern Cape province is the largest automotive manufacturing and export hub in South Africa.

3

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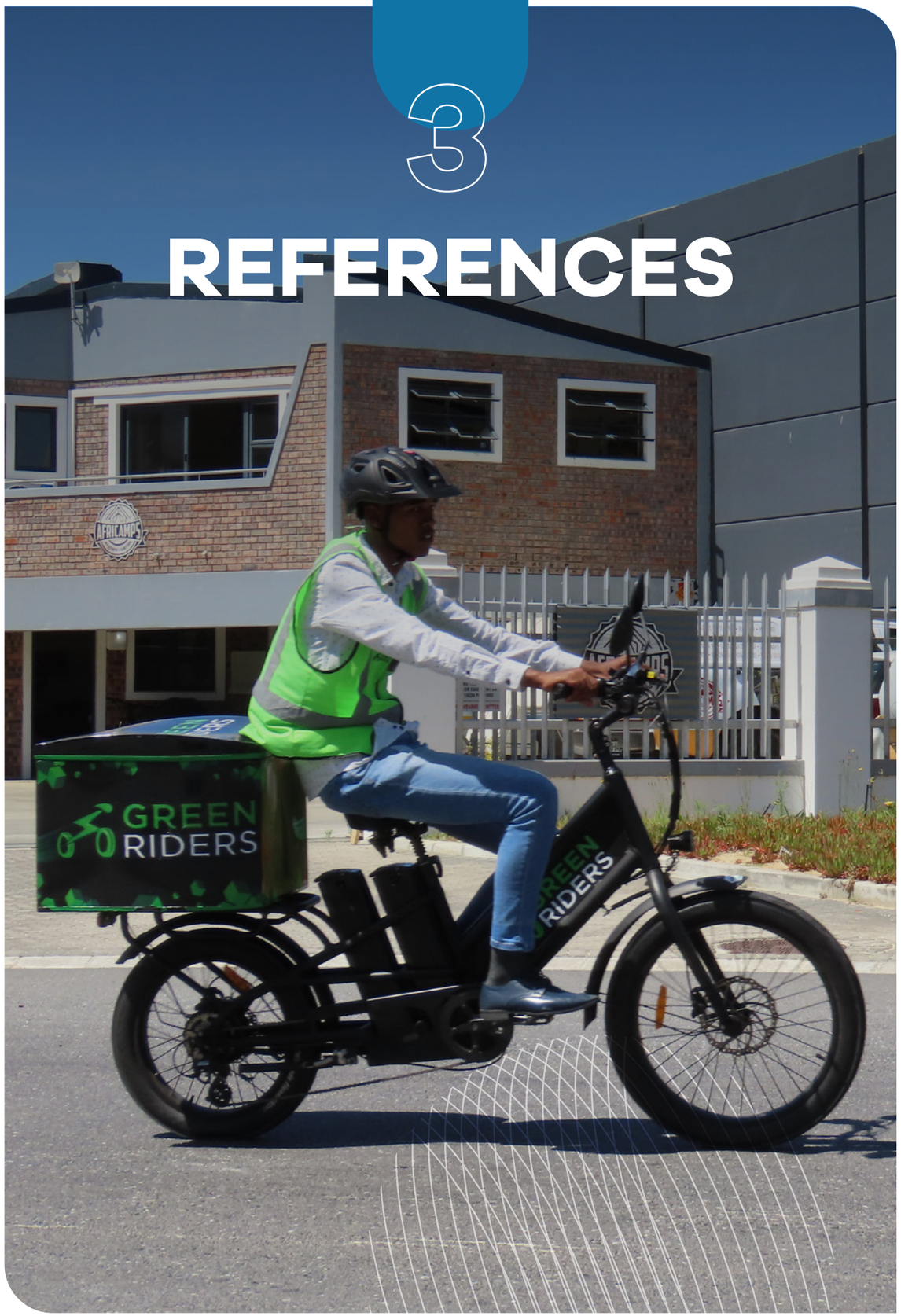

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This year we've updated our 2024 MIRs to create new hybrid reports. In order to make our printed reports shorter, and to keep up with policy changes, we've moved the sector overview and policy sections, which were traditional chapters in our MIRs, online. These sections will now be updated in real time and can be accessed by clicking on the button below. Our PDF reports and printed booklets have been shortened to focus more directly on the emerging opportunities in the sector. We hope these changes improve your reading experience.

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