



Electric Vehicles

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2019

Market Intelligence Report

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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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18 Roeland Street, Cape Town, 8001, South Africa

Author: Khanyiselo Kumalo
Editorial and review: Sarah O'Carroll, Jack Radmore, Salomé Bronkhorst, Bruce Raw and Nicholas Fordyce
Images: Jaguar, Hiten Parmar, Mellow Cabs, BMW, Green Scooter, GreenCab and Dr Ji Shan
Layout and design: Tamlin Lockhart Art Direction

Contents

Executive summary	2
1. Introduction	4
2. Global industry overview	6
3. South African industry overview	8
3.1. South African automotive market supply	8
3.2. South African automotive market demand	10
3.2.1. Commuter behaviour and travel patterns	10
3.2.2. Consumer behaviour	12
3.3. An overview of the development of SA's EV industry	12
3.4. The South African EV value chain	14
3.5. Potential impacts of EV market growth on the ICE value chain and economy	15
3.6. Market sizing and dynamics	17
3.6.1. The EV passenger vehicle market	17
3.6.2. The public and industrial EV market	18
3.6.3. Charging infrastructure and network	18
3.7. Market drivers: EV and charging infrastructure	20
3.7.1. Macroeconomic drivers	20
3.7.2. Local demand drivers	20
3.8. Market barriers	22
3.8.1. Products not fit for the South African market	22
3.8.2. High import duties	22
3.8.3. Lack of policy certainty	22
3.8.4. Lack of local skills to facilitate market growth	23
3.8.5. Lack of enabling finance terms	23
4. Policy and regulation	24
4.1. Automotive Production & Development Programme (APDP)	24
4.2. The South African Automotive Masterplan (SAAM) 2021 – 2035	24
4.3. Green Transport Strategy (GTS) for South Africa: (2018 – 2050)	25
4.4. Procurement Policy Framework Act (PPFA)	26
5. Market opportunities	28
5.1. Passenger vehicle manufacturing	28
5.2. Manufacturing and increased uptake of electric buses	28
5.3. Lithium ion batteries (LIB) production	29
6. Funding and incentives	32
7. The Western Cape: Africa's growing greentech hub	34
8. GreenCape's support to businesses and investors	38
9. References	42

List of figures

Figure 1: Cumulative global passenger EV sales, current & forecast	6
Figure 2: Manufacturing transport hubs in SA	10
Figure 3: Commuter travel patterns indicated by the number of annual travel trips by trip type	11
Figure 4: Modal split of work travel in South Africa by province	11
Figure 5: Timeline of market entry by automakers	13
Figure 6: EV value chain in SA	15
Figure 7: Illustration of gains and losses in the ICE value chain due to EV uptake	15
Figure 8: Petrol & diesel consumption from 2007 to 2016	16
Figure 9: Passenger electric vehicle sales in South Africa: 2013 – 2018	17
Figure 10: Active & incoming charging infrastructure stations in SA	18
Figure 11: Year on year fuel prices from 2007 to 2017	21
Figure 12: LIB price/kWh over time	21
Figure 13: LIB manufacturing value chain	29
Figure 14: GreenCape's focus areas	39

List of tables

Table 1: An overview: drivers and barriers	3
Table 2: Key market segment definitions and vehicle types	4
Table 3: Private transport representation in SA	9
Table 4: The foundations of the EV market: 1970s to 2013	13
Table 5: Benefits and drawbacks of EV market growth and fewer oil imports	16
Table 6: Overview of South Africa's conventional ICE vehicle market: 2017/2018	17
Table 7: OEMs and Industry & distributors' DC charging technology	19

List of acronyms and abbreviations

AC	Alternating Current
AIS	Automotive Investment Scheme
APDP	Automotive Production & Development Programme
AV	Autonomous Vehicles
BFP	Basic Fuel Price
BRT	Bus Rapid Transit
CO ₂	Carbon Dioxide
CSIR	Council for Science & Industrial Research
DC	Direct Current
DoE	Department of Energy
DoT	Department of Transport
DST	Department of Science and Technology
E-buses	Electric Buses
EC	Eastern Cape
ES	Energy Storage
EU	European Union
EV	Electric Vehicle
FDI	Foreign Direct Investment
GHG	Greenhouse Gases
GP	Gauteng
GTS	Green Transport Strategy
ICE	Internal Combustion Engine
IDC	Industrial Development Corporation
IDZ	Industrial Development Zone
ITAC	International Trade Administration Commission
Km/a	Kilometres per annum
KZN	KwaZulu-Natal
LCV	Light Commercial Vehicles
LFP	Lithium Iron Phosphate
LIB	Lithium Ion Battery
MIR	Market Intelligence Report
NCA	Lithium Nickel Cobalt Aluminium Oxide
NHTS	National Household Transport Survey
NMC	Nickel Manganese Cobalt Oxide
OEM	Original Equipment Manufacturer
PAYS	Pay As You Save
PI	Production Incentives
PJ/a	Petajoules per annum
PPPFA	Preferential Procurement Policy Framework Act
PRCC	Production Rebate Credit Certificates
PV	Photovoltaic
RAF	Road Accident Fund
RE	Renewable Energy
SA	South Africa

List of acronyms and abbreviations

SAAM	South African Automotive Masterplan
SADC	Southern African Development Community
SEZ	Special Economic Zone
dti	Department of Trade and Investment
TIA	Technology Innovation Agency
US	United States
UWC	University of the Western Cape
VAA	Vehicle Assembly Allowance
VALA	Volume Assembly Localisation Allowance
WC	Western Cape

Exchange rate used

An exchange rate of 1 USD = R14.10 was used.

Executive summary

Globally, the momentum for electric mobility has increased exponentially over the last seven years. Global sales of electric vehicles (EVs) are projected to reach five million in 2019, up from one million in 2015. This global shift is primarily driven by emission reduction commitments, growing urban air pollution concerns and continued crude oil price volatility.

While South Africa (SA) has not yet joined the ranks of those countries experiencing a steep rise in EV uptake, the country, much like others, has the same obligations where emissions and energy security are concerned.

South Africa already has a strong market for the manufacturing of internal combustion engine (ICE) vehicles. The automotive sector is a key player in the country's economic landscape. Total revenue from this sector was more than R500 billion (\$35.6 billion) in 2017, with the industry employing ~900 000 workers. SA is considered as a second-tier market producing over 600 000 ICE vehicles in 2018, predominantly for the export market.

For South Africa, a thriving EV market supported by local manufacturing holds the promise of economic growth and job creation. It will also counteract the inevitable decline in demand for ICE vehicles globally.

There are a number of emerging opportunities in SA's nascent EV market:

- **Passenger vehicle manufacturing:** There is a medium- to long-term opportunity for SA to be used as a manufacturing hub for electric

passenger vehicles for the export market, with manufacturing for the domestic market being a longer term opportunity as demand increases. This opportunity is particularly attractive to Greenfield investors.

- **Electric bus manufacturing:** Public transport presents the best business case for electrification. This is especially true for the bus market as it already produces buses largely for the domestic market. Buses are designated in SA and are subject to between 70% and 80% local content requirements by the dti for public procurement. The assembly of buses further enjoys the benefit of duty-free importation of all driveline components. SA assembled 1 131 units in 2017 with 54 (4.7%) of those destined for the export market. While this is a fairly flat market in SA, there is scope to revitalise this space. Incorporating e-bus manufacturing is a more economically viable way of achieving this revitalisation.
- **Lithium ion battery (LIB) production:** South Africa is an attractive manufacturing destination for lithium ion batteries because of its existing battery manufacturing (and recycling) industry. This is coupled with South Africa's mining sector's ability to provide some of the raw materials required for the nickel-manganese-cobalt (NMC) cathode battery chemistry, especially manganese. SA possesses 78% of the world's manganese. In addition, other raw materials required in the cathode are mined in Sub-Saharan Africa.

Table 1 provides an overview of the major drivers and barriers that are also discussed in this report.

1

Introduction

Globally, the momentum for electric mobility has increased exponentially over the last seven years. It took five years for electric vehicle sales globally to reach one million units (in 2015). This figure doubled in just over a year, and it is projected that five million electric vehicles will be sold in 2019.

This global shift is primarily driven by governments on the back of emission reduction commitments, increasing air pollution concerns in cities and the continued volatility of the crude oil price. In order to drive the uptake of electric vehicles, governments have implemented financial and non-financial incentives to make electric vehicles an attractive purchase.

- **Emission reduction commitments:** The transport sector has been identified as a key contributor to global emissions because of its reliance on fossil fuels. The Paris Agreement obliging signatories to reduce their emissions, was signed by 195 countries. Electric vehicles provide an alternative to traditional internal combustion engines as they can be powered by renewables.
- **Air quality concerns in cities:** Of global carbon dioxide emissions, 15% are attributed to the transport sector. Increasing motorisation in cities has resulted in increasing air pollution concerns. Because electric vehicles produce zero direct emissions they are able to assist in improving air quality in cities.

- **Continued volatility of the crude oil price:** Reliance on fossil fuels in the transport sector poses a risk to countries because of the volatility of the crude oil price. As a result, many countries are seeking alternatives that will reduce their crude oil import bill. Because electric vehicles can be powered by local energy sources, they are becoming increasingly attractive.

While South Africa has not yet joined the ranks of those countries experiencing a steep rise in uptake of electric vehicles, the country, much like others, has the same obligations where emissions are concerned. Energy security for the transport sector is equally attractive. For South Africa, a thriving electric vehicle market supported by local manufacturing holds the promise of economic and investment growth and job creation.

This report provides potential investors and businesses with an overview of the state of the electric vehicle market in South Africa. It highlights emerging opportunities in the electric vehicle market, and also notes barriers and risks in the market. Although the market can be segmented in several ways, based on the context of the South African market, the key market segments discussed in this report are: private, public and industrial. A definition for each segment is provided in [Table 2](#), as well as the types of vehicles included in each category.

Table 1: An overview: drivers and barriers

Market drivers	Market barriers
<p>Macroeconomic drivers</p> <ul style="list-style-type: none">■ South Africa's commitment to reducing emissions■ The potential loss of automotive trade markets <p>Local demand drivers</p> <ul style="list-style-type: none">■ Climate conscious consumers■ Rising fuel costs■ Energy storage innovations■ Falling cost of electric vehicles■ Reduced range anxiety	<ul style="list-style-type: none">■ Products not fit for the South African market■ High import duties■ Lack of policy certainty■ Lack of local skills to facilitate market growth■ Lack of enabling finance terms

Table 2: Key market segment definitions and vehicle types

Market segment	Definition	Vehicle types
Private transport	It refers to privately owned and operated vehicles. These vehicles are predominately used for personal travel and daily commuting.	<ul style="list-style-type: none"> ■ Single occupancy vehicles
Public transport	It refers to transport of passengers by group travel systems available for use by the general public. These are typically scheduled, have dedicated routes and charge a fee for each trip.	<ul style="list-style-type: none"> ■ City buses ■ Commuter buses ■ Minibus taxis ■ Metered taxis
Industrial transport	This refers to vehicles used in the commercial industry to move heavy goods and materials.	<ul style="list-style-type: none"> ■ Forklifts ■ Trucks

While there are a number of vehicle segments where the application of electric mobility is plausible, this report will focus on three key investment opportunities:

- The uptake and manufacturing of electric buses (e-buses);
- Lithium ion battery manufacturing; and
- Local manufacturing of private vehicles and components for the export, and later domestic, markets.

Additional markets that are affected (directly or indirectly) by the emerging market of EVs, but are not discussed in this report, include:

- the impact of electric vehicles on liquid fuel dynamics;
- grid impacts of electric vehicles;
- the role of electric vehicles in energy storage;
- electric mobility as a service
- autonomous electric vehicles; and

- new models of vehicle ownership and the role that commercial banks can play in the market.

In what follows, this report provides potential investors and businesses with an overview of the state of the South African EV market (Section 3). It then highlights market drivers (Section 3.7), market barriers (Section 3.8), relevant policies and regulations (Section 4), and emerging opportunities in the South African EV market (Section 5). The sections that follow highlight finance and incentives (Section 6), and the case for the Western Cape as a greentech hub for Africa (Section 7). Section 8 outlines GreenCape’s work and the opportunities for investors across the South African and Western Cape green economy.

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- local manufacturing and economies of scale, thereby reducing the cost of vehicles; and
- extensive charging infrastructure networks.

Europe and the US are also leading global markets, driven by financial and non-financial incentives for manufacturers and consumers, as well as each government's commitment to developing enabling policy environments.

Although the market is seeing rapid growth, there are key factors that could slow down the growth of the EV market. These include:

- battery prices not decreasing as expected;
- oil prices falling further instead of increasing; and
- limited range and charging infrastructure networks.

Without incentives and subsidies, the aforementioned barriers would result in delayed EVs and ICE vehicles cost parity, thereby limiting rapid adoption.



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3

South African industry overview

The emerging EV market represents substantial opportunities for businesses and investors active and/or interested in the sector.

This section will discuss how the EV market has unfolded within the SA context.

3.1. South African automotive market supply

The automotive sector is a key player in the country's economic landscape. According to the 2018 Automotive Export Manual (AEM), the revenue from the automotive sector was more than R500 billion (\$35.6 billion) in 2017, with the industry employing ~900 000 skilled, semi-skilled and unskilled employees. The automotive sector remains the largest manufacturing sector in the

country as a second-tier market, producing over 600 000 ICE vehicles in 2018, predominantly for the export market.

Since the stabilisation of the sector in 1995 in the post-Apartheid era, the market has expanded to include all major global brands, with several brands also manufacturing locally. [Table 3](#) provides an overview of known original equipment manufacturers (OEMs), importers, and distributors in each market segment, and a map that shows where manufacturing facilities are located in South Africa.



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Table 3: Private transport representation in SA

Original equipment manufacturers
BMW (South Africa (Pty) Ltd
Ford Motor Company of Southern Africa (Pty) Ltd
Mercedes-Benz SA Ltd
Volkswagen Group South Africa (Pty) Ltd
Nissan South Africa (Pty) Ltd
Toyota South Africa Motors (Pty) Ltd
Isuzu South Africa
Importers and Distributors
Audi (VW Group)
European Automotive Imports South Africa (EAISA) (Pty) Ltd (Maserati)
FCA South Africa (Pty) Ltd (Fiat Chrysler Automobiles Group)
Jaguar Land Rover
Mini South Africa
Porsche
Volvo Car South Africa
Honda
Mahindra & Mahindra South Africa (Pty) Ltd
Mazda Southern Africa (Pty) Ltd
Mitsubishi Motors South Africa (MMSA)
Peugeot SA (Pty) Ltd
Renault South Africa (Pty) Ltd
Subaru
Suzuki Auto South Africa
Hyundai Auto South Africa Pty Ltd (MOTUS Group)
KIA Motors South Africa (Pty) Ltd
HVAL Motors South Africa (Pty) Ltd (HMSA)
TATA Motors South Africa

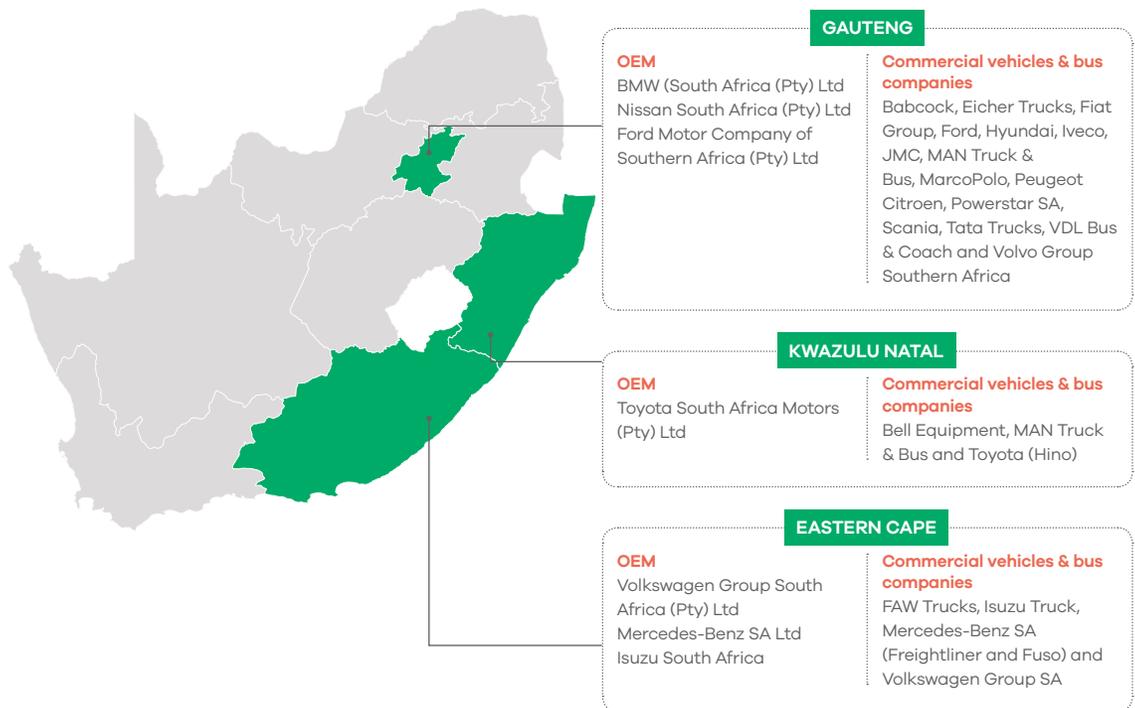


Figure 2: Manufacturing transport hubs in SA

Figure 2 highlights that SA has three key automotive manufacturing hubs located in the Eastern Cape province (EC), KwaZulu-Natal (KZN) and Gauteng province (GP). Although the EC does not experience high commuter patterns like the WC, KZN and GP, the EC has been an attractive manufacturing destination because of the incentives provided by the East London and Coega Industrial Development Zones (IDZs). All three transport hubs have commonalities in that they all harbour private, public and industrial transport manufacturing industries, as well as component companies that support them.

3.2. South African automotive market demand

Commuter behaviour and travel patterns as well as consumer preference all play an important role in shaping the automotive market demand in SA.

3.2.1. Commuter behaviour and travel patterns

There are more than 12 million vehicles on South Africa's road networks. Gauteng, KwaZulu-Natal and the Western Cape are the provinces with the highest vehicle sales and ownership. Uptake for EV is expected to grow in a similar geographic pattern as the incumbent vehicle market, based on a higher purchasing power in these provinces.

Figure 3 (NHTS 2013) shows commuter travel patterns in South Africa, based on data obtained from the National Household Transport Survey (NHTS) that was conducted in 2013. The survey revealed that education was the dominant reason for increased commute time in SA, with work trips being the secondary driver. Private transport holds a dominant modal share with 62.1%. This pattern of modal share is expected to continue into the future. The consistently high private transport modal share provides an indication that the EV sales growth will likely be led by private transport as well. This bears similarities to how EV uptake has grown in the three leading global markets (see Section 2).

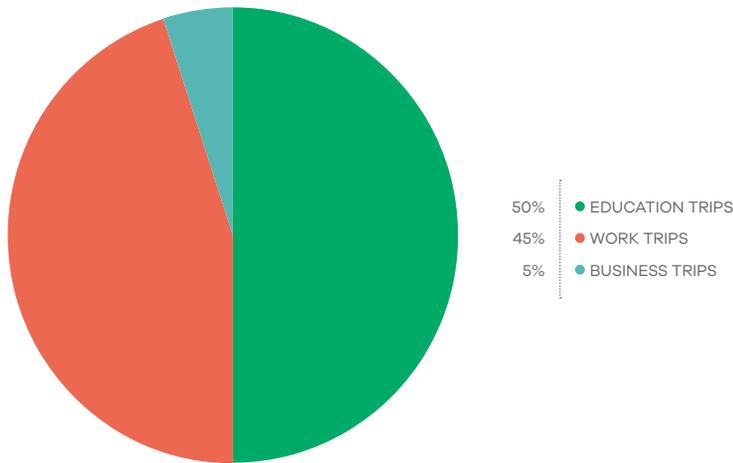


Figure 3: Commuter travel patterns indicated by the number of annual travel trips by trip type

The public transport share of the total market has increased marginally since 1995. Minibus taxis have been the dominant mode of choice for public transport users, marginally increasing their market share at the expense of trains and

buses. It is also worth noting that South Africa's population continues to increase and city residents are also travelling more than previously, causing the total number of trips to increase.

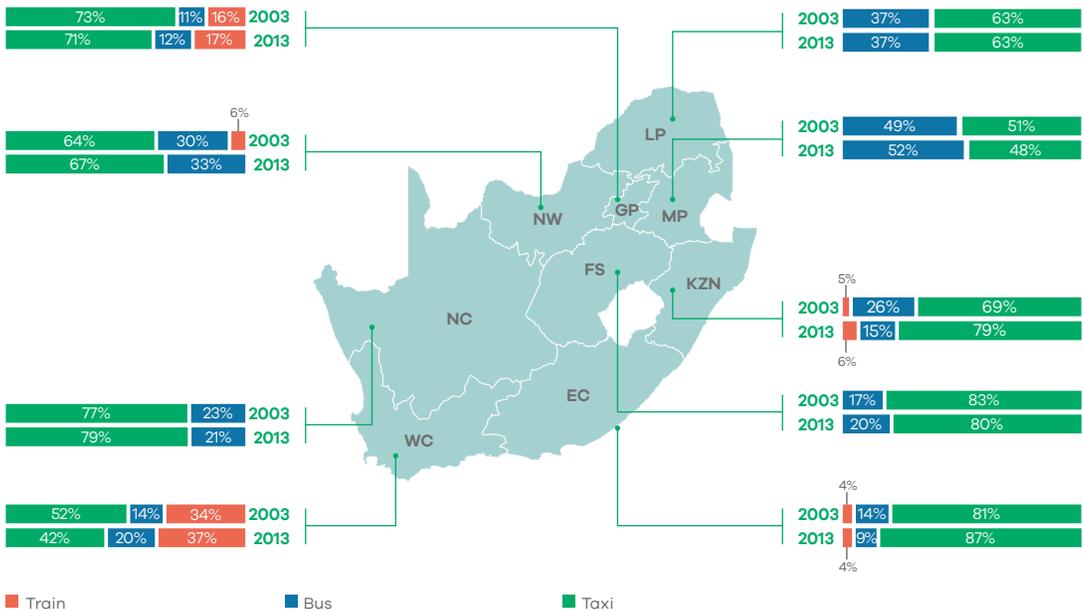


Figure 4: Modal split of work travel in South Africa by province

Figure 4 (NHTS 2013) is a comparison of how commuters have used public transport for work trips in 2003 and 2013. The figure shows that:

- **minibus taxis** are the dominating mode and this has increased in all provinces except for Gauteng and the Western Cape;
- **bus** usage has also marginally increased in almost all provinces; this number would also have increased substantially with the introduction of Bus Rapid Transit (BRT) systems that have dedicated lanes and have improved reliability and travel efficiency for many commuters; and
- **trains**, despite being the most cost-effective mode of travel, is the least used option and one that has seen the smallest increase between 2003 and 2013. Reliability, safety and travel time are some of the factors cited as reasons for this limited increase in use.

3.2.2. Consumer behaviour

This section discusses how South African consumers make decisions regarding vehicle purchases. It is expected that these factors will affect how customers engage with the EV market.

Brand loyalty

South Africans are brand conscious and loyal. They stick to tried and tested brands. They have high spending limits, but only when the price is considered fair. Any price premiums need to be linked with well-defined benefits. This is especially true for the middle class and the new black middle class.¹

Though anecdotal, this highlights two notable insights for the EV market:

- People identify and associate with premium brands, hence the higher uptake in EV sales for BMW in the country and an increased willingness to pay a premium price.
- A large portion of consumers have not been able to link the benefits of electric vehicles to their lifestyle, hence the limited uptake of EVs.

Affordability

The majority of South African households rely on debt to meet their consumer needs and the vehicle market is no different. While employment has increased by only 18% since 2007-08, the number of credit consumers has grown by almost 44%. As such, credit usage and extension outnumber job creation, and the over-indebt gap is growing.

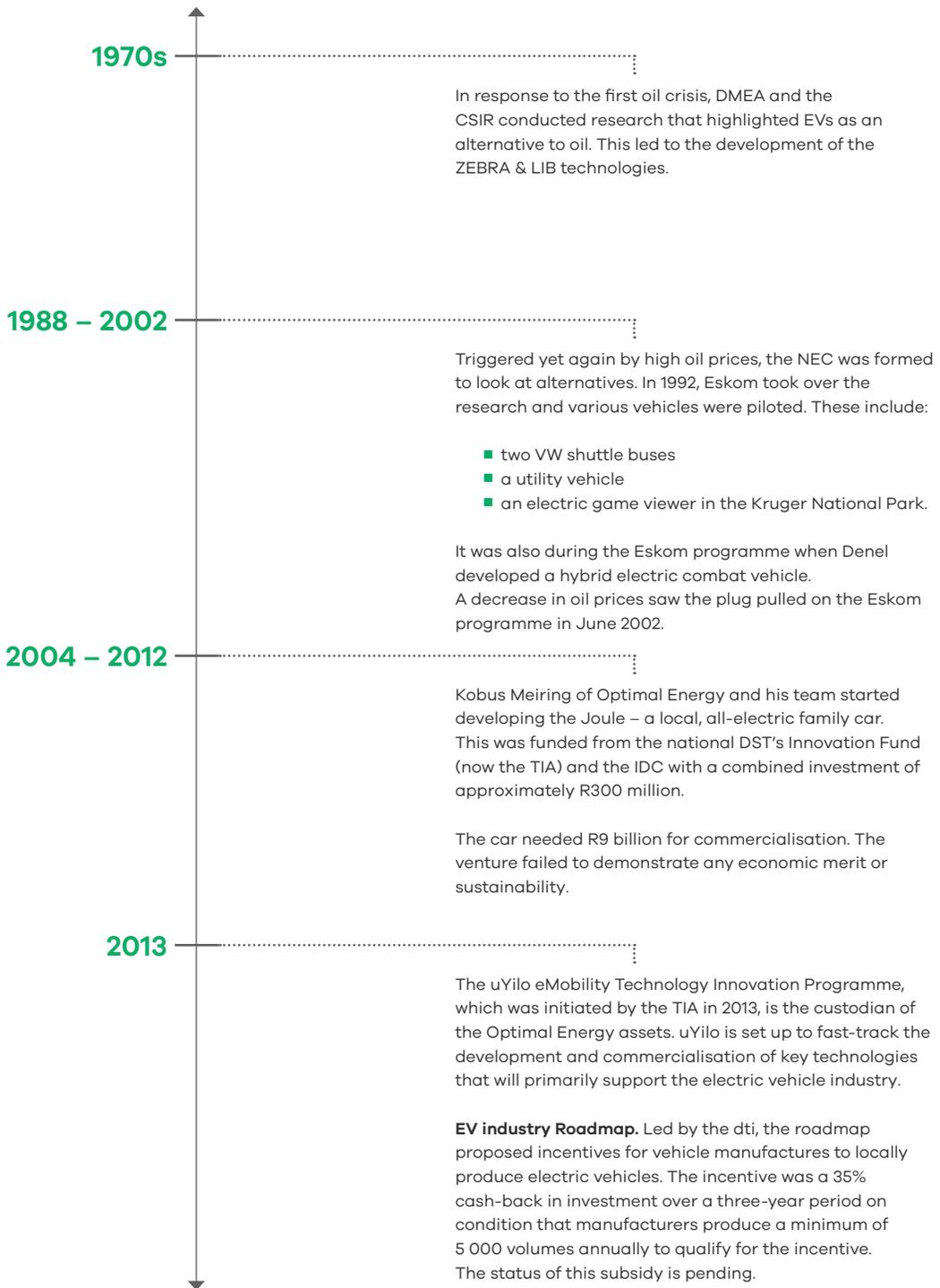
These affordability indicators have two important implications for the EV market. Firstly, for EVs that have a price range between R450 000 and R565 000, one needs a monthly gross salary of between R50 000 and R61 000 to afford finance costs. Most South Africans do not earn this much. Secondly, if one could afford an EV, the operational cost savings achieved by EVs do not make up for the relatively high capital price difference between EV and ICE vehicles.

3.3. An overview of the development of SA's EV industry

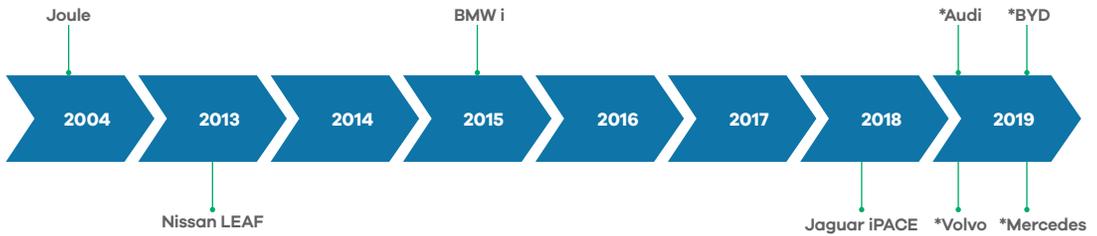
The early foundations of the EV market in SA can be seen as far back as the early 1970s in response to the first oil crisis hitting SA. Table 4 details the developments from these early foundations until 2013.

¹ <https://en.portal.santandertrade.com/analyse-markets/south-africa/reaching-the-consumers>

Table 4: The foundations of the EV market: 1970s to 2013



As shown in Figure 5, this nascent market has seen a slow growth path since Nissan entered the market in 2013, with BMW and Jaguar following in 2015 and 2018 respectively. Although the market is small and not showing significant growth, Audi, BYD, and Volvo are some of the automakers that are expected to enter the SA EV market in 2019.



* Denotes potential entrants to SA's EV market in 2019

Figure 5: Timeline of market entry by automakers

3.4. The South African EV value chain

A variety of key players are competing to shape the South African EV market. While the exact dynamics of the industry are still emerging and

the timing of key tipping points are unknown, car manufacturers and charging infrastructure companies are the most active investors in the market, with very limited activity currently from the battery companies (see Figure 6).



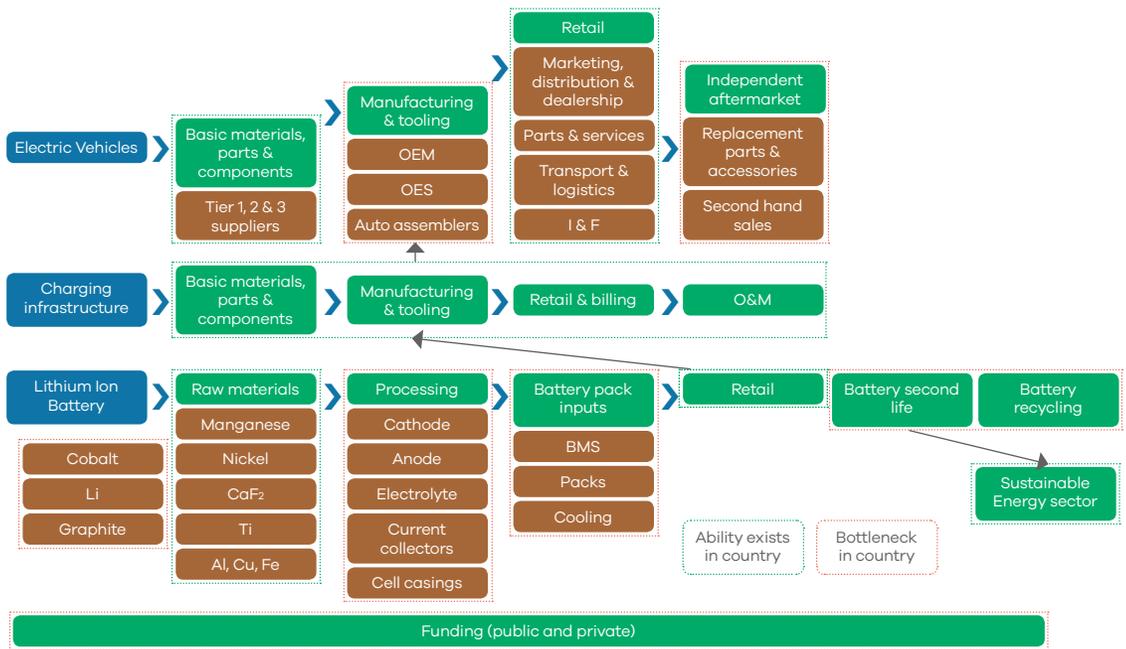


Figure 6: EV value chain in SA

As the EV market grows and local manufacturing is established, there will be an impact on the traditional internal combustion engine (ICE) value chain. Unlike ICE vehicles that have over a 1 000 moving parts, EVs are much simpler in that regard, with fewer parts. While there are valid reasons for South Africa’s transition towards electric mobility, this is not without potential losses.

3.5. Potential impacts of EV market growth on the ICE value chain and economy

Figure 7 shows where we are likely to see gains and losses in the ICE value chain. SA’s involvement in the local EV market will result in minimal job losses, should there be a concerted effort towards upskilling across the value chain. Expected job gains and losses are, however, unquantifiable at this stage due to the nascence of the market.

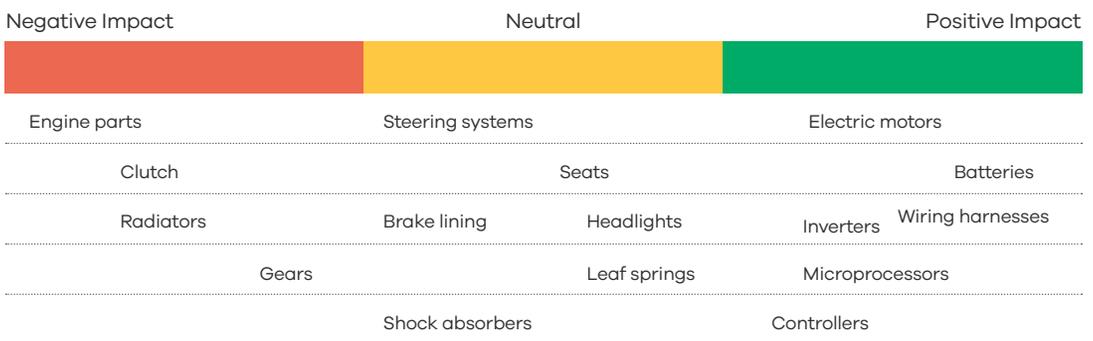


Figure 7: Illustration of gains and losses in the ICE value chain due to EV uptake

Where there will be a notable impact is on fuel levies. Fuel levies are government’s fourth biggest and most efficiently collected revenue stream. At present, a fuel tax is levied on petrol, diesel and biodiesel with the policy silent on electricity as a fuel for mobility. Under the current fuel levy structure, EV uptake would have a significant impact on the fiscus over time.

The effect of EVs on oil imports, the balance of trade and government revenue

The South African transport sector consumes ~27 billion litres of liquid fuels per year, with additional oil used in the chemicals sector (for non-energy uses). Sixty per cent of South Africa's liquid fuels consumption is met

through crude oil imports, with an additional eight billion litres per year produced from coal and natural gas. [Figure 8](#) below is an illustration of South Africa's petrol and diesel consumption from 2007 to 2016 (DOE 2017).

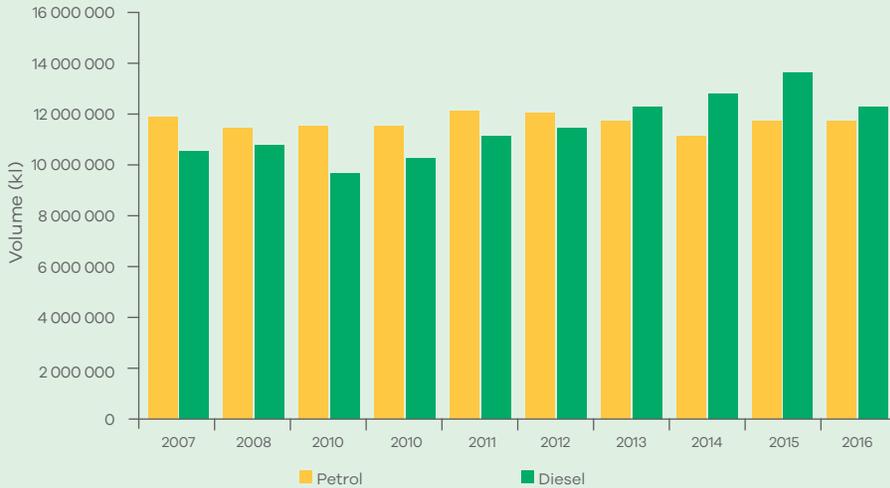


Figure 8: Petrol and diesel consumption from 2007 to 2016

If South Africa were to introduce one million electric vehicles that all drive 20 000 km/a, they would collectively reduce the importation of oil by 58 PJ/a (Petajoules per annum). That is an oil import reduction of more than 6%, representing a potential ZAR 8.1 billion (\$580 million per year) balance of trade saving for the South African economy.

South African consumers also pay a pre-determined fuel levy on all liquid fuels consumed. With the fuel levy going up by R0.29 and R0.30 per litre for petrol and diesel respectively, effective from 3 April 2019, the

case for switching to electric vehicles improves further.

However, for the national government, the fuel levy represents an important and efficient revenue stream. It is expected that R77.5 billion will be collected from this levy in the 2018/19 financial year. Falling liquid fuel sales on the back of increased EV uptake could put this revenue stream at risk.

The macroeconomic benefits and drawbacks of a growing EV market are outlined in [Table 5](#).

Table 5: Benefits and drawbacks of EV market growth and fewer oil imports

Benefits	Disadvantages
<ul style="list-style-type: none"> ■ The country has an increased ability to meet emission reduction targets ■ Decreasing the expense on oil import ■ Increased energy security ■ Better price control on electricity than oil 	<ul style="list-style-type: none"> ■ Balance of trade saving on the back of decreased oil importation is not proportional to the revenue generated through the fuel levy. ■ There is a high likelihood of reduced contributions to the Road Accident Fund (RAF)

3.6. Market sizing and dynamics

Table 6 provides a snapshot of SA's ICE vehicle market for 2017/18, showing EV penetration in different vehicle segments. The private car

segment has seen the most market activity in both the ICE and EV markets.

Table 6: Overview of South Africa's conventional ICE vehicle market: 2017/2018

Vehicle segments		Number of ICE units sold	Availability of EV equivalent	Penetration rate
Private transport	Passenger	557 701	Yes	<1%
	Light commercial vehicles			
Public transport	Minibus taxi	14 100	Yes	0%
	Buses	1131	Yes	<1%
Industrial transport	Forklifts	Unknown	Yes	Unknown
	Heavy duty vehicles	26 153	Yes	0%

3.6.1. The EV passenger vehicle market

Figure 9 provides a breakdown of electric passenger vehicle sales from 2013 to 2018. There is a notable decrease in sales from 2015 onwards. This speaks to the need for a market step change for any significant growth to be recognised.

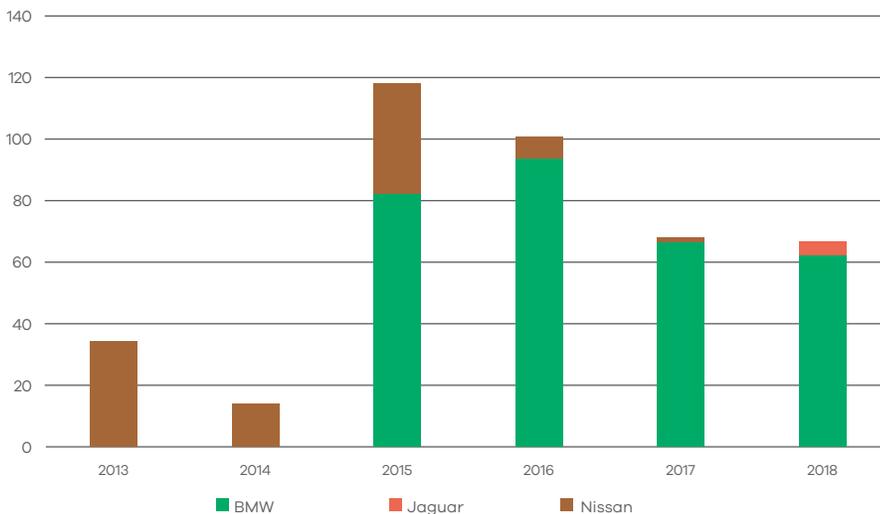


Figure 9: Passenger electric vehicle sales in South Africa: 2013 – 2018

3.6.2. The public and industrial EV market

It is expected that public transport will soon follow a similar trend to the one seen in passenger vehicles. The bus industry, BRT and local municipal buses in particular, and the minibus taxi industry present a good business case for electrification.

This potential business case is driven by:

- peak travel patterns (when and where people travel)
- long standing/idle times that coincide with current AC charging times.

The challenge in this market, as is with all EVs in SA at present, is financing for the significant capital price difference between ICE vehicles and EVs, and charging infrastructure investment.

Electrification of the forklift market is also expected to improve based on “fit for purpose” technology improvements. Where heavy-duty vehicles are concerned, the push for freight to rail

is a more immediate need and this is expected to take precedence over electrification.

Despite the barriers, automakers see value in SA's nascent EV market and expect a diversified electric vehicle mix as passenger vehicles continue to be purchased year-on-year. Forklifts and 2- and 3-wheeled EVs gain traction within the industrial segment and interest in the electrification of public transport increases.

3.6.3. Charging infrastructure and network

It is widely accepted that having charging stations in locations that commuters can easily access is key to the adoption and growth of the electric vehicle market. In South Africa the network currently consists of ~120 publicly accessible charging stations. Many of these are found in the Gauteng province and are largely AC charging stations that take up to six hours to arrive at a full charge. Figure 10 (PlugShare, 2019) shows active and incoming charging infrastructure stations in the country.



Figure 10: Active & incoming charging infrastructure stations in SA

The market is segmented based on the connector type: CHAdeMO and CCS, with Nissan using the former and BMW the latter. A broader breakdown of the charging standards employed by automotive companies in SA is shown in [Table 7](#).

Table 7: OEMs and Industry & distributors’ DC charging technology

Original Equipment Manufacturers			
CCS charging technology	CHAdeMO charging technology	CHAdeMO/CCS charging technologies	TBA charging technologies
BMW (South Africa (Pty) Ltd Ford Motor Company of Southern Africa (Pty) Ltd Volkswagen Group South Africa (Pty) Ltd Mercedes-Benz SA Ltd	Nissan South Africa (Pty) Ltd Toyota South Africa Motors (Pty) Ltd	N/A	Isuzu South Africa
Importers & distributors			
Audi (VW Group) European Automotive Imports South Africa (EAISA) (Pty) Ltd (Maserati) FCA South Africa (Pty) Ltd (Fiat Chrysler Automobiles Group) Jaguar Land Rover Mini South Africa Porsche Volvo Car South Africa	Honda Mahindra & Mahindra South Africa (Pty) Ltd Mazda Southern Africa (Pty) Ltd Mitsubishi Motors South Africa (MMSA) Peugeot SA (Pty) Ltd Renault South Africa (Pty) Ltd Subaru Suzuki Auto South Africa	Hyundai Auto South Africa Pty Ltd (MOTUS Group) KIA Motors South Africa (Pty) Ltd	HAVAL Motors South Africa (Pty) Ltd (HMSA) TATA Motors South Africa

The private sector has up until now been driving the roll-out of charging infrastructure in South Africa with limited support from government. AC chargers are expected to hold a significant share of the market. This is qualified by the potential increase in demand from the residential (multi-dwelling units), and to a larger extent, the retail (shopping malls, dealerships) and fuel (filling stations) sectors.

Growth for DC chargers is also expected to increase over time, driven by the growth of commercial vehicles for use in the public transport segment and a limited group of consumers looking to travel further than 400 km. Metropolitan cities, where there is a noticeable

uptake in electric vehicles, are expected to drive the majority of the initial infrastructure growth, followed by major highways.

GreenCape’s engagements highlight that potential investors in this space are adopting a ‘wait and see’ approach because they believe the market is still too small and does not yet merit investment. That being said, the market for charging infrastructure is expected to grow as the market for electric vehicles grows, but the timing of this is speculative. What remains unclear is who is responsible for incurring the high costs of rolling out infrastructure – the government, electric vehicle manufacturers or others?

3.7. Market drivers: EV and charging infrastructure

3.7.1. Macroeconomic drivers

South Africa's commitment to reducing its contribution to global emissions

South Africa has made commitments under the Paris Agreement to reduce emissions to between 398 and 618 MT CO₂e by 2030. The transport sector remains a significant contributor to South African emission statistics. The recently announced carbon tax, effective as of 5 June 2019, of 9 c/l and 10 c/l on petrol and diesel, respectively, is government's step towards reaching these emission targets. Switching to EVs is another significant contributor to accelerating SA's ability to reach these emission reduction targets. However, that impact is much greater if the electrical grid that powers EVs is also decarbonised (see GreenCape's 2019 MIRs on Renewable Energy and Energy Services).

The potential loss of automotive trade markets if manufacturing does not adapt

South Africa has trade agreements in place with the EU, US and SADC that sustain the country's automotive industry. The EU agreement allows for vehicles and components to be exported custom-free to 28 countries. This is a significant enabler of South Africa's export market that makes a marked contribution to the national Gross Domestic Product. Many of these countries have announced the ban of new-sale ICE vehicles starting from 2030 onwards. This presents a potential risk of trade market losses, should the South African automotive industry not transition towards electric vehicle manufacturing in order to satisfy the new international demand in core export markets.

3.7.2. Local demand drivers

Although the South African EV market is tracking international trends, there are four particular drivers that accelerate the demand for electric vehicles in South Africa.

Climate conscious consumers

SA's EV market is currently driven by a small percentage of high-income customers that are able to prioritise the cost to the environment in purchase decisions. As the climate change and renewable energy narrative becomes the norm, and the efficiency and affordability of electric vehicles improve, it is expected that the market will shift from consumers that are primarily climate conscious to a much broader base.

Rising fuel costs

Price security concerns are highlighting that electric vehicles are an attractive alternative to ICE vehicles for commuters.

Consumers feel the impact from oil price increases more so than other commodities. As the price increases, it also becomes noticeable that consumers have very little flexibility in the short term to change consumption patterns in response to changes in fuel prices. Most commuters are captive users and are therefore locked into the market.

SA's dependency on oil from high risk regions that are predisposed to geopolitical instability exposes the country to economic and energy security challenges. [Figure 11](#) (Businesstech 2016) shows the volatility in fuel prices over the past 10 years.

Factors that affect the SA fuel price

SA's fuel prices are heavily influenced by trends in the global oil market and the local exchange rate. These can be typically seen as domestic and international factors. The Basic Fuel Price (BFP) which constitutes 43% of the retail price of fuel in SA, is determined by taking into account the movement of petroleum product price, as well as the United States dollar/rand exchange rate. The domestic factor (57%) is subject to government's control and includes fuel tax, RAF levy, customs, excise levy, and transport costs.

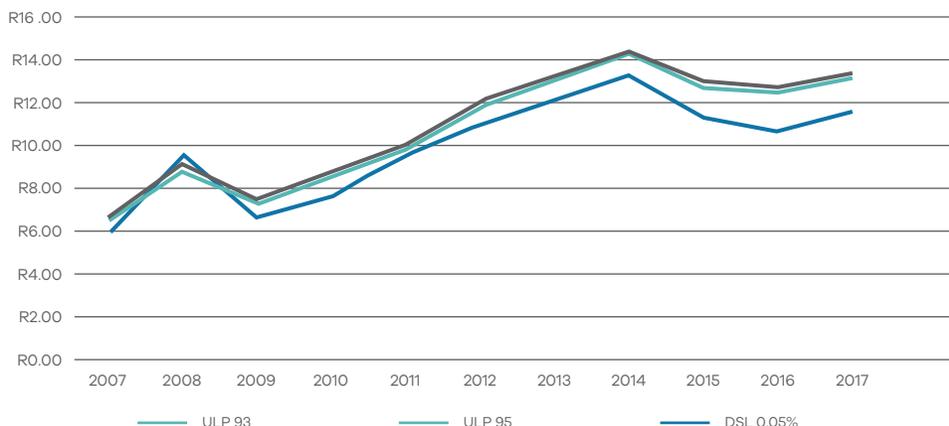


Figure 11: Year on year fuel prices from 2007 – 2017

Energy storage innovations

The growth of the distributed generation market and increasing global demand for EVs is driving the demand for Lithium Ion Batteries (LIBs) as seen in Figure 12 (BNEF 2016). Economies of scale and technical advances have seen battery prices fall by more than 70% since 2010. When the first

mass-market EVs were introduced in 2010, the batteries cost more than US\$1 000/kWh. In 2018, Tesla’s Model 3 battery pack cost \$190/kWh and the Chevrolet Bolt battery pack ~\$205/kWh. Prices are expected to continue to fall as demand rises for LIBs in other sectors.



Figure 12: LIB price/kWh over time

Falling cost of electric vehicles

Currently batteries make up between 40% and 50% of the total cost of an electric vehicle. Falling battery prices mean that EVs will be cost comparable with ICE vehicles by 2022 (~\$125–\$150 is the range in which price parity may be achieved). It is at this point that the business case for owning EVs moves from operational cost savings to include capital price savings.

Reduced range anxiety

The limited driving range of EVs is one of the key reasons for prospective buyers not to buy them. While most of the charging happens at home for private vehicles, consumers want the comfort of knowing they can safely travel on a single charge. Improvements in battery management systems have resulted in batteries with a significantly higher driving range, approximately 150 km to 400 km. The ability to consistently travel more than 350 km to 450 km is an expected minimum in South Africa.

3.8. Market barriers

As is the case with many new markets, there are more barriers to economic growth that drivers. This represents an exciting opportunity for intervention and focus areas for government and private sector support over the next 10 years.

3.8.1. Products not fit for the South African market

Current EVs cannot compete with ICE vehicles for the following reasons:

- South Africans have a high ability and willingness to pay for vehicles. However, electric vehicles cost more than R450 000 and look nothing like ICE vehicles in the same price range.
- Unlike the conventional car market, the electric vehicles currently available in the market do not cater for the emerging middle class and middle-income group. These are individuals who purchase vehicles that cost between R150 000 and R350 000, and constitute a larger portion of the market compared to the high-income group.

In light of the high purchase costs of EVs compared to ICE vehicles, there is a need for original equipment manufacturers (OEMs), dealerships and commercial banks to develop innovative vehicle ownership models, such as mobility, as a service and/or enabling finance terms specifically tailored for EVs.

That said, with very limited product choice, even once someone is comfortable with the idea of owning an electric vehicle, they are unlikely to find one that fits their lifestyle. As a result, some brands that currently have a high market share in the ICE vehicle market have a much lower share of the electric vehicle market.

3.8.2. High import duties

Even with the overall cost of the electric vehicles falling due to decreasing battery prices, the cost of electric vehicles remains high relative to ICE vehicles. In South Africa one of the key reasons for this is the high import duties imposed on EVs.

Currently, electric vehicles are subjected to 25% import duties, while buses and trucks carry a 20% duty. In comparison, ICE vehicles incur 18% import duties. Electric vehicles are further subjected to 17% ad valorem (luxury tax duty) because the battery price pushes the overall cost of the vehicle into a luxury threshold. Total taxes on electric vehicles and hybrids are 42%.

The dti is in negotiations with the EU to reduce the import tariff on electric vehicles down from 25%. In return, South Africa will increase the import tariff on vehicles with an engine size smaller than 1 000 cc, which currently stands at 0% to 18%. These vehicles hold a large segment of the new vehicle market and are not produced in South Africa. The timelines of an outcome from these negotiations are as yet unknown.

BMW has also submitted an application to the International Trade Administration Commission (ITAC) for the reduction of import duties to stimulate vehicles sales. The application was for a reduction in duties on imported electric vehicles to 0% for a period of three years with an increase to 10% thereafter. The outcomes of this application were unsuccessful.

3.8.3. Lack of policy certainty

The incumbent automotive sector works effectively because investors have the comfort of longstanding policy certainty and government support as outlined in the Automotive Production and Development Programme (APDP). While there are enabling policy frameworks in place to support ICE vehicle manufacturing, those policies have not been adapted to incorporate EV manufacturing. As such, the lack of policy directives on local EV manufacturing presents an investment risk to the country.

3.8.4. Lack of local skills to facilitate market growth

There is currently insufficient skills in the automotive market and ancillary services to adapt to the growth of the EV manufacturing section. There is a need to upskill existing technicians to facilitate the transition towards electric mobility. This training is also important for first level emergency responders, dealerships, and aftermarket services as these sector also play an important role in a functioning transport sector.

3.8.5. Lack of enabling finance terms

There are currently very limited enabling finance products available for EV projects. The risk profile does not match lenders' criteria, resulting in short tenors of debt and high interest rates. Investors just do not have enough equity to secure the debt they need. This speaks to the need for innovative finance tools and government assistance to absorb some of the risks associated with financing this nascent market.



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4

Policy and regulation

This section pays attention to the policy and legislative framework relevant to the SA transport sector. It also highlights policies and strategies that speak to alternative transport.

The regulatory framework for transport is governed by the Department of Transport (DOT) in SA. The Department of Trade & Industry (the dti) is key to ensuring the policy environment is conducive to investment and trade. There are a number of policies that are relevant to the automotive industry:

4.1. Automotive Production & Development Programme (APDP)

The APDP was implemented on 1 January 2013 and will be in place until 2020. It consists of four pillars that drive the programme:

- **Import duty (tax)** – these tariffs are meant to provide protection to support continued domestic vehicle manufacturing. Unlike traditional tax, this is non-revenue generating.
- **Production Incentives** (rebate mechanism) – this is to encourage increasing levels of local value addition along the automotive value chain, with positive spin-offs for employment creation.
- **Vehicle Assembly Allowance** (rebate mechanism) – this is targeted at doubling domestic vehicle production lines by providing lower duty rates for domestic vehicle manufacturers.
- **Automotive Investment Scheme** (cash grant) – effective from 2009, this support is available to encourage investments by OEMs and component manufacturers in a manner that supports productive capacity upgrading.

The APDP applies only to light vehicles (passenger cars and light commercial vehicles), although components produced for heavy commercial vehicles also qualify for the Production Incentive (PI).

While the automotive industry has not gone backwards since the introduction of the APDP in

2013, it has not shifted SA's global position as a second tier player. Aggregated vehicle sales have increased, but production for the local and regional market has declined. The local market is far from having sufficient demand to attract local assembly exclusively for domestic market supply.

This policy does not make provision for EV manufacturing, but outlines taxes, rebate mechanisms, and incentives in the traditional automotive industry.

4.2. The South African Automotive Masterplan (SAAM) 2021-2035

The SAAM is under development at the time of writing, and will guide policy on growing and supporting the domestic automotive industry from 2020 to 2035. It will replace the APDP, addressing some of the latter's shortcomings.

Developed by government and the automotive industry, the SAAM will cover car and light commercial vehicle manufacturing, medium, heavy, extra-heavy truck, and bus production (potentially including off-highway vehicles, yellow metals), motorcycles and the South African component supplier industry. Vehicle importers and distributors will also be covered. The Masterplan will create a framework for securing even higher levels of investments and production.

SAAM's goals include:

- growing SA's **vehicle production** to 1% of global output (projected to reach 140 million units annually by 2035);
- increasing **local content** of vehicles assembled in South Africa to 60%, from a 38.74% base.
- doubling total **employment** in the automotive value chain from 112 000 to 224 000 jobs.

- improving automotive industry **competitiveness** levels to that of leading international competitors, such as Turkey and Thailand;
- achieving **transformation** of the South African automotive industry by employing black South Africans, upskilling black employees, empowering dealerships and authorised repair facilities, and substantially increasing the contribution of Black-owned automotive component manufacturers within the automotive supply chain; and
- deepen **value addition** within South African automotive value chains, across selected commodities/technologies.

Notable changes in the SAAM:

- Vehicle Assembly Allowance (VAA), which is a one of the four legs of the APDP, will be phased out and replaced by Volume Assembly Localisation Allowance (VALA). VALA will be phased in between 2021 and 2026 to ensure no disruptions to existing OEM investment models.
- By 2026, the VALA is set at 35% of local value-add for OEM volumes above 10 000 units, but in 2021 it is set at 40%. This is different from the VAA, which gave vehicle manufacturers component import allowances of 20% (2013) of the ex-factory vehicle price. This reduces to 19% and 18% in 2014 and 2015 respectively for all light multirole vehicles produced domestically. In short, the VALA advocates for the use of local content in the components that manufacturers use by removing credits for imported contents.
- The Production Incentives (PI) benefit has been increased to 25% on components. The production rebate credit certificates (PRCCs) will be replaced by duty credits that are tied to local value addition. This is expected to help mop up the current surplus of PRCCs, which are used by OEMs and importers to bring new vehicles into South Africa duty-free.
- The Automotive Investment Scheme (AIS) cash grant for capital investments has been retained, but will be reduced by 5% in those instances where non-South African tooling and machinery is employed. Incentives for investment into new technologies such as EVs and hybrids will be covered under this scheme. These incentives are, however, still subject to approval by National Treasury.
- SA is seeking a one-tariff regime across all light vehicles, including EVs. This will potentially address the high import duty challenge.

- Previously, the APDP only applied to light vehicles (passenger cars and LCVs). The new-look APDP has been amended to also include medium and heavy commercial vehicles, as well as motorcycles, but the VALA formula would not be applied in either category.

Incentives for investment into new technologies such as EVs and hybrids are expected to be covered under the Automotive Investment Scheme (AIS). The potential of a single tariff for all light vehicles, including EVs, is expected to be covered in this masterplan as well.

4.3. Green Transport Strategy (GTS) for South Africa: (2018 – 2050)

To address the significant contribution of transport to national GHG emissions, the Department of Transport (DoT) has developed a green transport strategy. The GTS, which is based on sustainable development principles, aims to minimise the impact of transport on the environment, and meet current and future transport demands. It promotes green mobility and is the first national government-led strategy that makes provision for sustainable transport.

In order to radically grow the uptake of EVs in South Africa, in conjunction with dti and National Treasury, the DoT will:

- offer producers of EVs manufacturing incentives to both produce and sell affordable EVs in South Africa, for both the local and export markets;
- work with local research institutions to conduct research on EV batteries;
- work with national, provincial and local government departments and authorities and the automobile industry to set annual targets for the uptake of electric vehicles and hybrid electric vehicles in the government vehicle fleet, as well as monitoring the local content of the manufacturing of cars locally, in line with the Industrial Policy Action Plan (IPAP);
- introduce the conversion of old technology vehicles with higher emission factors to be retrofitted with EV technology;
- consider providing incentives related to the beneficiation of using local resources in the manufacturing of key machineries and or components (e.g. fuel cell); and
- assist in establishing and developing local EV OEMs.

4.4. Procurement Policy Framework Act (PPFA)

The revised regulations came into effect on 7 December 2011 to empower the dti to designate industries, sectors and sub-sectors for local production at a specified level of local content. Buses are one of the industries that have been designated for local production with minimum local content thresholds.

As such, the Preferential Procurement Regulations prescribe a 70% and 80% local content of the bus body for city and commuter buses respectively (the dti, 2016). In case of electrical vehicles, the regulations are not clearly excluding the battery from the bodywork, creating an import barrier.



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5

Market opportunities

There are a number of emerging opportunities in SA's nascent EV market.

SA has a very strong automotive market as a dominant player in the country's manufacturing sector. Under the Industrial Policy Action Plan (IPAP), the automotive industry is identified as a priority industry. This is all largely driven by strong government support and long-standing policy certainty that improves investor confidence.

Through the automotive production and development programme (APDP), government aims to leverage higher private investment to make the sector more globally competitive, while also creating jobs. Key to this shift will be the growth and development of EV market opportunities.

The following are emerging investment opportunities identified in SA's EV market:

5.1. Passenger vehicle manufacturing

There is a medium- to long-term opportunity for SA to be used as a manufacturing hub for electric passenger vehicles for the export market, with manufacturing for the domestic market being a longer term opportunity as demand increases. This opportunity is particularly attractive to Greenfield investors.

SA has a very strong automotive market, which is a dominant industry in the country's manufacturing sector, backed by a relatively cheap labour force. The SA government is faced with the task of securing higher investments and

Trade agreements with the EU and SADC and cheaper manufacturing, make SA suitable as an investment destination for EV manufacturing companies targeting Africa, the US and EU.

Electric public transport

Buses are designated in SA and subject to between 70%-80% local content requirements by the dti for public procurement. The assembly of buses further receive the benefit of duty free importation of all driveline components. SA assembled 1 131 units in 2017 with 54 (4.7%) of those for the export market. While this is a fairly flat market in SA, there is scope to revitalize this space and the incorporation of e-bus manufacturing is a more economically viable way of achieving that.

increasing vehicle production volumes to stimulate the local market and remain internationally competitive. This manufacturing base, combined with the significant tax incentives offered in the Atlantis SEZ for Green Technologies, contribute to cheaper manufacturing costs. The trade agreements that SA has with the EU (which allow vehicles and parts to be exported custom free to 28 countries) and SADC, coupled with cheaper manufacturing, position SA as a suitable manufacturing destination for companies targeting Africa, US and countries in the EU.

5.2. Manufacturing and increased uptake of electric buses

There is a medium term opportunity for the uptake of electric buses in South Africa. This opportunity is relevant to local investors and investors looking to enter the South African market.

Led by the aggressive e-bus growth rate in China, e-buses are surpassing the growth of every other EV segment globally with a compound annual growth rate of 100% since 2013, compared to 60% for passenger vehicles. Taking the SA context, public transport presents the best business case for electrification. This is especially true for the

bus market as it is already produces buses largely for the domestic market.

- Increasing urbanisation, failing rail networks that have pushed commuters onto the road network, and congestion, are factors that are forcing cities to expand their bus routes. Unlike private transport, buses are mass-based transit systems that are accessible across all income groups. Buses are also space, energy, and emissions efficient.
- Cities/Municipalities are already looking at mechanisms to finance electric buses. Pay as You Save (PAYS) presents an attractive innovative finance approach that transit companies can employ to finance electric buses cost effectively.

5.3. Lithium Ion batteries (LIB) production

LIB manufacturing is a medium- to long-term opportunity for the global LIB market (including South Africa's domestic market), based on the diversification of the LIB market and increasing demand from the electric vehicle industry.

There are a number of different chemistries used in batteries by EV manufacturers. Lithium Iron Phosphate (LFP), Lithium Nickel Cobalt Aluminium Oxide (NCA), and Nickel Manganese Cobalt Oxide (NMC) are the three leading cathode chemistry types. Of the three, NMC is the most prevalent and the fastest growing. This is due to its high specific energy and low internal resistance. NMC cathodes currently account for about 28% of global EV sales, which is expected to grow to 53% by 2027.

South Africa is an attractive manufacturing destination for lithium ion batteries because of its existing battery manufacturing (and recycling) industry. In addition, South Africa's mining sector is able to provide some of the raw materials required for the NMC cathode battery chemistry, especially manganese. SA possess 78% of the world's manganese. Moreover, other raw materials required in the cathode are mined in sub-Saharan Africa. In light of the safety challenges of transporting LIBs, manufacturing in SA also represents a strong entry point to the wider African market.

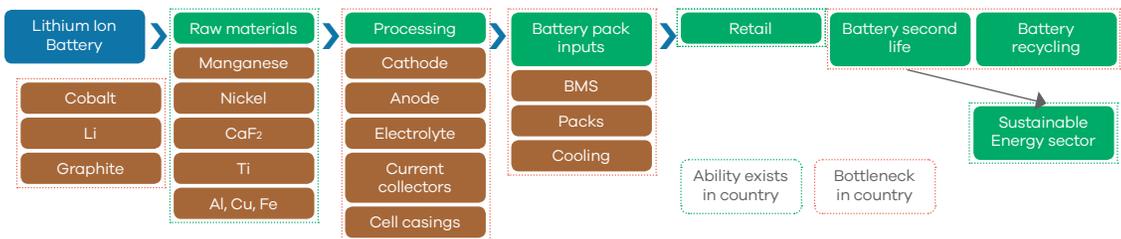


Figure 13: LIB manufacturing value chain

Be that as it may, the lead acid battery is the current dominant player in the country's battery market. This battery is typically used in motor vehicles and as a backup power source. With the uptake of EVs expected to happen at a slow but steady pace due to the absence of incentives and subsidies, the lead acid battery market is expected to continue dominating the motor vehicle market for the next 3-5 years.

In terms of activity in the country, the names listed below are partners in the dti Technology and Human Resources for Industry Programme (THRIP) project that is looking at SA's potential in the LIB manufacturing space:

- **University of the Western Cape (UWC)** is responsible for providing the lithium ion cell manufacturing facility with the best available lithium ion cell assembly process conditions and human resource skills, quality control protocols and processes to support the assembly of lithium ion cells in partnership with Zellow.
- **uYilo e-mobility programme** is responsible for defining the Lithium Ion cell testing protocol for the Project and execute testing in accordance with international standards for Lithium Ion cell testing.
- **Council for Science & Industrial Research (CSIR)** is responsible for providing cathode

material manufactured using South African intellectual property and raw materials, to be consumed in the Lithium Ion assembly process.

- **Zellow Technology** is responsible for the development of a local lithium ion cell manufacturing competency, driving commercialisation of the final product by identifying customers and using cases through off-take agreements.
- **Metair** is responsible for providing a use case for the final product and agreeing to utilise the product once all safety and quality standards have been met.

According to the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008): Effective from 23 August 2013, **lead acid batteries disposal is banned** from landfill. All "other batteries" will be banned from landfill by 2021.

The lead acid battery market has seen an increase in recycling capabilities (29 016 t) as a result of this piece of legislation. This legislation is also a key driver for the incorporation of LIB reuse and recycling by LIB manufacturing companies looking to set up in SA.



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6

Funding and Incentives

A range of general and sector-funding solutions and incentives is available to investors, manufacturers and service companies in the green economy.

It covers international sources, such as Development Finance Institutions (DFI), local funding pools including the public and private sector, and a considerable range of tax incentives.

6.1. General database web page

The GreenCape Finance Desk hosts a web page² with a number of Green Finance resources that cover funding and incentives available to companies in the green economy. A few of the available database are highlighted below.

6.1.1. Green Finance Database

In conjunction with the South African National Energy Development Institute (SANEDI), GreenCape maintains a database of funding sources and primarily dti-driven incentives that may be relevant to green economy investors. The database contains information on more than 100 funding opportunities, including an overview of the opportunity and its contact details and links. It is ideal for any entity seeking a broad range of funding solutions and financial incentives, with South African institutions being the main source of opportunities. The database is available to view and download online³.

6.1.2. Government funding and incentives database

An updated document focused on South African government funding and incentives is available to view and download online⁴.

6.1.3. Finfind database

Finfind⁵ is an innovative online finance solution that brings together SME finance providers and finance seekers. With a focus on finance readiness, Finfind has more than 200 lenders and over 350 loan products available to SMEs. The database is ideal for South African SMMs who are seeking funding and/or business advisory services, and those who want to improve their understanding of finance.

6.1.4. AlliedCrowds database

AlliedCrowds⁶ is the first complete aggregator and directory of alternative finance providers in the developing world. Sign-up is free and allows users to access a global database where one can filter for sector (including greentech, agriculture and social impact), type of capital (equity, lending, grant), and type of funding (crowdfunding, angel investing, venture capital, impact investing). In addition:

- Themed databases around the Sustainable Development Goals (SDGs) and the World Green Economy Organisation (WGEO) are available.
- Reports, including a number specifically about African funding sources, can also be downloaded for free.
- You can also contact Allied Crowds to create a customised funding database for you.

This resource is ideal for any entity seeking a broad range of financial solutions on a global scale.

² <https://www.greencape.co.za/content/focusarea/green-finance-databases>

³ <https://www.greencape.co.za/assets/Uploads/GreenCape-Finance-Database-v6.xlsx>

⁴ <https://www.greencape.co.za/assets/Uploads/Government-Funding-and-Incentive-Booklet.pdf>

⁵ www.finfindeasy.co.za

⁶ <https://alliedcrowds.com/>



7

The Western Cape: Africa's green economy hub

The Western Cape is a world-class investment destination.

The province provides businesses and investors with prime locations, modern infrastructure, a skilled workforce, low operational costs and an abundance of natural resources. It is also a sought-after place to live, with unrivalled natural beauty, vibrant culture, excellent schools and universities, and an outstanding quality of life. In 2017, Cape Town was ranked among the top 21 global investment destinations by Foreign Direct Investment (fDi) Intelligence, a division of the Financial Times.

A great place for green business

There are compelling reasons why the Western Cape Province is viewed by many as Africa's green economy hub. Coupled with a strong and rapidly growing market for green technology and services in South Africa and beyond, the Western Cape offers:

- Africa's renewable energy (RE) and cleantech hub, with a critical mass of leading companies present.
- Local presence of major professional services and financiers.
- Significant market opportunities for businesses and investors in agriculture, energy services, utility scale solar and wind, waste, water, bioeconomy and resource efficiency.
- A supportive government that has made ease of doing business and the green economy key priorities.
- Five universities with comprehensive R&D capabilities and dedicated green economy skills programmes.
- A range of investment incentives in the Atlantis Special Economic Zone (SEZ) for Green Technologies.

Supporting businesses and investors

The province also offers dedicated support for businesses and investors focusing on greentech and services, including:

InvestSA One Stop Shop: Offers convenient investor support on permits, licensing and registrations - all under one roof.

GreenCape: Provides dedicated support and market intelligence to green economy sectors.

Wesgro: The official investment and trade promotion agency for the Western Cape.

SAREBI: A business incubator providing non-financial support to green entrepreneurs.

SARETEC: Offers specialised industry-related and accredited training for the wind and solar industries.

Market opportunities in the province and South Africa

Some of the major market opportunity areas in the province and South Africa in the next five years are outlined in the graphic on the next page (see individual MIRs and the GreenCape website for more information).

R&D capabilities and skills

The region's five universities – University of Cape Town, Stellenbosch University, University of the Western Cape, the Cape Peninsula University of Technology and the George campus of the Nelson Mandela Metropolitan University – underpin all of this with comprehensive research and development (R&D) capabilities and dedicated green economy skills programmes.

Major market opportunities: Western Cape and South Africa

Agriculture

Precision agriculture

Tools, data analysis, local manufacturing & financing.

Solar energy for agriculture

Minimum market of R120 million (WC) and R420 million (SA) for solar PV in agri & agri-processing.

Controlled environment agriculture

R600 million potential market (WC), 15% annual growth (WC).

Energy services (SA-wide)

Solar PV systems & components

600MWp installed capacity; R1.7bn additional investment in 2018 (R7.7bn to date)

Local manufacturing & assembly

Solar PV systems and components – systems require compliance with local content regulations

Energy storage

Keystone of future energy services market; ~R5bn market for demand side management and back-up power by 2035

Utility scale renewable energy (SA-wide)

Independent power production

6.3GWp independent power procured, 13.7GWp additional capacity by 2030, based on updated IRP (5.67GWp solar, 8.1GWp wind).

Rest of Africa

Greater uptake of RE & decentralized systems. Off-take guarantees and local currency debt innovation needed.

Local manufacturing

Refined local content requirements, with specific components obligated to be locally manufactured e.g. wind towers, tower internals, panel laminating, PV mounting structures

Waste

Municipal PPP

Public-private partnership projects of R1.3bn (WC)

Organic waste treatment

Landfill ban require treatment technologies to process 1 m/t p.a. of organic waste (WC)

Alternative waste treatment

Cape Town has highest landfill cost in SA & good business case for AWT. R1bn+ invested by solution providers since 2016 (SA)

Water

Industrial and Commercial

Water intense food & bev sectors expected gross capital formation of ~R14bn by 2021

New developments

Green building certifications increased 25-fold since 2010 (SA)

Municipal

Significant opportunities in metro markets incl. new R5.8bn (417 MLD) Cape Town augmentation programme (WC)

Bioeconomy & resource efficiency

Food value retention

At least R600m retained through improved cold chain management & waste reduction (SA)

Solar thermal

Already installed: R33m (WC), R135m (SA); ~R3.7bn potential market in agri-processing

Biogas

For electricity, heating & transport; R100m of installations expected by 2023

Atlantis Special Economic Zone for Green Technologies

The Atlantis SEZ is a zone dedicated to the manufacturing and provision of services in the green technology space - technologies that reduce or reverse the impact of people on the planet. Wind turbines, solar panels, insulation, biofuels, electric vehicles, materials recycling and green building materials are all examples of green technologies that will be welcomed to the zone.

The zone welcomes manufacturers, service providers, suppliers and other players in the value chains of different green technologies.

The SEZ is situated in the Atlantis industrial area north of Cape Town, south of Wesfleur, east of Dassenberg Road, and west of the Witsand community.

Why invest in the SEZ?

There are strong and growing South African and African markets for greentech. The South African greentech manufacturing market is worth at least R30bn; with a growing greentech market in the neighbouring countries. South Africa has opportunities in energy, waste, agriculture, transport and other sectors and is a great entry point for the SADC market.

Atlantis is a great location and development ready. 93 hectares of zoned City of Cape Town

land is available for leasing to investors. Bulk infrastructure is in place and Atlantis has new public transport and shipping links and fibre connectivity. Atlantis is also close to major ports, roads, universities and greentech markets.

Investors have access to extensive investment support through the One Stop Shop for investor support and the rest of the investor support ecosystem, which includes InvestSA, GreenCape, the City of Cape Town, and Wesgro. Together the ecosystem provides information and advocacy; market intelligence; facilitated access to permits and licenses, planning and development approval; and skills training.

Investors and tenants are accessing attractive incentives in the form of tax relief and allowances, employment tax incentives, fast-tracked development approvals, fee exemptions and subsidies.

There is an attractive, wide-ranging skills base to recruit from with 5 universities and many more colleges in the province, and a large range of unskilled, semi-skilled, technical and professional candidates.

For more information, contact the SEZ's Investment Promotion Facilitator, Jarrod Lyons: jarrod@greencape.co.za



8

GreenCape's support to businesses and investors

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. Our vision is a thriving prosperous Africa, mobilised by the green economy.

Working in developing countries, GreenCape catalyses the replication and large-scale uptake of green economy solutions to enable each country and its citizens to prosper.

We work with businesses, investors, academia and government to help unlock the investment and employment potential of greentech and services, and to support a transition to a resilient green economy.

We assist businesses by removing barriers to their establishment and growth and provide our members with:

- free, credible and impartial market information and insights
- access to networks of key players in government, industry, finance and academia
- an advocacy platform to help create an enabling policy and regulatory environment for green business

We assist local, provincial and national government to build a resilient green economy by providing:

- support on the development of standards, regulations, tools and policies
- expert technical knowledge on key sectors in the green economy
- access to networks of key players across business, academia, and internationally

Since inception in 2010, GreenCape has grown to a multi-disciplinary team of over 40 staff members, representing backgrounds in finance, engineering, environmental science and economics.

We have facilitated and supported R17bn of investments in renewable energy projects and manufacturing. From these investments, more than 10 000 jobs have been created. Through our WISP (industrial symbiosis) programme, by connecting businesses with waste / under- used resources, we have to date diverted nearly 63,000 tonnes of waste from landfill.

Our market intelligence reports form part of a working body of information generated by sector desks and projects within GreenCape's three main programmes – energy, waste and resources.

Figure 14 on page 39 shows the different focus areas within each of our programmes.

Benefits of becoming a GreenCape member

We currently have over 1100 members, and offer free membership. Becoming a member of GreenCape will give you access to the latest information regarding developments in the various sectors; access to tools, reports, and project information; and offer you the opportunity – through our networking events – to meet and interact with various stakeholders in the green economy.



① **Renewable Energy**

Utility-scale projects, localisation of component manufacturing, incentives & financing options, wheeling & energy trading.

② **Energy Services**

Energy efficiency & embedded generation, electric vehicles, alternative basic electrification, incentives & financing options.

③ **Alternative Waste Treatment**

Municipal decision-making & policy & legislative tools on alternative waste treatment options; small-scale biogas, recycling & reuse (dry recyclables, construction & demolition waste).

④ **Western Cape Industrial Symbiosis Programme (WISP)**

The team matches businesses to share unused resources, cut costs & create value. They also support entrepreneurs to identify & realise new business opportunities in the waste industry.

⑤ **Water**

Water provision & economic development; greentech opportunities for water use efficiency, treatment & reuse, business water resilience.

⑥ **Sustainable Agriculture**

Precision-, conservation- and controlled environment- agriculture; valorisation of wastes to high value bio- products, including bio-energy.

Figure 14: GreenCape's focus areas

Support through the International Cleantech Network

GreenCape's membership of the International Cleantech Network (ICN) gives our members access to international business opportunities in countries where other cleantech clusters are based (mainly Europe and North America).

To become a member or to get your ICN passport, please contact GreenCape or visit our website: www.greencape.co.za



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References

- Black, Anthony & Barnes, Justine 2017. Developing a South African automotive Masterplan to 2035 in the context of Global Value Chain drivers: Lessons for second tier automotive economies. Paper prepared for the GERPISA Colloquium, 14 to 16 June 2017, Paris, France.
- Bloomberg New Energy Finance (BNEF). 2018. Cumulative Global EV sales hit 4 million. Available from: < <https://about.bnef.com/blog/cumulative-global-ev-sales-hit-4-million/> > [Accessed 29 January 2019].
- Bloomberg New Energy Finance (BNEF). 2017. Bloomberg New Energy Finance (BNEF). Available from: < <https://data.bloomberglp.com/bnef/sites/14/2017/07/BNEF-Lithium-ion-battery-costs-and-market.pdf> > [Accessed 29 January 2019].
- Bischof-Niemz, Tobias 2018. Re: Back of the envelope on Electricity sales for EVs. Email from Bischof-Niemz, Tobias to M Mulcahy, 15 October 2018.
- Businesstech 2017. How fuel prices have changed in South Africa over the past 10 years. Available from: < <https://businesstech.co.za/news/energy/176603/how-fuel-prices-have-changed-in-south-africa-over-the-past-10-years/> > [Accessed 11 February 2019].
- BusinessWire 2018. Electric Vehicle Market by Type, and Vehicle Type – Global Opportunity Analysis and Industry Forecast, 2018-2025. Available from <<https://www.businesswire.com/news/home/20180827005257/en/Global-Electric-Vehicle-Market-2018-2025-567.3-Billion>> [Accessed 11 February 2019].
- Department of Energy (DOE) 2017. Overview of the Petrol and Diesel Market in South Africa between 2007 and 2016. Pretoria, South African Government.
- Department of Environmental Affairs (DEA) 2018. South Africa State of Waste. A report on the state of the environment. First draft report. Pretoria, South African Government.
- Department of Trade & Industry (the dti). Industrial Procurement 2011. Available from: < http://www.dti.gov.za/industrial_development/ip.jsp > [Accessed November 2018].
- Department of Transport (DoT) 2018. Green Transport Strategy for South Africa: (2018-2050). Available from: <http://www.transport.gov.za/documents/11623/89294/Green_Transport_Strategy_2018_2050_onlineversion.pdf/71e19f1d-259e-4c55-9b27-30db418f105a> Pretoria, South African Government.
- Engelbrecht, Lezette 2012. Optimal Energy closes its doors. 5 July. Available from: <<https://www.itweb.co.za/content/gxnklOvzzzv4Ymz>> [Accessed November 2018].
- Lamprecht, Norman 2018. Automotive Export Manual 2017. Available from: < <http://www.aiec.co.za/Reports/AutomotiveExportManual.pdf> > [Accessed 20 January 2019].
- National Treasury 2012. Invitation and Evaluation of Bids Based on a Stipulated Minimum Threshold for Local Production and Content for the Bus Sector. Available from: < http://ocpo.treasury.gov.za/Resource_Centre/Legislation/INote%20on%20a%20stipulated%20minimum%20threshold%20for%20the%20bus%20sector.pdf > Pretoria, South African Government.
- Nkomo, JC 2005. The impact of higher oil prices on Southern African countries. Energy Research Centre, 17(1): 10–17.
- PlugShare 2019. Available from: <<https://www.plugshare.com/>> [Accessed 7 January 2019].
- Randall, Tom 2016. Here's How Electric Cars Will Cause the Next Oil Crisis. Bloomberg New Energy Finance, 25 February. Available from: < <https://www.bloomberg.com/features/2016-ev-oil-crisis/> > [Accessed November 2018].
- Rodrigue, JP 2017. The Environmental Impacts of Transportation. Available from: < https://transportgeography.org/?page_id=5711 > [Accessed March 2019].

Santander TradePortal 2019. South Africa: Reaching the consumer. Available from: < <https://en.portal.santandertrade.com/analyse-markets/south-africa/reaching-the-consumers>> [Accessed November 2018].

UNIDO Low Carbon Transport Project in South Africa (LCT-SA). Unity in Sustainable Mobility: Roadmap towards building a unified electro mobility industry in South Africa. Available from: < <http://www.evia.org.za/EVIA2016Booklet.pdf> > [Accessed January 2019].

uYilo E-mobility Programme 2017. Sustainable Transport and Mobility for Cities Workshop -eThekweni Municipality. Available from: < https://www.sanedi.org.za/Cleaner%20Mobility/images/Presentations/uYilo_UNIDO_Sustainable_Transport_and_Mobility_for_Cities_workshop_HitenParmar_320170330.pdf> [Accessed 6 February 2019].

Wyman, Oliver 2005. What's Your Strategy for the Electric Vehicle Market? 19 June. Available from: < https://www.oliverwyman.com/content/dam/oliverwyman/global/en/files/archive/2005/OW_UTL_EN_2009_Electric_Vehicle_Market.pdf> [Accessed November 2018].

