Electric Vehicles White Paper
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MINISTER'S FOREWORD

South Africa stands at a pivotal juncture, facing a challenge of profound complexity: how to transition both its automotive market and productive capacity to Electric vehicles (EVs) while simultaneously achieving the objectives outlined in the South African Automotive Masterplan (SAAM). This challenge is compounded by critical energy shortages, the imperative to decarbonise the economy, and financial constraints across South African households and the public sector. In response to these multiple challenges, this White Paper outlines a comprehensive electric vehicle roadmap for South Africa and the structure of a suite of policy interventions tailored to the automotive industry. It is a product of constructive engagement with stakeholders including within government, industry and labour to chart a viable and sustainable transition path for the industry.

The primary goal of this White Paper is to set a course to transition the auto industry from primarily producing Internal Combustion Engine (ICE) vehicles to a dual platform that includes EVs in the production and consumption mix, alongside ICE vehicles in South Africa by 2035. This vision is aligned with the foundational objectives outlined in the SAAM, a strategic framework implemented from 2021 to shape the nation's automotive industry. It also aligns with changing demand in export markets and South Africa's commitment to reducing greenhouse gases.

The compelling reasons behind this transition are numerous. Foremost is the urgent need to reduce greenhouse gas emissions and combat climate change. Additionally, we recognise the pivotal role the automotive industry plays in South Africa's economy, as a major employer and a driver of economic growth. Focusing on light motor vehicles underscores their ubiquity and contribution to emissions.

This Paper presents a comprehensive, coordinated approach to the transition to minimise the perils of an uncoordinated transition. It draws on extensive international and domestic research and consultations, spanning from 2019 to 2023. It is grounded in the principle that decarbonisation should not lead to de-industrialisation but rather be leveraged for growth, deepening the automotive value chain, fostering growth of local industry, and ensuring the transition aligns with economic priorities.

Central to our approach is the primacy of domestic production of EVs. We view this as the cornerstone of the transition, fortified by tailored market development interventions. Our technology-agnostic stance recognises the rapid evolution of the automotive landscape and positions South Africa as a production destination for vehicles and components in emerging technologies. The commitment to public measures including fiscal support, is clear. Successful management of the transition is a pro-growth and pro-investment strategy.

The approach to the transition set out in this White Paper reflects a commitment to supporting the investors and workforce in the auto and related industries, hence the priority to deepen the auto production value chain.

The success of the transition requires all stakeholders to continue to work collaboratively to navigate this challenging transition and transform it into an opportunity for growth, sustainability, and economic vitality.

MR EBRAHIM PATEL

MINISTER OF TRADE, INDUSTRY AND COMPETITION

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ABBREVIATIONS

AfCFTA	African Continental Free Trade Agreement
AIS	Automotive Investment Scheme
APDP	Automotive Production Development Programme
BEV	Battery Electric Vehicle
CCU	Carbon Capture and Utilisation
DoT	Department of Transport
EPA	Economic Partnership Agreement
EU	European Union
EV	Electric Vehicle
FAME	Faster Adoption and Manufacturing of Electric Vehicles
FCEV	Fuel Cell Electric Vehicle
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GTS	Green Transport Strategy
HEV	Hybrid Electric Vehicle
ICE	Internal Combustion Engine
JET IP	South Africa's Just Energy Transition Investment Plan
MIDP	Motor Industry Development Programme
NDC	Nationally Determined Commitment
EV	Electric Vehicle
OEM	Original Equipment Manufacturer
PHEV	Plug-in Hybrid Electric Vehicle
PI	Production Incentive
R&D	Research and Development
SAAM 2035	South African Automotive Masterplan 2035
SADC	Southern African Development Community
the dtic	The Department of Trade, Industry and Competition
UK	United Kingdom
USA	United States of America

GLOSSARY OF TERMS

A just transition aims to achieve a quality life for all South Africans, in the context of increasing the ability to adapt to the adverse impacts of climate, fostering climate resilience, and reaching net-zero greenhouse gas emissions by 2050, in line with best available science. A just transition contributes to the goals of decent work for all, social inclusion, and the eradication of poverty. A just transition puts people at the centre of decision-making, especially those most impacted, including the poor, women, people with disabilities, and the youth—empowering and equipping them for new opportunities of the future. A just transition builds the resilience of the economy and people through affordable, decentralised, diversely-owned renewable energy systems; conservation of natural resources; equitable access to water resources; an environment that is not harmful to one's health and well-being; and sustainable, equitable, inclusive land use for all, especially for the most vulnerable.

Automotive Investment Scheme (AIS): is an incentive designed to grow and develop the automotive industry in South Africa through investment in new or replacement models and components. The scheme aims to increase plant production volumes, sustain employment, and strengthen the automotive value chain. The AIS is open to light motor vehicle manufacturers, medium and heavy commercial vehicle manufacturers, component or deemed component manufacturers, as well as tool manufacturers.

Green Transport Strategy (GTS): A policy developed by the Department of Transport in South Africa to minimize the adverse impact of transport on the environment while addressing current and future transport demands. The GTS aims to contribute to economic development, build a safe, efficient, reliable, and affordable transport system, and drive the goals of the National Transport Master Plan 2050. It also complements the country's Environmental Implementation Plan 2020-2025. The GTS focuses on several strategic initiatives, including integrated transit systems, road passenger and freight transport, rail transport, aviation transport, maritime transport, cleaner fuels and alternative fuels, cleaner fossil fuels, compressed natural gas, biogas and biofuels, electric vehicles, future modes of transport, transport adaptation and mitigation, and more.

Innovation: An innovation is the implementation of a new, significantly improved product (good or service), process, a new marketing method, or a new organisational model in business practice, workplace organisation or external relations.

Motor Industry Development Programme (MIDP): One of the most significant industrial policy interventions since 1994 in South Africa. It was established to promote the growth and development of the automotive industry in South Africa by providing incentives to manufacturers and exporters of vehicles and automotive components. The MIDP reduced tariffs and provided strong support for exports, which resulted in rapid export expansion.

Automotive Production and Development Programme (APDP): The APDP replaced the MIDP on January 1st, 2013, with minor changes implemented in 2016. The APDP is a production incentive scheme for the motor industry aimed at promoting production volumes in the specified motor vehicle industry, promoting added value in the automotive component industry, and creating employment across the automotive value chain.

South African Automotive Masterplan (SAAM): Published in 2018 with the ambition of increasing productive output and deepening localisation across the value chain.

Nationally Determined Contributions (NDCs): are countries' self-defined national climate pledges under the Paris Agreement, detailing what they will do to help meet the global goal of reducing greenhouse gas emissions.

Electric vehicles (EV): are vehicles that are either partially or fully powered by electricity. In this White Paper, EVs refer to zero or low-emission vehicles, which include battery-electric vehicles, plug-in hybrid vehicles, hybrid vehicles, fuel-cell vehicles, and green synthetic fuel combustion engines. In terms of the policy interventions supporting the production transition, this is only applicable to zero-emission vehicles. With regards to South African government investment funding, EVs are defined as battery electric vehicles, fuel-cell electric vehicles and alternate Electric vehicles that are zero carbon emission.

Research and development R&D comprises creative and systematic work undertaken to increase the stock of knowledge – including knowledge of humankind, culture, and society – and to devise new applications of available knowledge.

R&D tax incentive: The South African government offers the R&D tax incentive under section 11D of the Income Tax Act, 1962 (Act No. 58 of 1962) to promote private sector R&D investment in the country. The incentive allows any company undertaking scientific and/or technological R&D in the country to deduct 150% of its R&D spending when determining the taxable income.

EXECUTIVE SUMMARY

The global automotive industry is undergoing one of the most seismic shifts in its nearly 150-year history. Spurred by the urgent goal of decarbonising the world's economy in the wake of unprecedented climate change, regulators and consumers around the world are demanding a range of lower or no-emission vehicles, which includes electric vehicles (EVs), sustainable fuel-driven vehicles and fuel-cell technologies. Adoption of EVs has increased globally, driven in part by greater government incentives such as tax breaks and targeted subsidies for producers and consumers, and demand trends. Several regulators have also decided to ban the sale of new Internal Combustion Energy (ICE) vehicles within the next 12 years as part of their contribution to achieving net zero emissions by 2050, including markets like the European Union (EU) and the United Kingdom (UK).

These global trends will have a significant impact on South Africa and its economy. Not only is South Africa the largest automotive manufacturing hub on the African continent, but it is also highly integrated into global supply chain that draws components from across the world, including the Southern African Development Community (SADC) region, and exports the final consumer product to more than 150 countries worldwide. As a larger number of countries transition both their consumer and production markets to EVs, the impacts will be significant for South African producers. The effective bans on ICE vehicles in key markets like the EU and UK will be profound, as they absorb nearly half of South African auto production.

Allowing the South African automotive industry to decline without the appropriate support is thus not an option for the South African Government. The automotive industry contributes significantly to the South African economy, ranking as the fourth largest in terms of output across all manufacturing sectors and contributing materially to export revenues; they account for a significant part of the regional development in provinces like Eastern Cape, Gauteng, and KwaZulu-Natal; and the industry creates and sustains large numbers of jobs and promotes skills development. (See Chapter 2 for more detail.)

This White Paper thus sets out the policy goals and actions which will be taken to support the transition towards a broader new energy vehicle production and consumption in South Africa, with an immediate focus on electric vehicles. The White Paper is the culmination of substantial research and engagement over the last number of years and follows the publication of a Green Paper in 2021, extensive industry consultation (assemblers, component makers and organised labour), consideration of public comments, all of which helped to shape the policy actions to be taken. The White Paper also builds on the work of the South African Automotive Masterplan (SAAM 2035), which was published in 2018 with the ambition of increasing productive output and deepening localisation across the value chain.

In developing the EV and NEV White Paper, a set of six core principles have underpinned the policy goals and actions to be taken: (i) The transition to EVs and NEVs is necessary, and the pace at which key decisions are required is urgent given the speed at which markets are developing, and the long lead-times for investment decisions; (ii) attracting investment requires a technology agnostic[1] approach, including embracing a range of clean energy sources to ensure an appropriate transition;

[1] An approach that is neutral towards specific technologies in new energy vehicles and rather opts to embrace a range of zero-emission vehicle technologies as they become established in markets

(iii) investment support is required to boost productive capacity; (iv) policy actions have to reflect cost-effective and fiscally-sustainable solutions; (v) deepening localisation of the auto supply chain, including through beneficiation of critical minerals through the development of regional value chains is essential; and (vi) policy actions must reflect the need for a just transition in the automotive industry. (See Chapter 3 for more detail.)

Whilst the White Paper distinguishes between the different technologies, as set out above, which range from battery-electric vehicles, to fuel-cell technologies and sustainable fuels (also called synthetic fuels), and maintains policy neutrality, for ease of reading in a number of cases refers to 'electric vehicles (EVs)' as a generic term of all new-energy vehicles – context indicates where it is a specific technology that refers to batter-electric vehicles and where it is a generic term for all new energy vehicles.

The White Paper recognises the major industrialisation opportunity for South Africa and the region to develop regional 'critical minerals to batteries' value chains. Realising this opportunity will require a regional approach to critical mineral beneficiation. Southern Africa is endowed with considerable mineral wealth necessary for the global green transition; both to produce EV components and other energy sources necessary for the green industrial revolution. The White Paper thus seeks to establish a framework under which African countries work with partner countries to develop the industrial capacity necessary to make the continent a key industrial player, rather than just a source of critical minerals, in the transition to EVs. The White Paper has thus identified a two-pronged approach, with two focus areas. A first focus on developing South African EV productive capacity through early action; and a second focus on developing a local market for EVs. While there are linkages between the production and consumption of EVs in South Africa, a clear distinction between the two is necessary to ensure a focused approach to policy implementation. Transitioning South Africa's automotive productive capacity to EVs further supports South Africa's contribution to global decarbonisation through South Africa's large export footprint.

While existing policies such as the Automotive Production Development Programme (APDP 2) and the Automotive Investment Scheme (AIS) provide a good framework for developing EV productive capacity, including in assembly and component manufacture, additional action will be required. The White Paper thus identifies 10 policy goals with a set of 16 unique and distinct policy actions to be implemented over specific timelines between 2023 and 2035 (illustrated in Figure 1 and described in more detail later in the White Paper) with 10 actions in support of the development of cost-competitive EV productive capacity in South Africa; and 6 actions in support of the development of a cost-effective local market for EVs. (See Chapters 4 and 5 for more detail.)

The 10 actions in support of the development of South African EV productive capacity are:

- 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 AIS guidelines. The higher levels of investment funding are intended to catalyse EV investment in automotive assembly and component manufacturing.
- 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 SADC region's participation in the automotive value chain.
- The introduction of a temporary reduction on import duties for batteries in vehicles produced and sold in the domestic market, to improve cost competitiveness.

- Securing or maintaining duty-free export market access for vehicles and components produced in South Africa to support the resilience of the industry.
- Leveraging R&D tax incentives to deepen domestic value addition.
- Commercialising green hydrogen production in South Africa as a source of sustainable fuels;
- Implementing energy reforms, including executing interim solutions for energy in partnership with industry.
- Implementing reforms to network industries, including freight rail and ports.
- Refurbishing the rail line between Gauteng and Ngqura to improve overall cost-competitiveness.
- Developing an EV certification programme in collaboration with industry for skills development.

The 6 action actions in support of the development of a South African market for EVs are:

- Developing and implementing a framework for fleets to transition to SA-produced new energy vehicles, including government-owned, public transport, corporate fleets, and mining equipment.
- Scale up investment in charging infrastructure
- Developing opportunities for localisation of charging components and infrastructure.
- Supporting increased grid capacity to facilitate uptake of EVs.
- Consider consumer incentives for adoption of EVs.
- Evaluating the need for economic regulation on EV charging.

To be successful, the 16 actions will require all stakeholders to contribute to their implementation. This includes government departments and agencies, as well as industry. A key tenet of success will be the appropriate alignment of interventions which will be facilitated through the SAAM oversight bodies. The mobilisation of funding will also be critical, especially against the principles of cost-effectiveness and cost competitiveness. The role of DFIs, private capital and industry will thus be essential in supporting the government in financing the implementation of the necessary policy actions outlined in this White Paper (see Chapter 6 for more detail).

The transition to EVs and clean transportation forms an important area of the broader green industrial revolution taking root in the 21st century. South Africa's ability to leverage its historical strengths in the automotive industry and to build towards one which is compatible with the pursuit of net zero can thus form a pillar of the country's industrial success in the years to come. This White Paper sets out those actions which the government, working with social partners in industry, labour and communities, can leverage to ensure a just and prosperous transition for the industry.

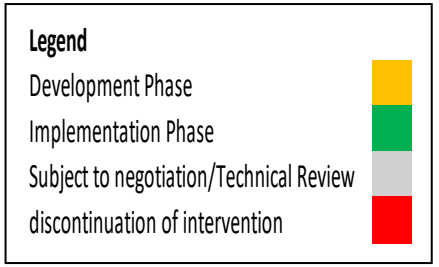
The Minister of Finance announced elements of the architecture of measures to support EV production and sales in his Medium-Term Budget Policy Statement in November 2023. Further details will follow in the 2024 Budget Speech. The Minister of Trade, Industry and Competition will also announce changes to the APDP 2 framework to support the EV transition.

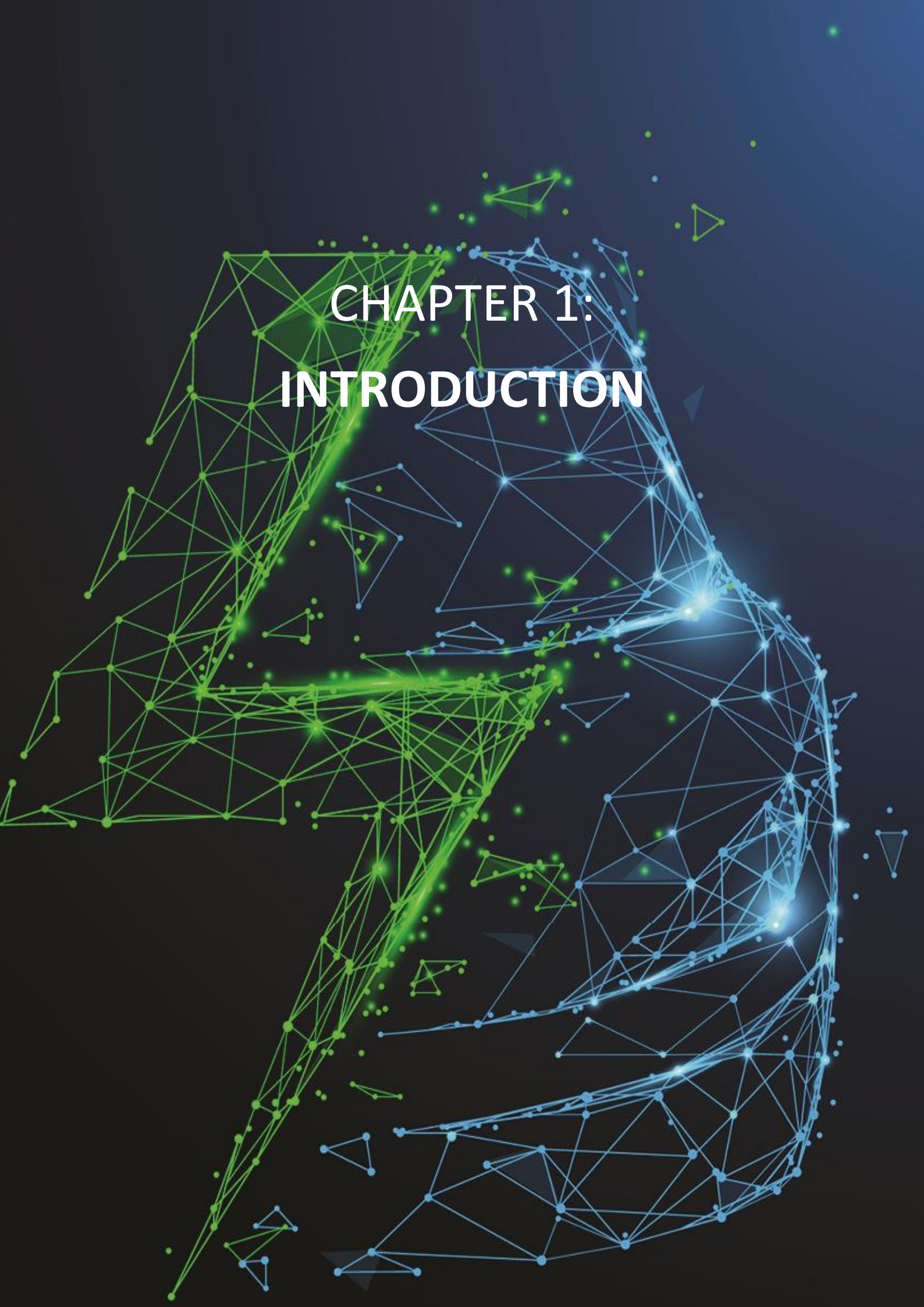
The rest of this paper is set out as follows: Chapter 1 provides a brief introduction to the global and South African context and intent of the White Paper. Chapter 2 provides details on the global transition, including the global and local policy landscape, implications for South Africa and the contributions of the automotive industry to the South African economy. Chapter 3 provides details on the principles followed in developing the White Paper. Chapter 4 provides details on the context,

policy goals and actions to transition productive capacity towards EVs. Chapter 5 provides details on the context, policy goals and actions to develop the local market. Chapter 6 provides details on funding and stakeholder support required to achieve the goals of the White Paper. Chapter 7 concludes.

Figure 1 Summary of policy actions and timelines to be taken in support of the transition to EVs in South Africa

	ACTION	Responsible Parties	Potential Impact	Expected Implementation 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Investment in Production	1. Increase levels of investment and investment funding	Government & Industry	Increase EV & EV component investments	
	1.1 Publish AIS guidelines	DTIC		
	1.2 Manage cost-effectiveness and affordability of incentives	DTIC & NT		
	1.3 Investments in assembly and component manufacturing	Industry		
	2.Facilitate the development of the electric battery value chain	Industry & Government	Localise/regionalise EV value addition	
	2.1 Enable raw material refining and battery active materials and components production	DTIC, DMRE,NT, ITAC & IDC		
	2.2 Jointly develop SADC regional battery value chain	DTIC,DMRE& DIRCO		
	2.3 Develop a value proposition for production of battery cells in South Africa.	Industry, DTIC, IDC& DMRE		
	2.4 Commit demand for EV batteries	Industry & Government	Local market development	
	3. Introduce a temporary reduction import duties for batteries in vehicles produced and sold in the domestic	DTIC,ITAC & SARS	Decrease cost of producing EVs for SA market.	
	3.1 Amend and publish APDP legislative framework	DTIC,ITAC & SARS		
	4. Market Access: Secure duty free export market access for EVs and EV components	DTIC	Improving export competitiveness	
	5 Leverage Research and development Tax Incentives to deepen value addition	Industry	Improving international competitiveness	
	6. Commercialise green hydrogen	Industry, Presidency, DTIC, IDC, DBSA, NT, DSI, DMRE,	Production of green synthetic fuels &	
	7. Refurbish rail line between Gauteng and Ngqurha	Transnet, DTIC, IDC, Industry	Improving cost competitiveness	
	8. Implement the energy and freight rail and port reforms	Eskom, DMRE,Transnet Presidency, NT, Industry	Improving cost competitiveness	
	9. Execute interim solutions for energy in partnership with industry	Presidency, DTIC, municipalities, Industry	Improving cost competitiveness	
	10. Develop an EV certificate programme in collaboration with the industry	merSETA, DEL, the DHE, Industry	Skills development for job retention.	
Local market development	11. Scale up investment for charging infrastructure and deepen localisation	Eskom, SANRAL, DTIC, DoT, IDC, and DBSA, Industry.	Increased domestic demand of EVs	
	12. Industry together with the DTIC, and IDC to explore opportunities for localising charging components, to support employment creation along the value chain.	NAAMSA,NAACAM, DTIC	Efficiencies in infrastructure rollout	
	13. Develop & implement a framework for government fleets to transition to SA produced NEVs	DoT, DCGT, DTIC	Accelerating the EV transition	
	14. Support Increased grid capacity to facilitate uptake of EVs	Eskom, NECOM	Increased domestic demand of EVs	
	15. Consider consumer incentives for adoption of EV vehicles	NT	Accelerating the EV transition	
	16. Evaluate the need for regulation of EV charging.	DTIC, DMRE, DOT, NERSA		





CHAPTER 1:
INTRODUCTION

1 CHAPTER 1: INTRODUCTION

The global automotive landscape is undergoing profound transformations triggered by climate mitigation and adaptation legislation and the associated technological disruptions. In response, demand and supply patterns are changing from a dominance of internal combustion engine (ICE) vehicles to a mix that incorporates battery electric vehicles (BEVs); plug in hybrid electric vehicles (PHEVs); hybrid electric vehicles (HEVs) and fuel-cell electric vehicles (FCEVs). In this paper, these categories are subsumed under the heading of electric vehicles (EVs) for ease of reading. These changes are profoundly affected by supply chains for auto production, including the introduction of new components such as batteries and a decline in the demand for ICE-specific components such as petrol engines and catalytic converters.

These transformations simultaneously pose threats to, and create opportunities for, the South African automotive assembly and component manufacturing industry. A failure to transition the automotive industry will likely result in the loss of key export markets for both assembled vehicles and automotive components. In terms of automotive assembly, 46%[2] of vehicles produced in the country are exported to the United Kingdom (UK) and European Union (EU), markets that have made commitments to ban the sale of new fossil-fuelled ICE vehicles by 2035. In terms of component manufacturing, an estimated 67% of the country's exports are at risk due to a projected decline in demand for ICE-specific components.

In parallel, technological changes shaping the industry – such as batteries – create opportunities to deepen backward integration and thus maintain or increase value addition and employment in the value chain. For many of the components, international competitiveness is dependent in part on demand from domestic vehicle assembly to achieve economies of scale.

Thus, it is imperative that the country navigates the transition in a manner that supports the continued production and export of vehicles and components to maintain and potentially grow the more than 110,000 direct jobs (8% of manufacturing employment) in the industry. A failure to do this risks a decline in the automotive industry, a vital component of the country's manufacturing capacity accounting for approximately 10%[3] of total manufacturing output; up to 2,9%[4] of South Africa's GDP. Given the importance of the automotive manufacturing value chain in regional economies of several provinces across the country – particularly Eastern Cape, Gauteng, and KwaZulu-Natal – a decline in the automotive industry may have devastating effects. These effects would be more pronounced at a metro or city level.

Achieving a successful transition requires clear policy direction to facilitate coordination of the various elements of the transition including investments in automotive assembly, component production, and charging infrastructure; alignment with energy and logistics developments; skills development; and implementation of policy levers affecting the supply chain development. The key challenges and opportunities that the EV policy seeks to address and give direction on include:

[2] Calculated with NAAMSA Export Manual data for 2022.

[3] Calculated with Quantec standard industry data, output is measured as real output (2015 prices).

[4] NAAMSA Export Manual, note that this is above the contribution attributed by standard statistics due to the "motor vehicles, parts and accessories" excluding key automotive components. For example, catalytic convertors are classified as machinery and equipment in the standard industry classifications.

- how South Africa will navigate the tension in the pace of the transition in the domestic market and in its key export markets;
- the country's approach to reconfiguring automotive production to embrace EVs, leveraging their eco-friendly features and technological advancements;
- how the country will catalyse a shift in consumer preferences and infrastructure rollout to promote the adoption of EVs within the domestic market, in line with South Africa's NDCs and to support economies of scale for the production industry;
- how policy will support deepening backward integration in the automotive value chain to capture higher levels of value addition and support the growth of employment;
- how policy can support the development of the necessary skills to ensure a just transition across the automotive value chain, including in aftermarket services.

This is all to support the EV White Paper's overriding objectives of creating a conducive environment for the industry to:

- **take up opportunities for value addition growth** by producing EV vehicles and components including battery production; and
- **limit value addition and employment losses** created by the global phasing out of ICE vehicles and automotive components produced by South Africa.

The maintenance of automotive production in South Africa ensures that the road transport transition is just, in this context understood as at a minimum limiting job loss and identifying areas of job-creation; supporting continued entrepreneurial opportunities in the value chain; managing the regional impact; re-skilling and redeploying displaced employees; and supporting inclusive, sustainable growth.

This White Paper outlines South Africa's approach to transitioning the production and consumption to EVs while aligning with the ambitious objectives of growing the industry to 1% of global production and increasing local content from the current average of 40% to 60%, as articulated in the South African Automotive Masterplan (SAAM).

1.1 Global Context

Climate change is triggering significant economic transformations as societies and industries adapt to its impacts and strive to mitigate its effects. At a global level, the transport sector accounts for more than a third of greenhouse gas emissions.[5] This has meant that the sector is amongst those that are prioritised for reducing emissions.

In response, countries are setting pathways for reducing emissions for the various modes of transportation. In terms of road transport, these policy announcements include setting targets for banning new sales of ICE vehicles; introducing carbon taxes levied on new vehicles and fuel

[5] International Energy Agency: https://www.iea.org/energy-system/transport

consumption; incentives for transitioning automotive and component production; plans for rolling out charging infrastructure and upgrading electricity grids; and consumer subsidies for purchases of EVs.

This has supported the global growth in the production and consumption of EVs. Globally, EVs as a share of total vehicle sales have more than tripled from 4% in 2020 to 14% in 2022.[6] Going forward, new sales of ICE vehicles are projected to decline to approximately 25% of total sales by 2035, with the remaining 75% being EV sales.[7] However, while global sales of EVs may increase to such levels, there may be differences in the distribution of ICE and EVs at a regional level, with many parts of the developing world, including the African continent likely to transition at a slower pace. Whilst it is also the case that more recently, there has also been a slowdown and/or pushback in developed market economies in regard to EV consumption/regulation, the general trendline of greater EV adoption is clear and South Africa will need to respond to it.

As South Africa exports approximately 63% (2022) of the vehicles it produces, the country cannot ignore global developments.[8] Key export markets like the EU and the UK have each announced effective bans on the sale of ICE vehicles by 2035, coupled with incentives for the consumption of EVs in these markets and a general consumer trend towards climate-friendly modes of transportation will reduce demand for many of the vehicles currently produced in South Africa. The long lead times in investment decisions in the industry, as well as the investment cycles lasting between 5 to 7 years, mean that most investment decisions need to be taken in the 2020s. This requires the country to ensure policy certainty to support these investments, while continuing to support the demand for ICE vehicles which may arise from markets which transition slower, like parts of the developing world, due to infrastructure gaps and price premiums.

1.2 The South African Context

In its updated Nationally Determined Commitments (NDCs, 2021), South Africa has set targets to reduce greenhouse gas emissions. The transport industry is South Africa's 3rd largest source of emissions, accounting for 11% of the total and therefore important for emissions reduction[9]. The Department of Transport published the country's Green Transport Strategy (2018 – 2050), which set out the ambition to reduce transport greenhouse gas emissions to 5% by 2050.

The pace of South Africa's transport transition will however be influenced by several factors:

- First, the country currently has an energy shortage and power availability has led to load shedding. This will impact on domestic adoption of EVs in the short-term due to the need to avoid a sharp rise in energy demand on the grid from EVs whilst the grid capacity is rebuilt.

- Second, the current energy mix is skewed towards fossil fuels, which have a high carbon footprint. This may impact on domestic adoption of EVs due to the lower positive impact on emissions from EVs that continue to use fossil-fuels for charging purposes, reducing the overall decarbonisation benefit of EVs in South Africa versus countries with greater a renewable energy mix.

[6] International Energy Agency, 2023.

[7] Bloomberg Electric Vehicles Outlook 2023.

[8] Calculated using NAAMSA Export Manual data.

[9] National GHG Inventory Report, 2021

- Third, the charging infrastructure rollout is still in early stages and there are challenges with the interoperability of the privately-funded charging systems. Lessons from network industries are clear that interoperability supports greater access and competition, which can deliver better prices.

- Fourth, the prices of EVs are currently at premiums ranging from 20% to 50% above equivalent ICE models making them uncompetitive, particularly with price-sensitive consumers. However, these premiums are projected to decline over time and the total cost of ownership over the useful life of an EV is comparatively lower due to lower operating costs such as refuelling and maintenance costs.

The combined impact of the above factors has meant a slow uptake of EVs in South Africa. In 2022, 4 674[10] EVs were sold in South Africa, 0,9% of total sales in that year. This creates tension in the transition trajectory of the South African market relative to the local automotive manufacturing industry's key export markets, the UK and EU. These markets, which jointly consume 46% of the vehicles produced in South Africa and more than those supplied into the domestic market, have announced plans for new sales to be 100% zero-emissions by 2035.

This raises a challenge for automotive production in South Africa. The business case for production is dependent on a combination of domestic and export demand, infrastructure, competitiveness, and incentives. This is not unique to South Africa but is the global approach to automotive production. Domestic demand alone, including for ICE, does not support the economies of scale required to operate at internationally competitive levels. The global nature of automotive production and supply means that if South Africa's production transition significantly lags those of its key export markets, these will likely be lost. Though there is a possibility of finding alternative markets, there is no guarantee that the country will have cost-competitive and/or duty-free access to other markets as it does in the UK and EU. The developments of the African Continental Free Trade Agreement (AfCFTA) certainly show promise over the medium term, however, the pace of growth of the Rest of Africa's demand is slower than the projected pace of decline in ICE demand in the UK and EU and second-hand vehicles dominate sales in many parts of the Continent. Alternate markets may also become more competitive as other ICE producers seek markets for their production.

The component manufacturing industry accounts for the lion's share of jobs in the automotive industry, accounting for over 70% of the total employment in the automotive industry in 2022. It is also at this level of the value chain where there is potential to deepen domestic value creation and capture more benefits in South Africa. Maintaining production and export of components is critical for limiting job losses from the transition and growing employment as the industry grows.

A key tenet of SAAM 2035 is to grow the local content of vehicles produced in South Africa from the current average of 43% to 60%. The SAAM 2035, which was developed before the bans of fossil-fuelled ICE vehicles in the EU and UK were announced, set the objective of almost doubling domestic production of vehicles in order to increase economies of scale and therefore the domestic component industry's international competitiveness. The threat to export markets taken together with slow growth projections for the South African economy affects the achievement of this objective. Similarly,

[10] NAAMSA Export Manual

the replacement of ICE-specific components produced by South Africa with electric components not yet produced by the country would mean a decline in the local content of EVs, if the industry does not transition.

Consequently, one of the key areas of focus for the EV White Paper is facilitating the deepening of value addition in the industry, which entails producing several new electric components and increasing local value addition through backward integration in critical components such as batteries.

A successful transition for component manufacturers requires the domestic assembly of vehicles to establish demand and support the localisation of production through technology partnerships; leveraging South Africa and the region's critical mineral endowments and other raw materials to backward integrate into the EV automotive supply chain; and cost competitiveness in the context of the realities of economies of scale, and distance to export markets.

1.2.1 The Evolution of Automotive Policy and Industry Performance

The automotive industry is widely regarded as one of the industrial policy success stories of South Africa's democratic era. Starting with an industry with limited capacity and constrained global competitiveness, the country successfully facilitated a transformation of the industry to one which is globally competitive, hosting manufacturing facilities for 7 major Original Equipment Manufacturers (OEMs) (with another two more expected to establish manufacturing facilities), with annual output amongst the top 25 producing countries in the world. The automotive industry has benefited from industrial policy support that has been associated with above-average performance relative to other non-commodity manufacturing activities. It is this platform which the EV White Paper seeks to build on for its success.

During the pre-democratic period, the automotive industry in South Africa was managed under a policy of import substitution, characterised by extremely high tariffs. The industry largely served the South African market, with each manufacturer producing low volumes of a proliferation of different models at considerably higher costs than equivalent production in other countries. [11] The creation of the World Trade Organisation (WTO) in 1994 and the resultant agreement to liberalise trade through a reduction in tariff barriers threatened the very existence of the South African automotive industry and thus required a change in the approach to industrial policy. The Motor Industry Development Programme (MIDP), which ran from 1995 to 2012 led to increased investments and integration in the global value chains with higher exports and imports. The number of vehicle platforms declined, and the average volume of vehicles assembled per platform increased, supporting economies of scale for the local component manufacturing industry.

Independent reviews of the MIDP found that overall, the programme was successful as the economic gains outweighed the fiscal costs, the industry outperformed the rest of manufacturing and there were improvements in its international competitiveness.[12]

The MIDP was replaced by the Automotive Production Development Programme (APDP) in 2013 to shift support from an export to a production focus and to deepen localisation of the value chain. A similar framework of incentives was used in the APDP, with a shift from a focus on exports to achieving

[11] Hartzenberg and Muradzikwa, 2002; Barnes, 2013

[12] Barnes & Black, 2014

greater levels of local value addition. Independent reviews of APDP 1 (2013-2021) found that there was real growth recorded over the 2011-2021 period, despite a general period of decline in many parts of the manufacturing sector. The industry had also established capabilities as illustrated by high export contribution, contribution to manufacturing employment, managerial capabilities, worker skill upgrading, and technology multipliers.[13] However, there were also concerns over the limited growth of the component industry. These concerns formed the basis of the development of the APDP phase 2 (APDP2) and the South African Automotive Masterplan (SAAM, 2021-2035).

APDP 2, implemented from July 2021, provides the incentive framework for the industry for the period from 2021 to 2035. The SAAM 2035 vision is the achievement of *"a globally competitive and transformed industry that actively contributes to the sustainable development of South Africa's productive economy, creating prosperity for industry stakeholders and broader society".* The vision of the SAAM can be broken down to four elements. The first is the improvement of the industry's global competitive position. The second is related to the industry's contribution to the transformation of the South African economy, which includes ownership through the greater inclusion of Black-owned firms. The third is the sustainable development of the South African economy which includes aspects such as industry growth, employment levels, skills development, and environmentally sustainable products and processes. The fourth is shared prosperity created by the industry and includes the financial health of firms within the value chain, the fair remuneration of employees, and the holistic contribution of the value chain to the South African fiscus. The long-term strategic objectives of the SAAM are to:

- grow South African vehicle production to 1% of global output;
- increase local content in South African assembled vehicles to 60%;
- double total employment in the automotive value chain;
- improve automotive industry competitiveness levels to that of leading international competitors;
- transform the South African automotive industry through the employment of black South Africans, upskilling of black employees, empowerment of 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 the South African automotive value chain.

The EV transition poses challenges to the achievement of these objectives, as noted earlier in this White Paper. As South Africa's most successful non-commodity manufacturing industry, it is critical to the domestic economy that the automotive industry achieve its potential through to 2035 and beyond. A failure to transition risks a decline in the contribution of the industry to the economy, which is detailed in Chapter 2.

1.3 Looking to the future

The SAAM vision and specifically achieving vehicle production accounting for 1% of global production by 2035, will need to be realised through alignment with the global EV transition. The dynamics of the

[13] Morris et al, 2021

South African automotive industry are notably changing owing to the global supply chain disruptions, as well as the transition to EVs. While Europe continues to dominate as a key automotive export region, accounting for 72.7%, or nearly three out of every four vehicles exported in 2022[14], the future of South Africa's vehicle exports to Europe is uncertain due to the increasingly strict emission regulations.

Furthermore, the legislation to ban the sales of new fossil-fuelled ICE vehicles in the EU and the UK by 2035, in favour of zero-emission vehicles, poses a significant risk to South Africa's exports. Domestic vehicle production, therefore, needs to align with the overall technology shift of the global value chains in which the OEMs operate to ensure that the manufacturing base in South Africa is retained and strengthened. A failure to do so leaves the country is at risk of losing more than 46% of its production volume from 2035, which will no longer make production viable in South Africa.

It is important for South Africa to shift from the production of ICE vehicles to EVs in efforts to not just retain but to successfully grow the domestic automotive industry in realising SAAM 2035 objectives. This is also as South Africa's industrial policy aims to support industrial development, sustainable economic growth, decent well-paying jobs, and economic inclusion, and seeks to improve the balance in the country's international trade by increasing exports of higher value-added manufactured goods.

The transition from ICE to EV will take some time. South Africa may need to support a dual platform for a period which may require capacity in both ICE and EVs through the value chain. ICE vehicles may be required for the local market, but also for some export markets. Manufacturing facilities will thus require capacity in both types of vehicles for a period. An orderly yet urgent transition will thus secure established capabilities as illustrated by high export as a proportion of production, contribution to manufacturing employment, managerial capabilities, worker skill upgrading, and technology multipliers.

1.4 The EV White Paper: rationale and process

After the publication of the Auto Green Paper titled "on the Advancement of Energy Vehicle in South Africa" (**the dtic**, 18 May 2021), the government received comments from a range of stakeholders including government departments and agencies, academics, industry stakeholders, social partners, and the general public.

The Green Paper recognised and articulated South Africa's transition challenges and identified the causes and proposed policy solutions. While comments were generally supportive of the shift to EV manufacture in South Africa, several areas were highlighted as essential for the broader EV strategy including grid stabilisation, prioritisation of charging infrastructure, the need for appropriate tax incentives, prioritisation of skills development and policy coordination. These concerns have been considered and discussed with industry in detail.

In conjunction with developing the White Paper, an EV work programme was undertaken with the following workstreams:

- **Supporting the maintenance and expansion of capacity that can be leveraged for the transition.** Much work has been done to stabilise the industry from the COVID-19 shock. This included: the introduction of APDP2 in July 2021; supporting new investments that expanded domestic production capacity; launching the Automotive Industry Transformation Fund (AITF), a mechanism to deepen transformation in the industry; and the negotiation of the

[14] NAAMSA, 2022

African Continental Free Trade Agreement (AfCFTA) Rules of Origin to secure duty-free market access in the rest of the Africa.

- **Building on the evidence base established in the preparation of the Green Paper:** To assist the development of a road map that navigates the complexities of the transition for South Africa, four studies were undertaken. The first study estimated the cost of the industry proposals, Study 2 was an analysis of measures in comparator countries, Study 3 was an analysis of the environment for battery production, and Study 4 was comparative analysis of government intervention options.

- **Comparative assessment of the different approaches to the transition, balancing first best scenarios, country context and cost.** This entailed further consultation with industry and labour on developments since the green paper, possible phasing of investments, and analysis of opportunities for deepening backward integration in EV value chains, including battery production. This was complemented by consultations within the government on the broader EV ecosystem and engagements with the budget process on the fiscal implications of the incentive package that is considered.

- **Building the broader EV Ecosystem:** The EV transition takes place in the context of the country's just energy transition and a successful transition requires the development of an ecosystem including clean energy availability, charging infrastructure, coordination of policy to support certainty and development of the key supply chains. Much has been achieved in terms of policy laying the foundations of this ecosystem. In 2021, South Africa updated its climate mitigation and adaptation targets through its NDC, which set a phased approach to emissions reduction. While there is overlap in the periods, there is a focus on each of the decades leading to 2050. Transitioning towards low-emission vehicles will be a priority focus for the 2030s. The transition focus for the 2020s will be on shifting electrification towards clean energy and supporting energy security. The South African Renewable Energy Masterplan (SAREM) is currently being finalised, which aims to drive the industrial development of renewable energy and battery storage value chains. There has been support for renewable energy roll-out, which has increased the contribution of clean energy to the grid and self-generation has also been introduced.

- **A Just Energy Transition:** South Africa has developed a Just Energy Transition Investment Plan, negotiating funding for the plan with the International Partnership Group**.** Transition investments that are prioritized for the transport industry include logistics and public transport, with charging infrastructure as a consequence of demand pathways. The government has developed and finalised a Green Hydrogen Commercialisation Strategy, which seeks to establish domestic markets in mobility applications including fuel-cell EVs, amongst other objectives.

The vision and strategy of the EV transition White Paper is to mitigate the risks created by the transition for the country and facilitate the realisation of economic development opportunities that are created. This is in line with the principle of a just transition. Given the various potential benefits and burdens of the transition, a phased approach to the transition will be adopted. The aim of the interventions proposed in this White Paper is to support:

- the creation of a high-yielding business environment, including an appropriate fiscal and regulatory framework, which makes South Africa a leading and highly competitive location, not only within the African continent but globally, for EV production;

- investment in the expansion and development of new and existing manufacturing plants to support the production of EVs within South Africa and to grow the level of employment in the industry;

- development and investment in EV component technology and expansion of the fledgling electric supply chain, by increasing support and investment in a set of unique EV components;

- reinvestment and support towards reskilling and upskilling of the workforce to ensure the right skills are available for the design, engineering and manufacturing of electric vehicles and related components and systems;

- adoption of new and sustainable manufacturing processes across the automotive value chain, to significantly reduce greenhouse gas emissions, and improve our environmental wealth; and

- ensuring that Research and Development (R&D) investment is strategically targeted at activities that are likely to give South Africa a competitive advantage.

In line with SAAM 2035, the development of the South African automotive industry is characterised by a technology-agnostic approach, emphasizing support for an array of technologies based on market readiness, appropriateness for the SA and export markets, and the potential for domestic value addition through the supply chain. This could include sustainably-fuelled ICE vehicles, battery electric vehicles or fuel-cell electric vehicles. This inclusive approach recognises that the future of the automotive industry is not limited to a single technology but encompasses a diverse range of innovations and advancements. It ensures that the industry remains adaptable and can embrace emerging technologies.

Core principles that underpin this transition and the EV policy development are:

- **Urgency and Necessity of Transition:** The transition to EVs is not merely a strategic option; it is a necessity and an urgent imperative. To maintain and grow South Africa's production base and secure export markets, the country must actively participate in the global shift toward cleaner transportation solutions. This principle underscores the urgency of action, emphasising that South Africa's automotive industry must lead in the production of fully electric vehicles.

- **Investment Support for developing an EV Productive Capacity:** Public support and active policy and fiscal measures for investment in electric vehicle manufacturing and related infrastructure is essential for maintaining and enhancing South Africa's productive capacity. This is a critical means of growing the SA economy. This principle encourages public-private partnerships, incentives, and policy frameworks that foster a conducive environment for investment. It recognises that investments in EV production contribute not only to job creation but also to technological advancement and sustainable economic growth.

- **Cost-Effectiveness:** In the pursuit of EV production and adoption, the cost-effectiveness of related incentives is paramount. This principle acknowledges that the affordability of transitioning the industry to produce electric vehicles and for consumers to use them is central to their acceptance and proliferation. Strategies and policies must be developed to make the production of electric vehicles in South Africa feasible and increase the accessibility of EVs to

a broad range of consumers, ensuring that the transition is economically viable for producers, workers, consumers, and the government.

- **Technology Agnosticism for Attracting Investment:** South Africa's commitment to the transition to EVs is rooted in a technology-agnostic approach. This principle recognises the diverse landscape of emerging technologies in the electric vehicle domain, encompassing various propulsion systems, battery chemistries, and charging infrastructure. By remaining technology-agnostic, South Africa welcomes a broad spectrum of innovation and encourages investment from a multitude of stakeholders, both domestic and foreign. It allows the market to act within a predictable production and consumption environment. In addition, the transition to clean energy Synthetic fuels, also known as e-fuels or synthetic hydrocarbon fuels, may play a role in addressing climate change and reducing carbon emissions in the transportation and industrial sectors. Whilst retaining the principle, attention will be given to developments in the fuel-cell EV technologies, given the opportunity to use PGMs as catalysers.
- **Deepening the auto supply chain, including through beneficiation of Critical Minerals:** The transition to EVs hinges on the availability of critical minerals, such as lithium, cobalt, copper zinc, PGMs and rare earth elements. South Africa and the SADC region possess significant mineral resources, and this principle emphasises the beneficiation of these resources. By adding value through refining, processing, and manufacturing, South Africa and the region can secure a reliable supply chain of critical minerals, reduce dependence on imports, and position itself as a global industrial player in the EV value-chain.

Embracing these principles is crucial for ensuring the sustainability, competitiveness, and economic growth of the automotive industry in South Africa.

CHAPTER 2:
THE EV TRANSITION

2 CHAPTER 2: THE EV TRANSITION

2.1 The many intersecting challenges of the green transition

One of the critical challenges of the broader EV transition is that the transition needs to take place whilst other significant shifts in the domestic and global landscape are occurring.

First, there is the transition from ICE to EVs outlined in the earlier sections of this White Paper. As highlighted, this transition is uneven, with different parts of the world moving at different speeds and with differing levels of support to encourage the transition.

Second, there is a broader energy transition, whereby, for climate and sometimes economic reasons, countries around the world are adopting strategies for clean energy generation. This broader transition has different cost implications for countries, which may impact GDP and/or constrain the resources available.

Third, there is a specific technology transition within the broader transition to EVs, with both an uncertain timing and trajectory. Battery technology for example is changing quickly, whilst e-fuels and fuel-cell technologies are being considered, with rapid evolution requiring countries which implement EV strategies to navigate a complex and uncertain set of circumstances around which technology may "win out" in the long run. Account will also need to be taken of the considerable projected benefit to SA if fuel-cell technology maturity enables greater demand for platinum-group metals (PGMs).

Fourth, mobility is changing, with autonomous, self-driving vehicles likely to shift how society engages with vehicle ownership and usage. Artificial intelligence and machine learning may also impact further, extending not only to how vehicles operate but also how they are produced and used.

Fifth, an impact of these intersecting challenges is that different OEMs have different plans for how, when and where each will transition from ICE to EV production and marketing. Thus, in designing an enabling scheme for the transition from ICE to EVs in South Africa, the uneven speed and uncertainty must be appropriately navigated.

2.2 Global drivers of change

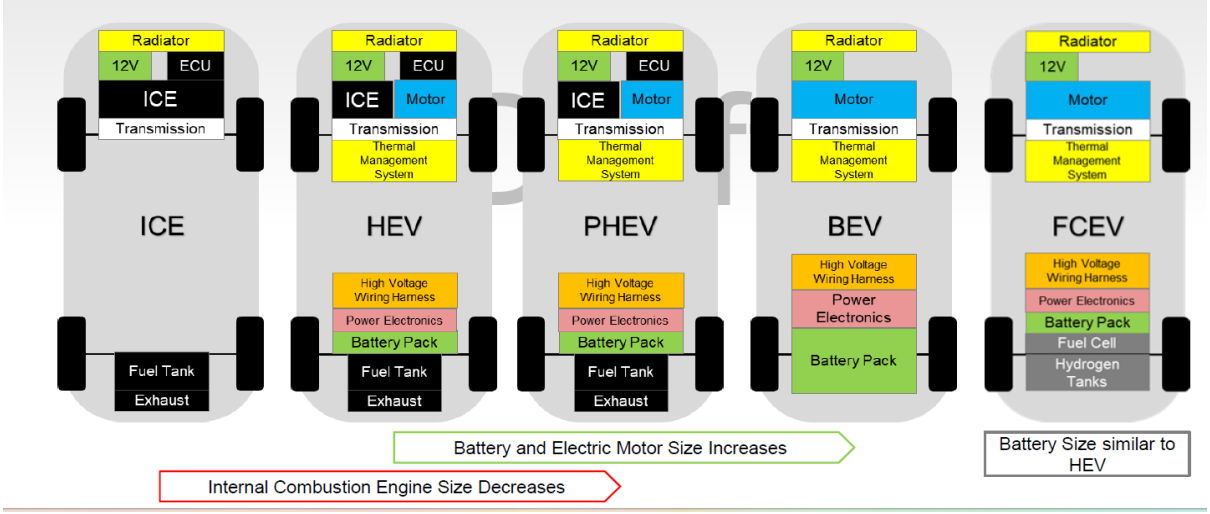
2.2.1 Technological shifts

Technology changes are at the core of this transition. Technological shifts have facilitated a 200% increase in the average driving range of EVs between 2010 and 2021, while increasing efficiencies by 15%.[15] The availability of EV models on the market has improved significantly, and the price premiums are declining over time.

The main changes in the configuration of a vehicle include the reduction of engine size, the exclusion of fuel tank and exhaust in full BEVs and FCEVs; the introduction of larger batteries; power electronics; thermal management systems, high voltage wire harnesses, and electric motors (Figure 2).

[15] https://www.pnas.org/doi/10.1073/pnas.2219396120

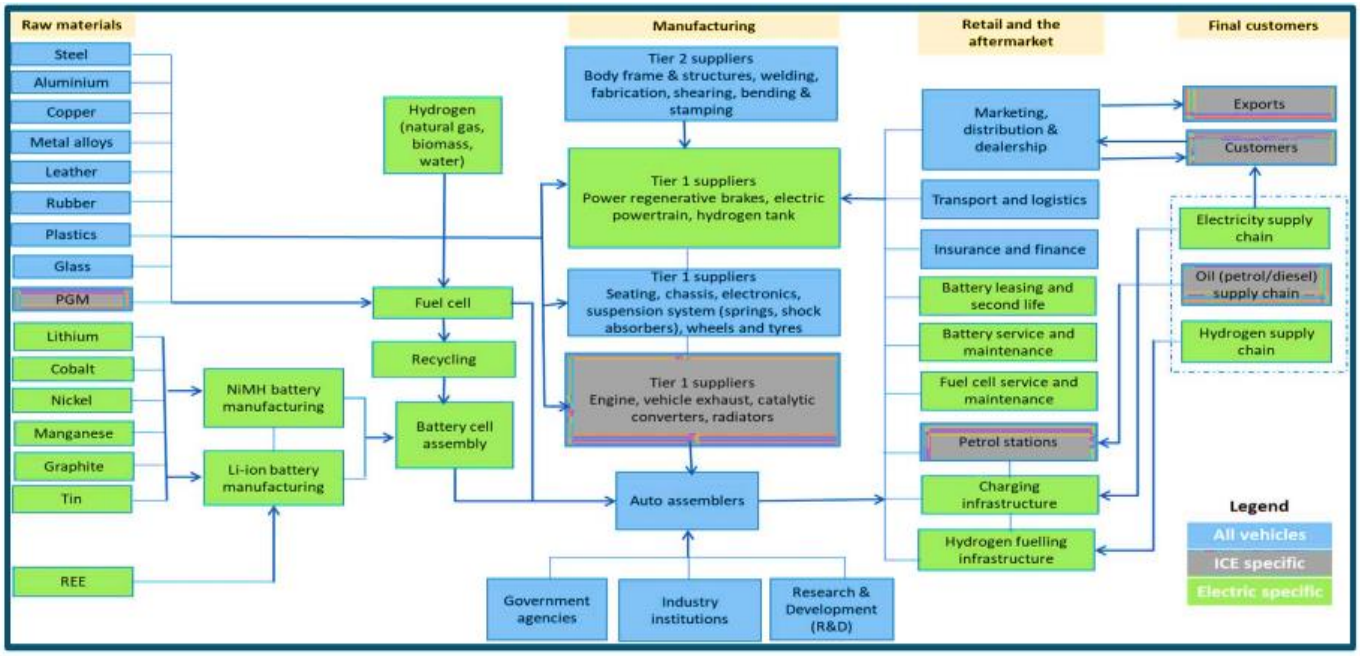
Figure 2: The main components of the various categories of EVs



Source: ASCCI Technology Study

HEVs and PHEVs introduce electronic components, however, do not lose the ICE-specific components, while BEVs and FCEVs are bringing about a significant disruption of the supply chains. This includes the introduction of new raw materials and components, while some ICE-specific components are expected to become obsolete over time. These changes in the supply chain are resulting in the re-organisation of the global value chain with the growing importance of locations that can supply the EV-specific components.

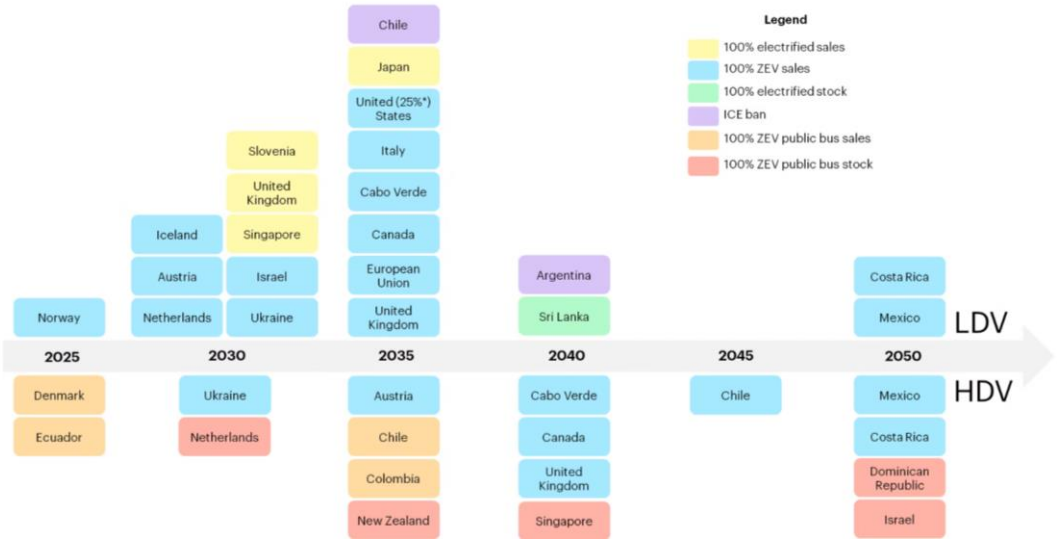
Figure 3: Changing supply chain of vehicles



2.2.2 Global EV and Green Transition Policy

The technology changes alone are not enough to facilitate the transition of the road transport sector and public policy is playing an important role in enabling the transition towards zero-emissions options, improving fuel efficiency, readying power system for electric vehicles, and reducing overall passenger vehicle dependency. The development of the automotive supply chain, and more importantly, successful, and sustainable localisation is dependent on several factors. Economies of scale in particular are important for production, including for after-market sales. To support the EV transition, a combination of emissions reduction regulations (eg zero-emission vehicle mandates and ICE bans) and incentive schemes are increasingly adopted by countries. In terms of emissions reduction policies, the most common instrument used has been zero-emission mandates (Figure 4).

Figure 4: Global zero-emission vehicle mandates and internal combustion engine bans



Source: International Energy Agency (2023)

Notes: "Electrified" includes hybrid electric vehicles (HEVs) in addition to electric vehicles (EVs) and fuel-cell electric vehicles. LDV = light-duty vehicles including passenger vehicles and HDV = heavy-duty vehicles such as trucks and busses

Incentives are playing an important role in the initial adoption of electric vehicles and are supporting the growth of the EV manufacturing and battery industries in several countries (notably Thailand and South Korea). Purchase subsidies, registration taxes, and tax rebates are the most common measures utilised. Countries like Norway (1990s), the US (2008), and China (2014) were among the first to offer such measures.[16]

Landmark EV policies and firm objectives are driving the outlook for EVs where early indications from first-quarter sales of 2023 point to an upbeat market, supported by falling prices as well as policy support in key markets. Policy interventions are enabling the achievement of net-zero road transport emissions by 2050, with examples such as the United States under new and higher subsidies, and early EV progress in a few emerging economies like India, Thailand, and Indonesia. The United States, in particular has introduced a 'Blueprint for Transportation Decarbonisation' through the Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA) which has triggered a rush by global EV

[16] IEA, 2021

companies to expand US manufacturing operations. These policies are expected to represent a once in-a-generation investment in infrastructure, technology, and supply chains, and are projected to lower economy-wide emissions by more than 40% by 2030. The programme is comprehensive and covers both consumer demand and production incentives. Importantly, the consumer demand incentives are linked to domestic sourcing requirement.

Table 1: Inflation Reduction Act Support for EVs in the United States.

Incentive Type	Level of Support ($)	Level of support (ZAR)[17]	Conditions
Consumer tax credit: Light-duty vehicles	$7500	R144 000	40% of the materials used in production originating from the US or a country that has a free trade agreement with the US, increasing to 80% by 2028 50% of EV battery components to be produced in the US, increasing to 100% by 2028.
Consumer tax credit: Commercial vehicles up to 14 000 pounds	$7500	R144 000	
Consumer tax credit: Commercial vehicle above 14 000 pounds	$40 000	R768 000	
Individual/residential charging	30%		Cap of $1000
Commercial charging	6%		Cap of $100 000, charging must be in low-income communities.
Fiscal expenditure for electrifying the US Postal Services Fleet	$ 3 billion	R57,6 billion	
Fiscal Support for transitioning public-owned heavy-duty vehicles, e.g.	$ 1 billion	R19,2 billion	
Diesel Emission Reduction Act program,	$60 million	R1,2 billion	
Domestic Manufacturing Conversion Grant Programme,	$2 billion	R38,4 billion	
Advanced Technology Vehicle Manufacturing Loan Programme	$3 billion	R57,6 billion	
Advanced Manufacturing Production Credit			Battery component manufacturers qualify amongst other green energy firms
Reduce air pollution at ports through deploying zero-emission technology,	$2.25 billion	R43, billion	
Environmental and Climate Justice Block Grant Programme	$3 billion		Projects in underserved and overburdened communities.
Greenhouse Gas Reduction Fund	$27 billion		

Source: Inflation Reduction Act, and various programmes created by IRA.

China's success in producing more than 50% of all the EVs on the world's roads in 2022 was from more than a decade of sustained policy support for early adopters, in addition to non-financial support such as the rapid roll-out of charging infrastructure and stringent registration policies for non-electric vehicles. China has therefore achieved its 2025 national target of a 20% sales share for EVs well in advance of its deadline. The 'key air pollution control regions' aim to reach a 50% sales share by 2030. Provincial governments are also supporting the adoption of EVs, with 18 provinces to date having set EV targets. This regional-level support in China has also helped to advance some of the world's largest EV makers.

[17] Dollar amounts converted with October 2023 exchange rates.

Across the rest of Africa, some notable progression in EV policies have been initiated. In vehicle-producing African countries:

a. Morocco has introduced custom duty exemptions for EVs and VAT exemptions for importers and distributors of EVs. On the production side, EVs qualify for the standard automotive incentives, which include up to 5-year corporate tax exemptions and VAT exemptions and withholding tax exemptions for dividends.

b. Egypt offers custom duty exemptions and subsidies for the first 100,000 vehicles produced.

Rwanda, Kenya, Uganda, Ghana, Tanzania, and Zimbabwe have identified the reduction of road transport greenhouse gas emissions as important for meeting their NDCs. These countries have introduced incentives largely to support adoption including reduced electricity tariffs for EVs; reductions in custom duties for EVs and spare parts; zero rating EVs and spare parts; dedicated EV parking; charging infrastructure rollout, standards for lithium batteries and EVs; and special financing for electric vehicles.[18] .

African states also have the opportunity to establish new manufacturing nodes for global trade, supported by the continent's access to strategic minerals (such as lithium, cobalt, platinum group metals, copper and manganese) required for the automotive and related industries. The AfCFTA agreement will lower barriers to trade and competitiveness. However, governments will need to structure policy and regulatory measures to facilitate the development of regional value chains for the beneficiation of critical minerals.

The cost of the support packages varies substantially, from R4.5 billion in Japan to R52.8 billion in China. The expenditure accounts for up to 0,6% of GDP on facilitating the transition (South Korea) (Table 2).

Table 2: Comparison of support measures

Country	Cost to the fiscus	GDP per capita - current prices (2020)	Population (2020) in millions	Cost per year	Cost per year per capita	Cost per year / GDP
China	Spent roughly R687bn on NEV subsidies since 2009	R154,196	1,439	R52.8bn	R37	0.024%
Thailand	Plans to contribute R18.9bn until 2025 to boost local use of EVs and increase local EV production	R105,448	70	R4.7bn	R67	0.064%
South Korea	Aim to spend R144bn in 2022 on e-mobility including incentives for NEVs and installation of charging stations	R464,129	51	R144bn	R2809	0.605%
Japan	Allocated R4.5bn in 2021 for vehicle purchase premiums, EV charging stations and hydrogen filling stations	R588,106	126	R4.5bn	R36	0.006%
India	The government has extended the FAME II scheme and have allocated funds of R7.1bn for the year 2022	R28,313	1,380	R7.1bn	R5	0.018%

[18] Cliff Dekker: E-MOBILITY IN AFRICA Critical for Africa's industrialisation.

Source: Deloitte, 2022 (The table represents a summary of the fiscal investment in the domestic demand for and production of EVs. The investments included in this summary table ignore any tax incentives applied by each country.

Global policy around EVs typically sits within a broader policy framework around stimulating and promoting a green transition. Many of these policies have strong industrial policy linkages in addition to targets around greenhouse gas reductions as a way of positioning these economies to benefit from the broader green industrial revolution. The Inflation Reduction Act in the US and the European Green Deal in the EU are examples of such policies which seek not only to create a roadmap to decarbonise the economies but also to channel support to those industries that create competitive advantages for the US and EU respectively. The IRA is estimated to contain as much as US$500 billion in available funding and tax breaks for US companies in a range of industries from EVs, EV components and renewable energy.[19]

2.2.3 Impact of technological shifts and transition policies on competitiveness of production

The technological shifts and transition policies have direct implications for the relative competitiveness of production locations. First, the battery supply chain affects the cost competitiveness of locations. Batteries are expensive relative to standard ICE components and are bulky, thereby increasing the costs of logistics; there are few firms with the technological know-how to produce them; and they are only competitively produced in a few locations in the world, mainly in Asia. Second, the global EV incentives and policies acknowledge the changes in the attractiveness of locations and seek to change that to the benefit of the country in question. On the demand side, countries are seeking to support the uptake of EVs and assist the industry in achieving economies of scale. On the supply side, countries are seeking to attract EV investments and new technologies and reduce the cost of production.

The combination of these factors has different implications for BEVs, PHEVs and HEVs. The cost competitiveness challenges are most acute in the case of BEVs, as they use bigger batteries and as a result more expensive. BEVs and FCEVs are also the only EVs that would meet the zero-emission regulations that are being instituted in most high-consumption markets. For example, the EU and UK commitments to 100% new sales of zero-emission vehicles by 2035 mean that PHEVs and HEVs will be banned together with ICE vehicles. The EV White Paper is in part a response to the threat of loss of high-consumption export markets and consequently, the supply-side interventions are for BEVs and FCEVs.

2.3 The South African Automotive Industry and the EV Transition

2.3.1 Importance of the automotive industry to the domestic economy

The South African automotive manufacturing industry contributed 2.9%[20] of South Africa's GDP in 2022; and 10% of manufacturing output making it the fourth-largest manufacturing sub-sector in the country in terms of sales revenue. This revenue includes the production and sale of vehicles and automotive components. It employs 116 683 (2022 data) people directly and supports an additional 239,000 indirect jobs. If induced jobs are also considered, then the industry contributes to the maintenance of an additional 214,305 jobs. The automotive industry's direct jobs account for 8% of

[19] McKinsey, 2022

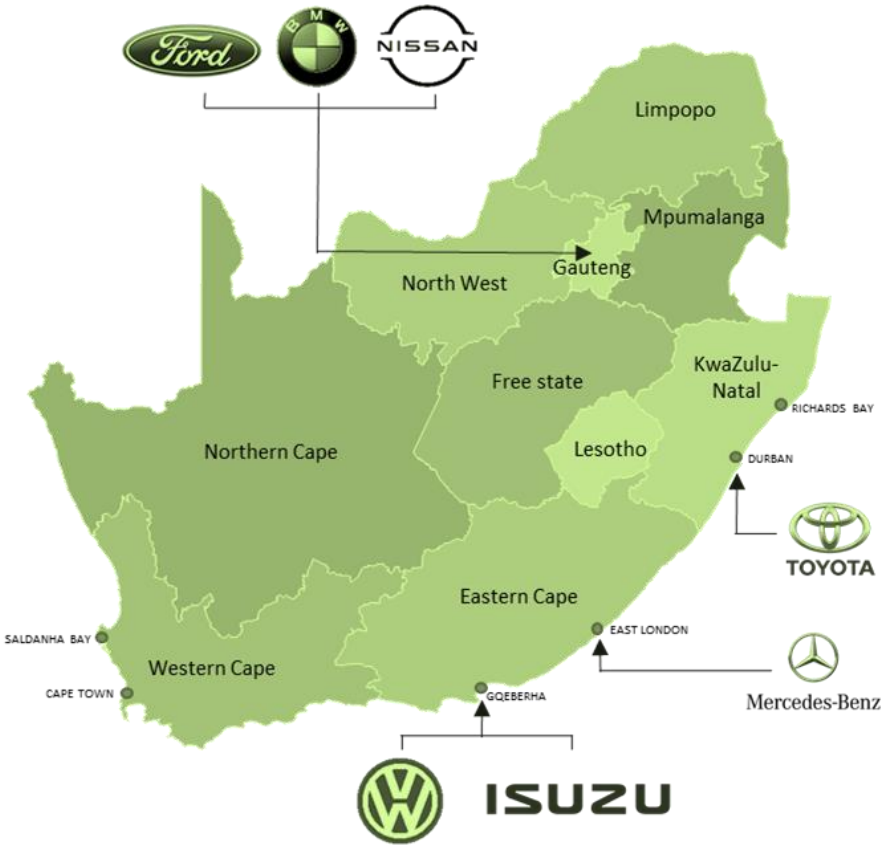
[20] NAAMSA (2023) - Automotive Export Manual 2023. The broader contribution of the industry including retail was 4,9%.

manufacturing employment[21] or 0,8% of total SA employment. The industry pays approximately R36 billion in formal wages, providing an important source of income for workers and their families.

There are 7 operating multinational OEMs with CKD automotive assembly plants in South Africa, with 2 more on the horizon. In addition to the assemblers, South Africa has attracted investment from many of the largest multinational component suppliers, which are complemented by approximately 200 locally-owned component manufacturing firms engaged in the automotive value chain. The presence of automotive assembly and component production in the country supports backward linkages to various other economic activities. An ICE vehicle is made up of 10,000 different parts that are manufactured from various materials including steel, aluminium, plastics, glass, leather, textiles, and rubber. There are also forward linkages to retail (dealerships) and various aftermarket services.

The industry supports an ecosystem of ancillary industries and indirect jobs in mainly three provinces, namely: the Eastern Cape, KwaZulu-Natal, and Gauteng, helping to diversify and stimulate local economies. This translates to 41% of manufacturing employment in Nelson Mandela Bay, 27% in Buffalo City,13% in Tshwane; and 9% in eThekwini.

Figure 5: Geographic Distribution of Automotive Assembly in SA



[21] IDC (August 2023) - Estimates of the economy-wide impacts associated with the motor vehicles parts and accessories sector in South Africa

The industry has recorded a positive trade balance annually for at least the last 20 years[22], thus making a positive contribution to the country's balance of payments. The exports of vehicles and automotive components accounted for 12.4% of total South African exports in 2022. The industry exported R157.0 billion worth of vehicles and R70.3 billion worth of components to 152 countries in 2022.[23] The EU and UK accounted for 72,7% of total exports in 2022 (Table 3).

Table 3: Industry export performance by major region 2018-2022, units

	2018	**2019**	**2020**	**2021**	**2022**	**Percentage in 2022**
Europe	233,772	285,599	197,355	229,672	255,709	72,7%
Asia	50,277	39,879	29,440	24,170	35,154	10%
Africa	23,988	23,382	16,987	21,825	22,564	6,4%
North America	13,037	13,540	9,463	7,981	21,684	6,2%
Australasia	22,767	17,350	13,698	10,621	12,389	3,5%
Central America	1,511	5,651	3,156	3,045	2,759	0,8%
South America	5,787	1,691	1,188	706	1,527	0,4%
Total	**351,139**	**387,092**	**271,287**	**298,020**	**351,786**	**100%**

Source: NAAMSA (2023) – Automotive Export Manual

The automotive industry has attracted substantial foreign investment. Between 2021 and 2022 it accounted for a total of R26.1 billion[24] in green and brownfield investment. This investment not only supports the industry but also bolsters South Africa's standing as an attractive destination for foreign investors.

Whilst the automotive industry has a positive impact on the South African economy, the cost to the fiscus is offset by the revenues earned through taxes collected. During the five-year period from the 2017/18 tax year to the 2021/22 tax year, corporate income and personal income taxes collected from the automotive industry covered the cost of industrial support provided through the APDP, providing a net-neutral position for the fiscus while creating substantial economic gain.

More details on the key contributions of the auto industry to the South African economy are reflected in Table 4.

[22] TradeMap, 2023, using SARS data (includes vehicles and components)

[23] NAAMSA (2023) - Automotive Export Manual 2023

[24] NAAMSA Export Manual, 2023.

Table 4: Key Performance Indicators under APDP1 and APDP 2, 2021-2022

Indicator	Performance	
	2021	2022
Broader automotive industry contribution to GDP	4,3%	4,9%
Vehicle and component production as % of South Africa's manufacturing output	17,3%	21,7%
Average monthly employment by vehicle manufacturers	30 697	33 321
Automotive component sector employment	78 874	83 362
Capital expenditure – vehicle manufacturers	R8,8 billion	R7,1 billion
Capital expenditure – component sector	R5,7 billion	R4,5 billion
Total South African new vehicle sales	464 493 units	529 562 units
Total South African vehicle production	499 087 units	555 889 units
South Africa's vehicle production as % of Africa's vehicle production	55,0%	54,4%
South Africa's global vehicle production ranking	21st	22nd
South Africa's global vehicle production market share	0,62%	0,65%
Vehicle ownership ratio per 1 000 persons	178	182
Vehicle parc (number of registered vehicles)	12,96 million	13,30 million
Total automotive export earnings	R207,5 billion	R227,3 billion
Automotive export value as % of total South African export value	12,5%	12,4%
Number of export destinations	152	152
Number of export destinations with export values more than doubling year-on-year	32	29
Top automotive export destination in Rand value terms	Germany	Germany
Total South African vehicle exports	298 020 units	351 785 units
Value of vehicle exports	R138,3 billion	R157,0 billion
Top vehicle export destination in volume terms	UK	UK
Value of automotive component exports	R69,2 billion	R70,3 billion
Top automotive component export category in Rand value terms	Catalytic converters	Catalytic converters
Top automotive trading partner (imports and exports) in Rand value terms	Germany	Germany
Top automotive trading region (imports and exports) in Rand value terms	EU	EU
Top country of origin for total automotive imports in Rand value terms	Germany	Germany
Top country of origin for vehicle imports	India	India

Source: AIEC, Econometrix, **naamsa**/Lightstone Auto, NAACAM, OICA, SARS, StatsSA

The South African automotive industry also has a stimulatory effect on other ancillary industries in South Africa, including steel, platinum group metals, plastics, textile/leather, and logistics services. The automotive industry is a large consumer of stainless steel, accounting for more than a quarter of local consumption, used in the production of locally fabricated exhaust systems and catalytic converters.[25] The inter-sectoral impacts of its operations are created through the industry's domestic purchases of goods and services from the various sectors directly and indirectly affected by its production activities and requirements for intermediate goods and services.

For example, the automotive industry's purchases of fabricated metal products have direct implications on the fabricated metal products sub-sector in terms of GDP and the number of jobs employed in that sub-sector, among other impacts. The wide range of other intermediate input materials, electricity, water, and transport and business services required for its production processes are also among the automotive industry's sectoral impacts.

[25] South African Stainless Steel Development Association

The purchases of platinum for downstream beneficiation, such as the local manufacturing of catalytic converters (among other platinum applications) in 2022, resulted in the direct generation of GDP to an estimated value of R7 815 million in the platinum group metals (PGM) mining sector. Indirect linkage effects amount to R3 188 million (indirect impact).[26] Once the induced impact is also included, the ultimate GDP contribution on the domestic PGM mining sub-sector via all of the inter-industry linkages (multiplier effects) associated with the automotive industry and all other related production activities, was estimated at R11 594 million in 2022.

Similarly, the activities of the automotive industry support 11,837 employment opportunities within the PGM mining sub-sector. Along with other indirect linkage effects, this figure measures 4,829 jobs (indirect impact). Including the induced impact, an additional 341 jobs are estimated to have been created/supported in the PGM mining sector through the multiplier effects across entire supply chains. A total of 17,006 jobs in the domestic PGM mining sub-sector may thus be linked to the automotive industry's operations and all associated multiplier effects.

Through its demand for finance and business services, the automotive industry is ultimately responsible for overall GDP to the value of R48 347 million in this broad sector, while having created and/or supported a total of 99 688 employment opportunities in the financial and business services sector.

2.3.2 Domestic Drivers of Change

The South African National Greenhouse Gas Inventory (2021) highlights that transport has been identified as the fastest-growing source of greenhouse gas emissions, accounting for around 10.8% of National GHG emissions. Road transport specifically, contributes 91.2% of transport emissions from the combustion of petrol and diesel. Several interventions have been developed and are being implemented to facilitate the transition. The Department of Transport (DOT) published the country's Green Transport Strategy (GTS, 2018 – 2050), which set out the ambition to reduce total greenhouse gas emissions by 50%, thereby reducing transport's contribution to almost half its current emissions by 2050. South Africa's Just Energy Transition Investment Plan (JET IP, 2022) for the initial period of five years (2023- 2027) identified key areas of investments for the transition including public transport, manufacturing, and charging infrastructure. In 2019, the National Treasury also introduced carbon taxes to trigger behavioural changes towards cleaner alternatives.

2.3.2.1 Green Transport Strategy (GTS)

The GTS is underpinned by sustainable development principles to promote green mobility to ensure that the transport sector supports the achievement of green economic growth targets and the protection of the environment. Strategic Pillar 8 outlines the promotion of hybrid and electric vehicles towards the attainment of decarbonising the transport sector by 2050. The following policy actions are identified.

a. Offer producers of EV vehicle manufacturing incentives to both produce and sell affordable EVs in South Africa, for both the local and export markets.

b. Work with local research institutions to research EV batteries.

c. 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

[26] IDC Economy Wide Impact Model, 2023.

vehicles in the Government vehicle fleet, as well as monitoring the local content of the manufacturing of cars locally.

d. Introduce the conversion of old technology vehicles with higher emission factors to be retrofitted with EV technology.

e. Consider providing incentives related to the beneficiation of local resources in the manufacturing of key machinery and or components (e.g., fuel cell).

f. Assist in establishing and developing local EV OEMs.

2.3.2.2 South Africa's Just Energy Transition Framework and Investment Plan

The EV section of JET IP focuses on transitioning the automotive value chains as the global shift to electric vehicle production gains momentum, building EV supply chain localisation, and setting the base for EV manufacturing and component manufacturing, to protect employment and promote new growth in sustainable manufacturing. The JET IP has the potential to incentivise investments in public transport, logistics, last mile and private vehicles can lead to adoption and EV-charging infrastructure, which will accelerate the decarbonisation of the transport sector and support healthier and more equitable cities through clean and efficient transport.

2.3.2.3 Carbon tax

To facilitate the reduction of emissions and encourage businesses and consumers to transition to a low carbon economy, the Carbon Tax Act (Act no 15 of 2019) was introduced effective from 01 June 2019. The tax levies greenhouse gas emissions from various sectors of the economy, such as transportation (road transport, rail, domestic aviation, etc). The automotive industry is charged three categories of carbon taxes to influence the composition of South Africa's vehicle fleet so that it becomes more energy-efficient and environmentally friendly:

- **The carbon fuel levy**, charged between 10 cents per litre for petrol and 11 cents for diesel, in the financial year 2023/24. This carbon fuel levy is over and above the fuel levy currently levied by the government.
- **The environmental levy** on carbon dioxide emissions of motor vehicles applied to new motor vehicles manufactured in or imported into the Republic. In financial year 2023/24, the environmental levy is charged at R132, on new passenger vehicles with emissions exceeding 95g/km and at R176, on new double cab vehicles with emissions exceeding 175g/km.[27]
- **The tax levies on greenhouse gas emissions** are charged at R159 per tonne of carbon dioxide. This is a general carbon tax that is also applicable to industry.

The carbon taxes are set to increase over time and will contribute to achieving price parity (considering also the total cost of ownership) between ICE and EVs over time.

[27] South African Revenue Service (SARS) in 2022 amended Part 3D of Schedule No.1 to the Customs and Excise Act, 1964 "Environmental Levy on Carbon Dioxide (CO2) Emissions of Motor Vehicles

CHAPTER 3:

INCLUSIVE TRANSITION PATH

3 CHAPTER 3: AN INCLUSIVE EV TRANSITION PATH

South Africa's Just Transition Framework reflects the nexus between climate mitigation and adaptation, and inclusive economic development. A transition that is 'just' supports the country's broad efforts to transform the economy for the benefit of most citizens to enable a deep, just, and transformational shift in the context of delivering an effective response to climate change, improving economic resilience, making a substantial cut to greenhouse gas emissions, protecting, and promoting the health of communities.

The framework for a just transition identifies three justice principles. These are distributive justice[28], restorative justice[29], and procedural justice[30]. The overarching principle underpinning the transition in the auto industry is distributive justice. This means that the benefits and burdens of the transition should be distributed fairly across society. It seeks to avoid disproportionate impacts on vulnerable communities and ensure that the transition leads to a more environmentally sustainable economy and society in South Africa.

Table 5: Transition Justice Principles and the EV Transition

Key Principles:	Key Focal Areas	Implications for EV transition
Distributive justice	Implementing transformative national economic and social policies that consider how benefits and burdens are distributed.	Working with industry to maximise economic, fiscal, and social benefits focusing on supporting local production of full EVs, deepening the EV value chain across various regions, job retention in the sector and Skills training
Restorative justice	Equipping South Africans exposed to the transition with skills, assets and opportunities to participate in industries of the future.	
	Increasing provincial and local government capacity to promote local economic development	
Procedural justice	Ensuring corporate responsibility to support a green and inclusive economy.	

This chapter considers the burden and benefits of the transition to establish the principles that should guide the country's approach. The country has committed to reducing emissions in road transport, the question is how this can be done in a manner that encompasses the justice principles. This recognises that while South Africa's transition to EV is inevitable over the coming decades, the nature of the transition, particularly its domestic configuration, can be shaped by policy decisions.

[28] Defined by the Just Transition Framework as an equitable distribution of risks and responsibilities that addresses the direct impacts resulting from the transition.

[29] Defined by the Just Transition Framework as the redress of historical damages against individuals, communities, and the environment, with the goal of rectifying or ameliorating the situations of harmed or disenfranchised communities.

[30] Defined by the Just Transition Framework as Empowering (not only supporting) workers, communities, and small businesses, with them defining their own development and livelihoods in the transition.

3.1 Potential Implications of the EV transition on the road transport ecosystem

3.1.1 Automotive Industry

These broader transitions pose a potential existential crisis for the South African automotive industry and simultaneously create significant opportunities for deepening the value chain.

The global transition poses a threat to South Africa's exports, accounting for 63% of total production in 2022. The legislated targets to ban new sales of ICE vehicles in South Africa's key export markets could undermine the growth of the domestic industry. The projected pace of the global transition will likely lead to a decline in the demand for South African produced ICE vehicles and components.

The government acknowledges that transitioning to green economies is inevitable; however, decarbonisation should not lead to deindustrialization. If local producers fail to transition, they will lose global markets, thus affecting exports and the balance of payments for the country. A failure to transition by South Africa may result in:

a. Import displacement of the domestic automotive industry: EVs will likely become cheaper and local demand for EVs will be met through imports.
b. Loss of employment in the industry, as well as other industries in the value chain.
c. Continued exports of unrefined critical minerals, and higher levels of concentration of minerals and mineral-related products in the country's merchandise export basket. This would increase the economy's vulnerability to commodity cycles.

3.1.2 The economy and broader society

The transition from ICE vehicles to EVs will have deep, multifaceted, macroeconomic implications for the South African economy. The first and main channel would be through the supply and demand for ICE vehicles and petroleum products. The other channel would be through the spill-over effects on the environment, households, and infrastructure. While the net macroeconomic effect remains uncertain, clear-cut costs and benefits can already be identified.
Potential benefits:

- EVs would have positive impacts on air quality, notably in urban areas, with beneficial health effects. This would, in the long run, lead to a reduction in health expenditure and increased productivity, with positive spill-over impacts on the fiscus.
- The transition to EVs is likely to drive demand for critical minerals both within South Africa and the rest of Africa, providing an opportunity for increased regional industrialisation and the development of regional value chains.
- The prices of fully electric vehicles may increase the unaffordability of vehicle ownership for most South Africans in the initial stage of the transition.
- The reduced reliance on imported fossil fuels will support energy security of supply for the country and also reduce price fluctuations resulting from exchange rate movements and the price of crude oil.
- The infrastructure required for the EV transition, including that of charging facilities will create demand for the skills required to develop and construct such infrastructure.

Potential risks:

- The decrease in petrol/diesel consumption would lead to a reduction in government revenue, with a material decrease in the revenues collected from the fuel levies. In 2022/23, fuel levies contributed R89 billion to the government's revenues.[31] This would also impact the Road Accident Fund (RAF) levy, a source of revenue for the fund that is responsible for compensating victims of motor vehicle accidents.

- This negative impact would be compensated by a decrease in imports of crude, petrol, and diesel, displaced by locally-produced electricity, with favourable impacts on South Africa's foreign exchange reserves, the Rand exchange rate and economic development. South Africa's need for petroleum products is met 80% through imports, with petrochemical firm Sasol producing the remainder through the coal- and gas-to-liquid processes. Petroleum products are the largest South African import, valued at R323 billion in 2022.[32] A full transition of the country's vehicle fleet would lead to a decrease in imports by about two-thirds. However, the closure of refineries will lead to an increase in imports of kerosene/jet fuel and other products unless refineries can stay open, based on the local market (as exports are not considered a viable option) or biofuels can be produced locally.

- The reduction in fossil fuel demand will over time have a ripple effect on petrol stations and their employees. While some sites would be in a position to preserve their business by shifting to or incorporating EV charging points, the prevalence of home and office charging may lead to a reduction in the number of service stations in the country. Without adequate preparation, a notable share of the approximately 140,000 people working in petrol stations (as of 2019) stand to lose their jobs between now and the final shift to BEVs and PHEVs. An approach to dealing with this risk is considered in Chapter 4.

- Within the broader ecosystem segment, most occupation will require a degree of upskilling, and some are likely to have a net loss and others a potential gain. Professionals in aftermarket services like mechanics, where the skillset is predominated by work on ICE engines, will require retraining to transition their skill sets towards EVs. Sales managers and marketing departments will need to learn the specifications of EVs and how they operate to guide customers. Similarly, the insurance industry will also have to learn the specifications of EVs to price their insurance appropriately while the emergence of fintech and insure-tech solutions will drive the emergence of new occupations. First responders, such as the police and firefighters, will have to learn how to handle emergencies involving EVs.[33]

- The transition to EVs may result in fewer component manufacturers, especially those linked to ICE vehicles like catalytic converters.

- The transition to EVs may result in changes to global automotive supply chains, with OEMs potentially choosing to locate production either closer to their major consumer markets, or in their home markets in order to compensate for potential job losses in these markets.

3.2 Approach to an Inclusive EV Transition

Accepting that the transition is inevitable, the vision and strategy of the EV transition as set out in this White Paper is to mitigate the risks created by the transition for the country and facilitate the

[31] National Treasury: https://www.treasury.gov.za/documents/national%20budget/2023/review/FullBR.pdf

[32] The import value was particularly high in 2022 due to the effects of high prices and a weaker exchange rate in that year.

[33] Moshikaro et al.

realisation of economic development opportunities that are created. This is in line with the principle of a just transition. Given the various potential benefits and burdens of the transition, a two-pronged approach to the transition will be adopted.

a. **South Africa will actively support the development of the EV production ecosystem with a package of measures to maintain and potentially grow productive capacity and linked jobs**. An EV transition that maintains and/or grows the production of vehicles, automotive components and linked supply chains contributes to a just transition as it is associated with limiting job losses, employment creation, and opportunities to increase the contribution of the industry to the South African economy through increasing GDP contributions; and a growth in exports thereby contributing to a positive balance of payments. This includes:
    i. Supporting the domestic automotive industry to transition to limit the loss of export markets and support economies of scale, necessary for component manufacturers. This is with the view of maintaining and growing jobs in the industry.

    ii. Take up opportunities to deepen the automotive value chain in order to create jobs and potentially replace the job losses in the broader ecosystem. This includes participation in the battery value chain for production and supply for the domestic and export markets.

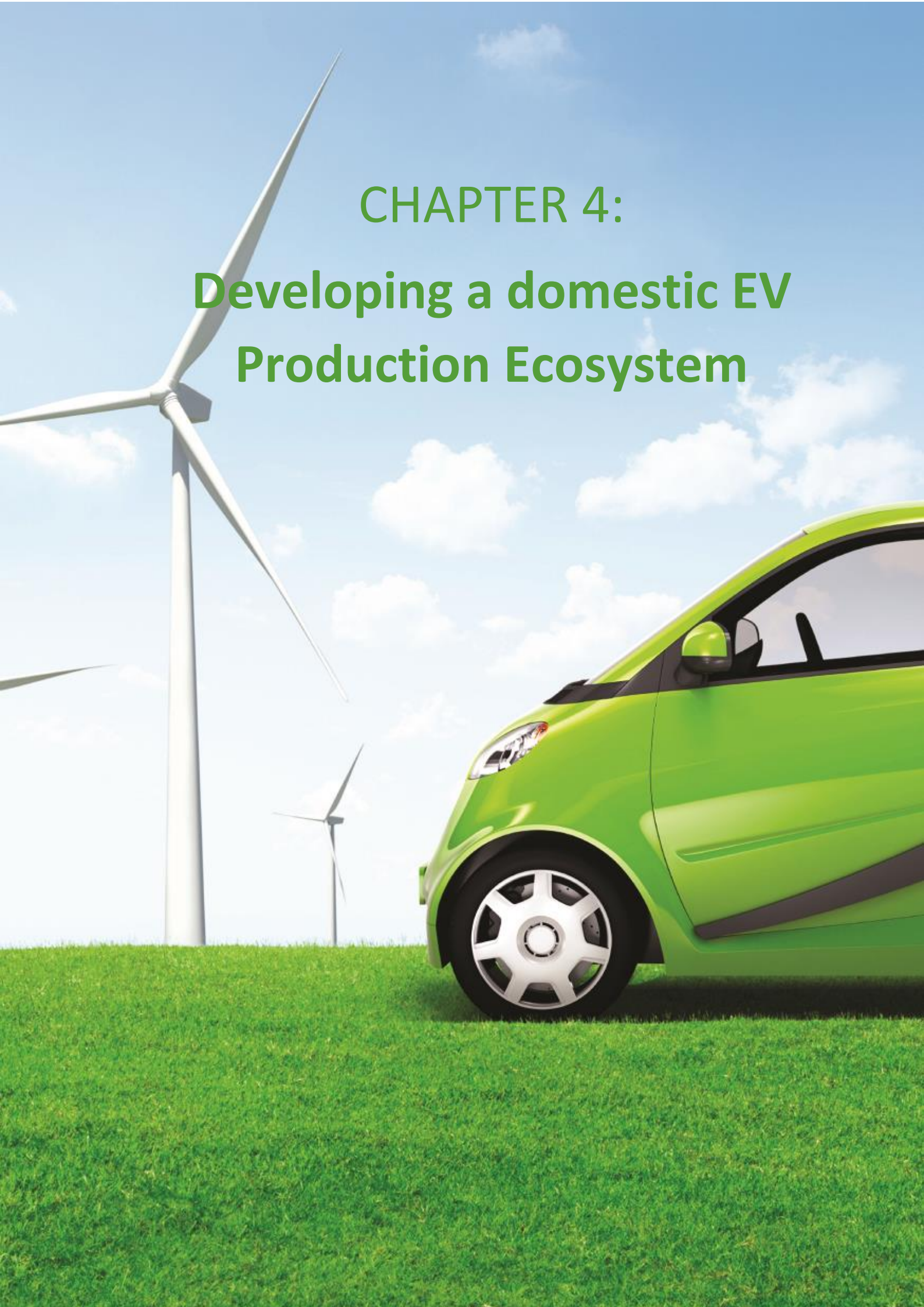
b. **South Africa will pursue a managed transition of the domestic market** (local market development) to allow time to develop the EV ecosystem in a manner that limits the losses. This entails:
    i. A slower transition of the domestic market – no bans of ICE vehicles will be instituted in the short to medium term – to allow the state and private sector to prepare for the transition and pivot where necessary.

    ii. Development of the broader EV ecosystem including charging infrastructure; electricity upgrades; and skills development.

    iii. Development of an appropriate framework in which public transport and government-owned fleets can cost-effectively transition to EVs.

    iv. Dual platform production of ICE and EVs.

    v. Cost-effectively transitioning corporate and mining fleets.



CHAPTER 4:

Developing a domestic EV Production Ecosystem

4 CHAPTER 4: DEVELOPING A DOMESTIC EV PRODUCTION ECOSYSTEM

4.1 Policy Issue

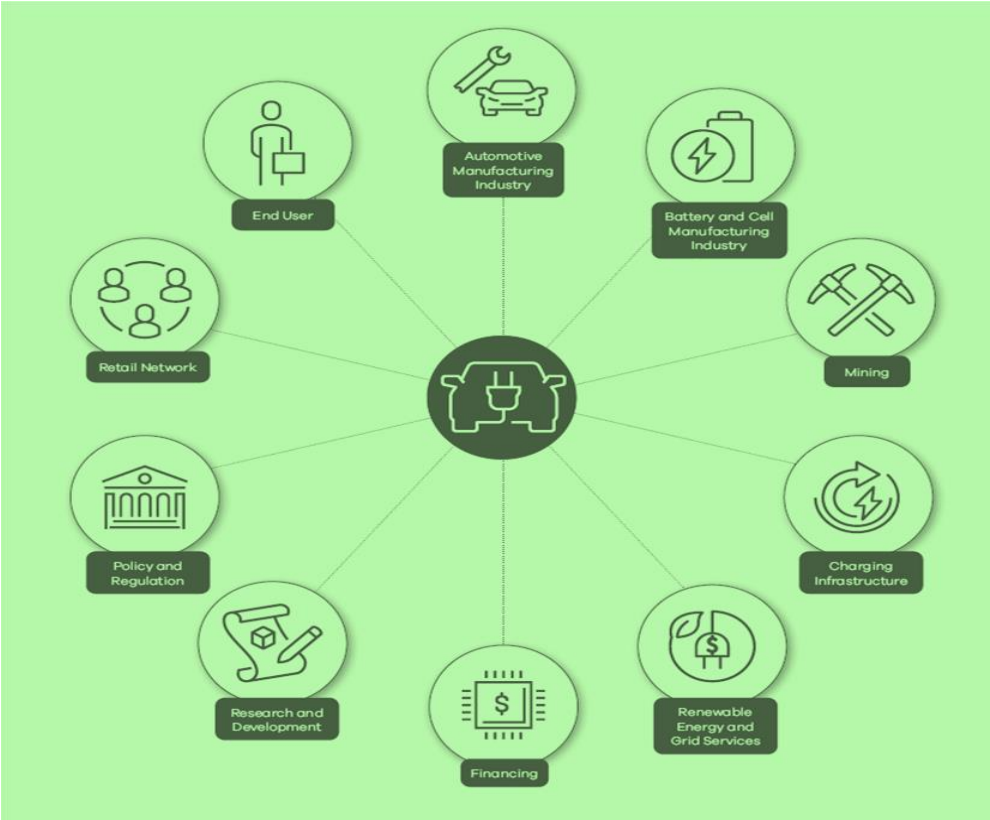
The EV transition poses a potential existential crisis to the automotive production industry, while also creating opportunities for deepening the value chain with the potential for increasing domestic and regional value addition and creating employment. Realising the opportunities requires coordination of the various elements of the ecosystem.

The objective is to protect and grow sustainable automotive assembly and component manufacturing to support jobs and livelihoods and to consider how to benefit from the strategic mineral resources available in the Southern African region. The policy intent is to support a just transition of the automotive industry, in a manner that makes a positive contribution to South Africa's sustainable re-industrialisation, and more broadly the region's economic and industrial development. This chapter elaborates on the priority areas and policy actions to support the production of EVs. These priority areas are:

- Where necessary, adjust the automotive incentive system to support the transition to EV production.
- Addressing power, and port and rail logistics challenges to support competitiveness. This will provide an environment necessary to encourage global investments, some from companies that may not presently be in South Africa, which will be required to sustain the industry over the medium term and foster its long-term growth.

A successful EV transition requires the coordination of several elements of the ecosystem, such as auto assembly, component and tooling manufacturing, facilitating the development of the battery value chain and a competitive EV production environment. Succeeding in deepening South Africa's automotive value addition as part of the transition only makes this coordination that much more important. Though there are overlaps in most of the elements of all the EV ecosystems, an electric vehicle ecosystem has some differences to that of a fuel-cell electric vehicle and that of a vehicle using green synthetic fuels. As of 2023, BEVs are ahead of FCEVs and green synthetic fuel vehicles in terms of total cost of ownership and the dominant technology adopted by passenger vehicles. However, this does not mean that this will always be the case, FCEVs currently have a longer range and charge (i.e., hydrogen refuelling) faster than BEVs; while the price of green hydrogen is expected to decline significantly with increased access to green hydrogen over time. A typical BEV ecosystem is depicted in

Figure 6: Electric Vehicle Ecosystem



Source: Green Cape

4.2 Supporting the transitioning to EV production

4.2.1 Automotive Assembly

the dtic has coordinated an assessment of the efficacy of the current incentive regime to support the EV transition in line with the envisioned roadmap and with consideration of the transition dynamics; the current economic context; the country's fiscal position; and the risks and opportunities created by the transition.

The assessment of the supply side programme makes the following findings:

a. The current APDP2 provides a good framework for supporting investments, production and exports of automotive vehicles and components; however, the system of incentives results in a decline in the net benefit to the industry in the initial period of the transition. This decline is caused by the higher share of components that need to be imported thereby attracting CKD duties for domestic production for local consumption.
b. At an aggregate level, the industry's customs duty liabilities will increase, due to the higher cost of EVs and a greater proportion of imported components (in the short to medium term).
c. The current investment incentives alone do not mitigate against the decline in cost competitiveness of the domestic industry resulting from.
    i. The gap in the timing between the South African and export market demand transitions limits economies of scale of EV and EV component production.

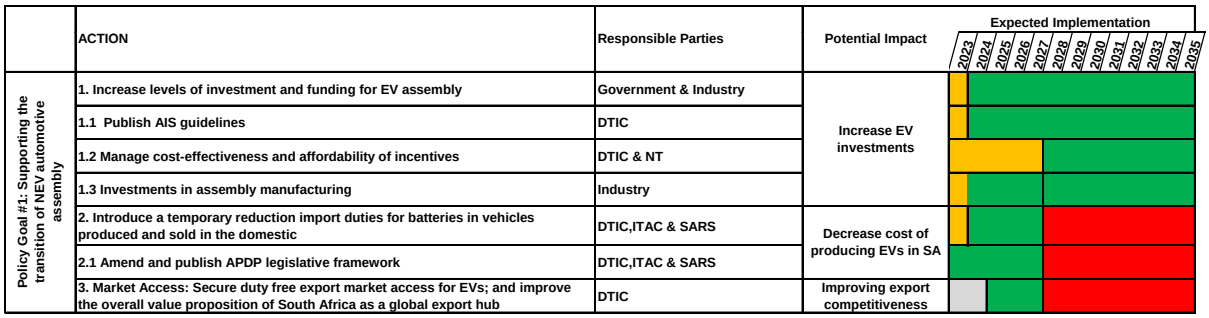
ii. The need for dual production platforms to produce ICE and EVs for different markets, including the South African market
iii. The energy challenges and poor logistics infrastructure (rail and freight) result in inefficiencies that increase the cost of production;
iv. The rapid changes in the technology of key electric components are increasing the risk associated with investments and driving technology owners to focus on home markets.
v. The need (initially) to import costly components like batteries heightens South Africa's geographic disadvantage, arising from its distance to high-consumption export markets. This also has implications for the carbon emissions (which are penalised in certain markets) of transporting components and then vehicles to and from South Africa.
vi. Incentive packages for the production and consumption of EVs amongst countries in which we would typically compete for the production of similar models as South Africa.
vii. The threat of green protectionism and climate-related trade policies such as border carbon adjustments in export markets.

The combined findings point to the need to make time-bound adjustments to the system of incentives to support the initial EV transition. This is to maintain and grow the domestic production of vehicles and components and support current and future jobs.

4.2.1.1 Policy Actions

a. Extend the APDP programme to explicitly include EVs without internal combustion engines. This will entail updating the APDP package of regulations.
b. Increase levels of investment funding to support the transition, including localising new capabilities and technologies.
    i. **the dtic** is to publish AIS guidelines with details on the adjustments to the investment incentives, conditionalities and the period covered, targeted at BEV and FCEV.
    ii. **the dtic** and National Treasury are to manage the cost-effectiveness and affordability of the incentives. **the dtic** will seek to ensure that the funding support drives outcomes such as localisation, jobs, and deepening the value chain. A review must be undertaken after 5 years of implementation to assess the continued necessity of levels of investment funding. Amongst other things, the review will consider the availability of funds by government, the levels of investment being made by the industry for EVs and batteries, and the responsiveness of OEMs to the transition.
c. Use duty rebates to address the relative decline in the net benefit of the incentive system for vehicles produced in South Africa for sale in the domestic market.
d. Support export market access of vehicles produced in the country.

Figure 7 Policy actions to achieve the goal of supporting the transition of EV automotive assembly



Notes: indicative timelines; yellow indicates development phase; green indicates implementation phase; grey indicates implementation subject to negotiation and/or technical review, and red indicates discontinuation of Intervention

4.2.2 Component and Tooling Manufacturing

Currently, a wide range of components for ICE vehicles are manufactured locally, contributing to the average 40% local value addition in vehicles produced in South Africa. Almost half of this value comprises components which are common to all types of vehicles, mainly the body, exterior and interior components. The rest of the current local production, comprising the drivetrain, electrical and most electronic products, will not be useable in BEVs. In addition to the components manufactured for locally produced vehicles, there are some manufactured primarily or exclusively for export markets. By far the biggest export is of catalytic converters, comprising almost 50% of total component exports, followed by engines and engine parts, tyres, radiators, transmission shafts and cranks. Only tyres among these will be usable in BEVs. The types of components that are not used in BEVs and the new components that BEVs require are listed in Table 6: Component losses and gains as BEVs replace ICE vehicles.

Table 6: Component losses and gains as BEVs replace ICE vehicles

MAIN ICE-SPECIFIC COMPONENTS	NEW EV COMPONENTS
Engine and parts	Battery pack and management system
Transmission, clutches, and parts	Electric traction motor and controller
Engine Control Unit	Thermal cooling system
Fuel tank, line, pump, filler	Electromechanical brakes (vacuum pumps)
Airconditioning system	High voltage harnesses
Mechanical brakes	Charging point
Exhaust system (including catalytic converter)	Regenerative braking systems
Radiator	

Source: Industry Engagements

The components that are at risk account for 67% of total automotive exports, or R69 billion worth of exports in 2022. There is also an expected decline in the ICE-specific components used in the domestic market, when its transition commences. The challenge for the component manufacturing industry is finding alternative markets for the ICE-specific components; improving competitiveness to support increased localisation and exports of components that are used by ICE-vehicles and EVs; and establishing capabilities and competitiveness in the new EV components. The existing incentive structure fully supports the production of ICE-specific components and improves competitiveness to support increased localisation and exports of components that are used by all types of vehicles.

In terms of EV components, there are some capabilities to produce EV components that account for up to 45% of a BEV. Several local manufacturers have existing capabilities to transition to some new EV component manufacturing because of suitable available technologies. However, this would require investments to localise the components. These investments are dependent on domestic demand from automotive assembly, achieving sufficient economies of scale to be internationally competitive, access to the latest technologies some of which are internationally owned.

4.2.2.1 Policy Actions

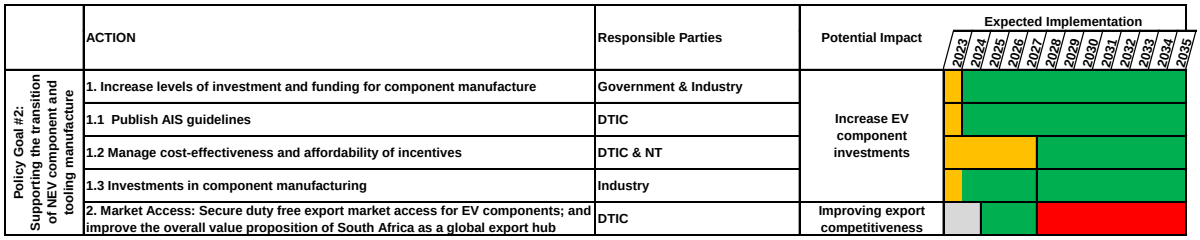
a. Increased levels of investment funding to support the transition, including localising new capabilities and technologies. Additional investment support will be necessary for component manufacturers to commence EV component production. An enhanced AIS is the logical mechanism for this, and this should ideally incorporate incentivising tooling, machinery and associated technical skills development linked to these investments. Current estimates of the potential component investments necessary to take advantage of the opportunities discussed in this section are as high as R80 billion, through to 2035.

b. Facilitate export market access for EV components, produced in South Africa.

c. Facilitate export market access for ICE components, including aftermarket sales.

d. Broad-Based Black Economic Empowerment conditionalities to be phased in for the production of core components in the value chain. The purpose of phasing in the conditionalities is to strengthen the commercial case for local production. In addition, measures to be announced to support small business involvement in the value chain, working with the Department of Small Business Development, DFIs and funding from the JET-IP.

Figure 8 Policy actions to achieve the goal of supporting the transition of EV component and tooling manufacture



Notes: indicative timelines; yellow indicates development phase; green indicates implementation phase; grey indicates implementation subject to negotiation and/or technical review, and red indicates discontinuation of Intervention

4.3 Facilitating the development of the battery value chain

Facilitating the development of the electric vehicle battery value chain by leveraging the South African and the broader Southern African region's battery critical mineral endowments presents opportunities to develop and grow new capabilities to support the auto and other economic activities.

Southern Africa has an extraordinary base of critical minerals that are going to be needed for the renewable or the green energy revolution (see Figure 9). Historically, Africa's mineral base has been exported for industrialisation elsewhere in the world. This White Paper posits a strategy in which African countries more actively and in coordination with one another leverages their mineral resource base to secure partnerships with major manufacturers in a range of countries, including the EU, US, UK, China, Japan, and India that would enable full value chain production on the continent together with the supply of mineral resources for production elsewhere. Achieving these levels of regional

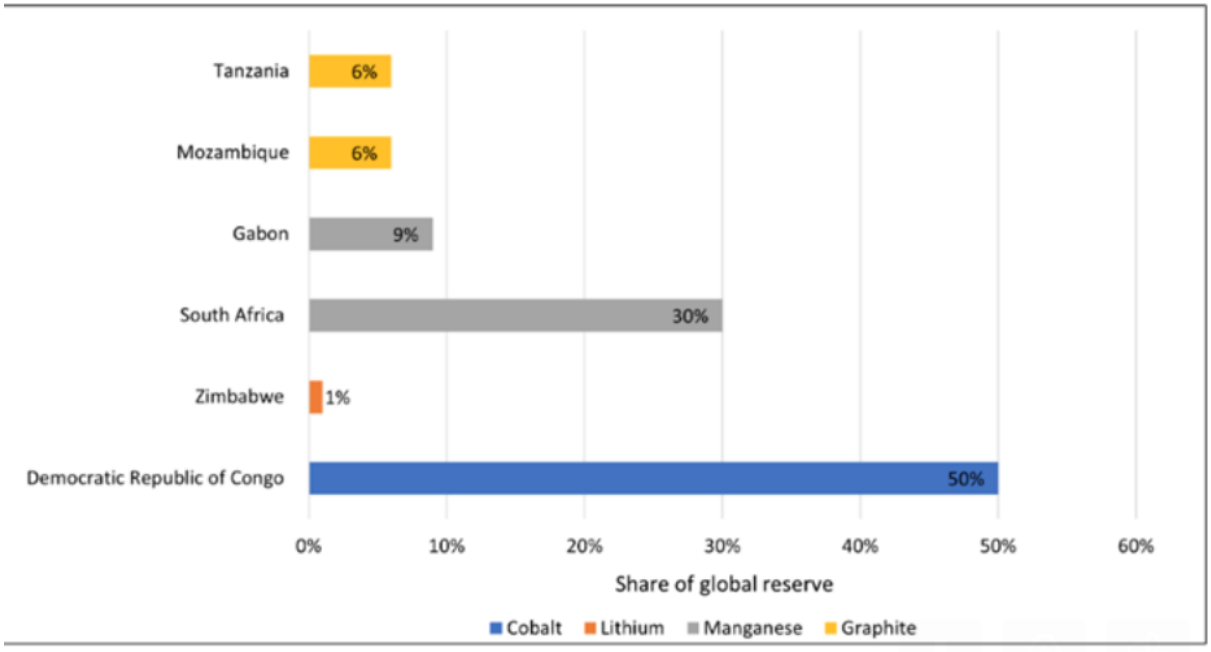
coordination will thus require the South African government to engage collaboratively under the framework of the AfCFTA, the AU and SADC with regional partners to establish such regional value chains. Such collaboration will include the convening of meetings between mineral resources and trade and industry ministers to develop and map out a common strategy to establish such regional value chains.

Leveraging Southern Africa's mineral wealth alongside its emerging capacity to beneficiate these minerals can serve as the region's greatest contribution to the green industrial revolution, laying the foundation for a *grand bargain* between the African continent and the industrialised countries of the north and east. In so doing, both the access and economics of critical minerals used in the green transition can be improved.

The battery is the single biggest contributor to value addition in an electric vehicle and participation in the value chain will be important for achieving the SAAM 2035 local content target of 60%. Similarly, it is important for achieving the 60% threshold for EU and SA value addition in vehicles exported to the EU duty-free.

There are different battery cell chemistries, including lithium-ion, with various ratios of NMC chemistry which enhance applicable performance characterisation, lithium-ion-phosphate (LFP), sodium-ion batteries and other types of anode and cathode chemistries. Newer formats of batteries include solid-state batteries[34] with similar chemistry largely still in development. Most of these chemistries require critical minerals some of which are available in South Africa and the broader SADC region. This further presents a regional industrialisation opportunity that should be explored together with other countries in the region.

Figure 9 Key minerals for Lithium-ion batteries (LIB) and green energy generation



[34] A solid-state battery uses a solid electrolyte, while a lithium-ion battery uses a liquid electrolyte solution.

Source: UNCTAD

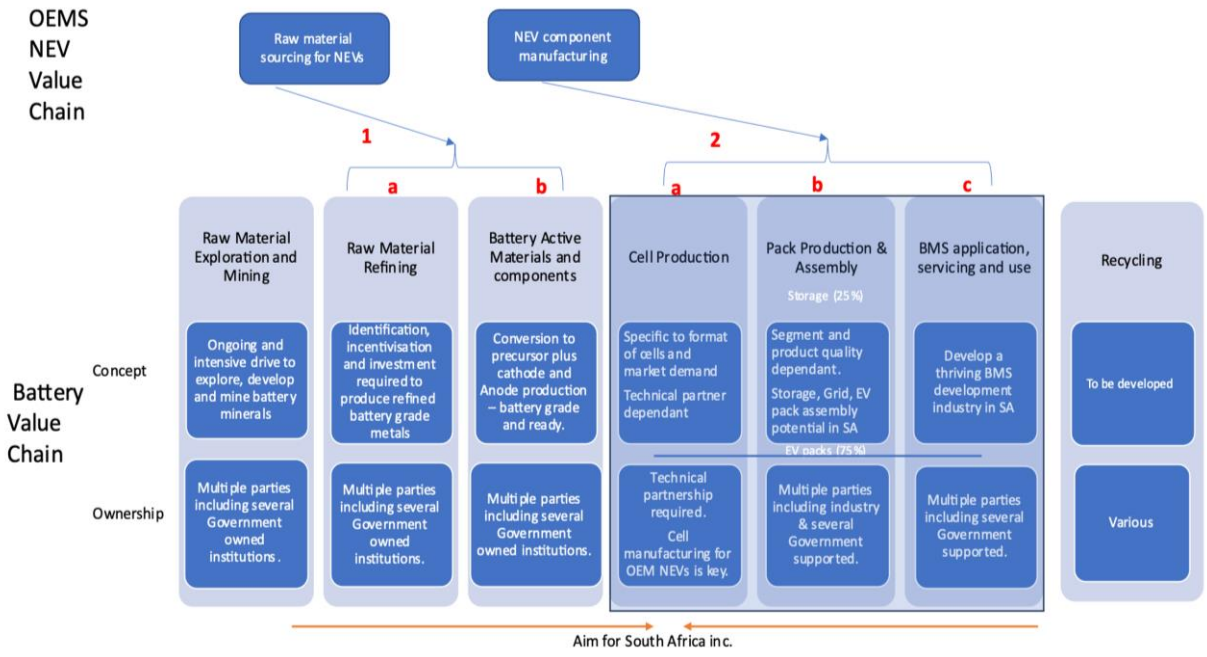
In addition to the critical minerals for LIB, renewable energy technologies require critical minerals including zinc, chromium, nickel, rare earths, silicon, copper and others. The global demand for these minerals is also likely to increase significantly and thus offers the Continent a substantial opportunity.

The battery value chain in Southern Africa is important for the future development of the automotive and renewable energy industry. The combined effects of these value chains have a fundamental impact on the way mobility is conceived, produced, and utilised (and recycled). In turn, the renewable energy industry gains as a result of battery storage capabilities that make the most of the abundant renewable resources the region has to offer. The South African Renewable Energy Masterplan currently being finalised will outline the linkages between batteries and renewable energy in this industry.

An assessment of South Africa's productive capabilities and strategic opportunities in the various nodes of the battery value chain (Figure 7) was undertaken and a multilevel approach to participation is feasible at three levels of complexity and potential costs:

- Level One:
    - battery pack production; and
    - battery management system applications and servicing.
- Level Two:
    - raw material refining; and
    - battery active materials and components
- Level Three:
    - battery cell manufacturing.

Figure 10: Overall EV and Battery Value Chain Development Opportunity



The SADC region not only offers viable reserves of these critical minerals, it also offers existing industrial capabilities around processing such minerals within the region. The opportunity then lies in developing a regional value chain for each of the critical minerals relying on both existing capabilities and comparative advantage as well as installing new capabilities with a view to expand the region's industrial capacities and ensure that the region ultimately benefits by exporting higher value-added critical minerals to the global market.

In accordance with this ambition, the opportunities outlined require investments in critical mineral refining and technology to realise battery component manufacturing, which may require a range of incentives to overcome initial inertia.

4.3.1.1 Policy Actions:

a. Government will identify an appropriate package of measures to promote the development of a battery value chain including local production of batteries. Several mechanisms are available to assist with the transition, which include:

    i. Joint work between **the dtic** and DMRE to consider the appropriateness of provisions of MPRDA Section 26 to promote beneficiation through a determination/regulation for strategic critical minerals (PGMs, diamonds and gold already regulated in the Precious Metals Act).

    ii. Leverage the SAREM to drive industrial development and economies of scale for critical minerals in the battery value chain.

    iii. Industry and labour to cooperate with the government in finalising appropriate mechanisms for refining critical minerals and value chain development.

    iv. The Ministers of DMRE, Finance and **the dtic** are to develop appropriate an appropriate incentive for the beneficiation of critical minerals.

    v. The Minister of **the dtic** is empowered to issue a trade policy directive to allow ITAC to administer the program across all three Ministries.

b. Work with counterparts in the SADC region to take up the industrialisation opportunity created by the supply chain changes in the automotive industry. This includes but is not limited to jointly developing a regional battery value chain and leveraging the critical mineral endowments in the SADC region while setting explicit conditions to enable domestic and regional industrialisation in engagement with export partners.

c. Working with industry, develop a value proposition for the production of battery cells in South Africa. Introduce a temporary battery duty rebate to address the relative decline in the net benefit of the incentive system for vehicles produced in South Africa for sale in the domestic market.

Figure 11 Policy actions to achieve the goal of facilitating the development of the battery value chain

	ACTION	Responsible Parties	Potential Impact	Expected Implementation 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Policy Goal #3: Facilitating the development of the battery value chain	1. Facilitate the development of the electric battery value chain	Industry & Government	Localise/regionalise EV value addition	
	1.1 Enable raw material refining and battery active materials and components production	DTIC, DMRE,NT, ITAC & IDC		
	2 Jointly develop SADC regional battery value chain	DTIC,DMRE& DIRCO		
	3 Develop a value proposition for production of battery cells in South Africa.	Industry, DTIC, IDC& DMRE		
	3.1 Commit demand for EV batteries	Industry & Government	Local market development	

Notes: indicative timelines; yellow indicates development phase; green indicates implementation phase; grey indicates implementation subject to negotiation and/or technical review; and red indicates discontinuation of Intervention

4.4 Developing a competitive EV production environment

4.4.1 Improving cost competitiveness, production, and technological capabilities

To support the cost competitiveness of the domestic automotive and other industries it is important that the industrial infrastructure of the country meets leading international competitor standards, to ensure efficient production and logistics. South Africa has a geographic disadvantage to large automotive consuming markets and poor functioning logistics increase logistics costs and exacerbate this disadvantage.

Power interruptions impact negatively on production efficiencies. The disruptions lead to reduced production output, delayed orders, and an overall decrease in productivity. This increases the cost of production and erodes international competitiveness.

Poor performance of South Africa's freight logistics system and unstable electricity supply weakens exports. Implementation of economic and institutional reforms are key to reversing the current trend in performance. Achieving a turnaround in the ports and rail network will have a positive impact on output, exports, and international competitiveness. Similarly, improvements in grid stability will have a positive impact on output, exports, and international competitiveness.

The policy intent is to resolve these challenges and also support the movement of manufactured goods from road to rail, which further supports inefficiencies and should reduce costs.

4.4.1.1 Policy Actions:

a. Accelerate the implementation of the freight logistics reforms.
b. Refurbish the rail line between Gauteng and Ngqura.
c. Accelerate implementation of measures to increase the supply of electricity.
d. Execute interim solutions for energy in partnership with industry.

Figure 12 Policy actions to achieve the goal of improving cost competitiveness, production, and technological capabilities

	ACTION	Responsible Parties	Potential Impact	Expected Implementation 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Policy Goal #4: Improving cost competitiveness of production	1. Refurbish rail line between Gauteng and Ngqurha	Transnet, DTIC, IDC, Industry	Improving cost competitiveness	
	2. Accelerate the implementation of the freight logistics reforms	Eskom, DMRE,Transnet Presidency, NT, Industry	Improving cost competitiveness	
	3. Accelerate implementation of measure to increase supply of electricity	Eskom, DMRE,Transnet Presidency, NT, Industry	Improving cost competitiveness	
	4. Execute interim solutions for energy in partnership with industry	Presidency, DTIC, municipalities, Industry	Improving cost competitiveness	

Notes: indicative timelines; yellow indicates development phase; green indicates implementation phase; grey indicates implementation subject to negotiation and/or technical review; and red indicates discontinuation of Intervention

4.4.2 Skills Development

The EV transition will be accompanied by changes in some of the skills required to produce vehicles and vehicle components and support the EV ecosystem. There are five categories of skills development that are required:

- **Upskilling existing employees** for the design, engineering, manufacturing of and aftermarket services for EVs and related components and systems. All segments of the value chain are projected to increase demand for automation-related skills and specialised EV-related skills (such as the installation of new components such as charging sockets, batteries, electric motors, and inverters). Welders will also require specialised training for welding aluminium, which is extensively used in EVs as opposed to traditional steel.[35]

- **Introduction or adaptation of tertiary programmes** to equip new entrants with the skills of the future. This includes the merging of mechanical and electric engineering capabilities required by EVs giving rise to the demand for electro-mechanical engineers.

- **Broader ecosystem training** on working with high voltage components of EVs. This includes programmes for first responders in the event of an EV accident. Respondents need to remove and cut vehicles to evacuate passengers to ensure safety in these events. EVs have different configurations and in-built safety systems to the traditional ICE vehicle and though the incidence of fires is lower in EVs with lithium-ion batteries, the fires burn hotter, longer, and take more water and resources than traditional vehicle fires. Training programmes are thus necessary to ensure that accidents are minimised.
- **Develop performance and safety testing and certification capabilities.** It is currently not possible to certify EV batteries manufactured in the domestic market for exports to the EU, the UK, or the United States.

- **Reskilling.** Evidence to date indicates that BEV automotive assembly is less labour-intensive than ICE manufacturing, due to electric vehicles having fewer and simpler parts.[36] Examples of occupations that may not be required in the long run include fuel managers and diesel mechanics/engine fitters. Several occupations in the vehicle ecosystem may be at risk such as petrol attendants. The job opportunities that are created by the transition, such as in battery production, charging infrastructure and the fuel retail transformation from vehicle-centric to customer-centric offering opportunities to charge, rest, and work, will require some reskilling.

The changes in the skills demanded by the transition is expected to be evolutionary, thus allowing time for preparation. However, the skills development must start immediately to avoid having to import all the new skills when the country has high unemployment levels. In addition, as occupations evolve, strategic collaborations between industry, labour unions, government and training institutions will be imperative to ensure a well-equipped and skilled workforce capable of driving EV

[35] (Moshikaro et al. 2023).

[36] FTI Intelligence 2018)

manufacturing and usage needs. The emergence of new roles, coupled with the reskilling of existing ones, is vital for a seamless transition and a sustainable future in the EV ecosystem.

The lower maintenance levels required for EVs may impact the demand for mechanics and other after-market technicians. In 2017, there were about 250,000 mechanics in South Africa, 30% of which were informally- or self-employed. The rollout of EVs introduces new technologies to the market which are materially different from ICE vehicles. While BEVs require significantly less maintenance than ICE vehicles, mechanics will still largely be responsible for the maintenance and repairs of EVs. Mechanical tasks performed in vehicles will likely have to evolve from simple mechanical repairs to high-level technology-related work. Troubleshooting will be a key constraint, particularly for informal mechanics, who may not possess the skills and training to perform EV-related tasks and/or the tools to undertake such an activity. The development of a plan to certify and formalise (train and support), informal service providers in the automotive value chain could assist in overcoming the challenge of computer literacy.[37]

4.4.2.1 Policy Actions

- MerSETA, the Department of Employment and Labour, the Department of Higher Education and Training, **the dtic** and the automotive industry must finalise the list of the skills required by the EV transition, review the fitness for purpose of existing programmes, and develop new curricula where required.

Figure 13 Policy actions to achieve the goal of skills development

	ACTION	Responsible Parties	Potential Impact	Expected Implementation 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Policy Goal #5: Skills Development	1. Develop an NEV certificate programme in collaboration with the industry	merSETA, DEL, the DHE, Industry	Skills development for job retention.	

Notes: indicative timelines; yellow indicates development phase; green indicates implementation phase; grey indicates implementation subject to negotiation and/or technical review; and red indicates discontinuation of Intervention

4.4.3 Research and Development for Technological Advancement

Research and development are crucial for the sustainability of the auto industry in the evolving technological space of EVs. Deepening South Africa's participation in the value chain in part requires technology adoption, adaptation, and innovation. These processes require ongoing investment in research and development.

The South African government provide a tax incentive to companies that incur expenditure related to research and development.

This incentive is provided in terms of section 11D of the Income Tax Act (Act No. 58 of 1962), and is currently based on a pre-approval system, i.e., companies intending to conduct R&D activities in South Africa need to apply to the Department of Science and Innovation for pre-approval, showing that the proposed activities will fall within the definition of R&D as set out in section 11D.

Once approved, companies can benefit from the incentive in that, to determine the taxable income of such a company, a deduction is allowed of an amount equal to 150 per cent of expenditure incurred

[37] Moshikaro et al. 2023

by that taxpayer on R&D carried on in South Africa. This translates into a benefit of 13.5 cents per rand spent on R&D, at a corporate tax rate of 27%, ultimately reducing the company's cost of R&D.

In addition, there is also an accelerated depreciation deduction on a 50:30:20 basis over three years for capital expenditure incurred on machinery or plant and equipment used for research and development.

Industry is encouraged to invest in research and development as it is one of the key ingredients in the competitive and changing global automotive industry. Owning cutting-edge technologies would deepen the industry's value addition and productivity and will ensure it remains relevant.

Policy Actions

- Leverage Research and Development Tax Incentives to deepen value addition, to improve international competitiveness
- Commercialise green hydrogen to stimulate production of green synthetic fuels & hydrogen for FCEVs

Figure 14 Policy actions to achieve the goal of R&D for technological advancement

	ACTION	Responsible Parties	Potential Impact	Expected Implementation 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Policy Goal #6: R&D for technological advancement	1 Leverage Research and development Tax Incentives to deepen value addition	Industry	Improving international competitiveness	
	2. Commercialise green hydrogen	Industry, Presidency, DTIC, IDC, DBSA, NT, DSI, DMRE,	Production of green synthetic fuels & hydrogen for FCEVs	

Notes: indicative timelines; yellow indicates development phase; green indicates implementation phase; grey indicates implementation subject to negotiation and/or technical review; and red indicates discontinuation of Intervention

4.5 Small, Medium and Micro Enterprises (SMMEs) Participation

In line with an objective to increase participation in the economy, access to development funding and markets, capacity development will be provided through the Automotive Industry Transformation Fund (AITF). This support will be targeted at SMMEs and Black Industrialists in the auto sector. It will provide financial support and offtake commitments to SMMEs to enter at upstream level as producers of components or suppliers of goods and services to Tier 1 component manufacturers. In addition to the AITF, measures to support the development of SMMEs in downstream activities such as mechanical repairs of EVs, panel-beating services, construction of charging stations and retail activities will be put in place. The benefit of wider participation is clear: not only will this assist with promoting greater spread of ownership and thus equity and economic inclusion, it will also help build a resilient and flexible supply-base and increase opportunities for young people and women-owned businesses to enter the supply-chain. A number of components and critical auto-industry services lend themselves to production by medium-sized firms or smaller-businesses.

CHAPTER 5:

Supporting the domestic market transition

5 CHAPTER 5: SUPPORTING THE DOMESTIC MARKET TRANSITION

Electric vehicles face several barriers in the marketplace - limited driving range, and the lack of charging infrastructure have all held back adoption and several other factors impacts negatively on adoption. An ecosystem approach is needed to drive EV adoption.

The barriers to adoption in the South African market can be summarised as follows:

a. **Affordability:** The price premiums of EVs disincentives domestic adoption and though expected to fall in the medium to long term, are an obstacle for the initial period of the transition.

b. **Range anxiety:** The state of charging infrastructure, the capacity of the grid and the limited range of a full battery charge all contribute to range anxiety.

c. **Availability of green energy:** The continued dominance of coal in South Africa's energy mix, means that replacing an ICE vehicle with an EV has a modest reduction of emissions. For example, a full battery electric vehicle will eliminate tailpipe emissions but the reliance on charging the vehicle with high emissions electricity still means that driving the car is associated with emissions.

5.1 Addressing the price differential between ICE vehicles and EVs

The South African vehicle market is highly price sensitive, especially across the first two quintiles, i.e. vehicles with an average selling price of R175 135 and R260 798 in 2020, respectively.[38] These two market segments, which cover the bottom 40% of the market in price terms, comprise almost half the South African market in volume and may be excluded from the market if the country legislates a transition while EVs are trading at premiums of up to 52% on ICE vehicles. However, EVs have a relatively lower total cost of ownership due in part to lower maintenance costs and are opening up new ownership models

This potentially has both positive and negative implications. The increase in disposable income, resulting from lower transport expenditure due to lower Levelized Costs of Transport (LCOT)[39] of EVs, would have a positive impact on households' and businesses' spending and indebtedness and, ultimately, economic activity, with a positive impact on fiscal revenues.

Nonetheless, the development of a local market may require active support for consumers to reduce the difference in the upfront cost between EVs and ICE vehicles. While consumer subsidies have been the dominant mechanism adopted by countries to support the adoption of EVs, the cost of the subsidies is currently unaffordable for South Africa. Alternative measures are being considered, noting that such interventions should be balanced against the fiscal priorities, which include promoting a thriving manufacturing sector in South Africa.

5.1.1 Policy Actions

a. Consider consumer incentives (to be adopted at an appropriate later period) for the adoption of EV vehicles, in a manner that is fiscally neutral, and which promotes a thriving manufacturing industry in South Africa. Figure 15 Policy actions to achieve the goal of

[38] Barnes et al. 2021

[39] LCOT is the discounted lifetime cost of ownership and use of a transport asset, converted into an equivalent unit of cost of transport in Rands per passenger kilometre.

addressing the price differential between ICE vehicles and EVs, with the first phase focused on charging-infrastructure; and subsequent phases on consumer incentives, once local production of EVs has been established.

Figure 15: Consumer measures including charging stations

	ACTION	Responsible Parties	Potential Impact	Expected Implementation 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Policy Goal #7: Address the price differential between ICE vehicles	1. Consider consumer incentives for adoption of EV vehicles	NT	Accelerating the EV transition	

Notes: indicative timelines; yellow indicates development phase; green indicates implementation phase; grey indicates implementation subject to negotiation and/or technical review; and red indicates discontinuation of Intervention

5.2 Re-energising Infrastructure Rollout

The availability of charging infrastructure (for BEVs and PHEVs) is a crucial factor underpinning the transition to EVs. This is important to address range anxiety concerns in prospective buyers but also to enable the effective use of BEVs on all roads. Studies have found a statistically significant link between EV uptake and charging infrastructure.[40] Public chargers, in the early stages of market development, are more important as mechanisms to curb range anxiety rather than to deliver actual charging services. Indeed, range anxiety is only a factor for new prospective buyers and largely disappears in active EV drivers.

A public network of both fast and slow chargers is required to complement private charging infrastructure. While most of the charging of PHEVs and BEVs are projected to occur through private, AC chargers at home (80%),[41] the availability of DC chargers (which can fully recharge a passenger car in less than 20-30 minutes) is critical on long-distance routes, such as highways, as well as high traffic areas, such as city centres, business districts, shopping malls, and large office parks. Overall, despite the prevalence of private charging, the availability of public chargers (both slow and fast) is critical to enable the use of BEVs and to support ubiquitous market development.[42]

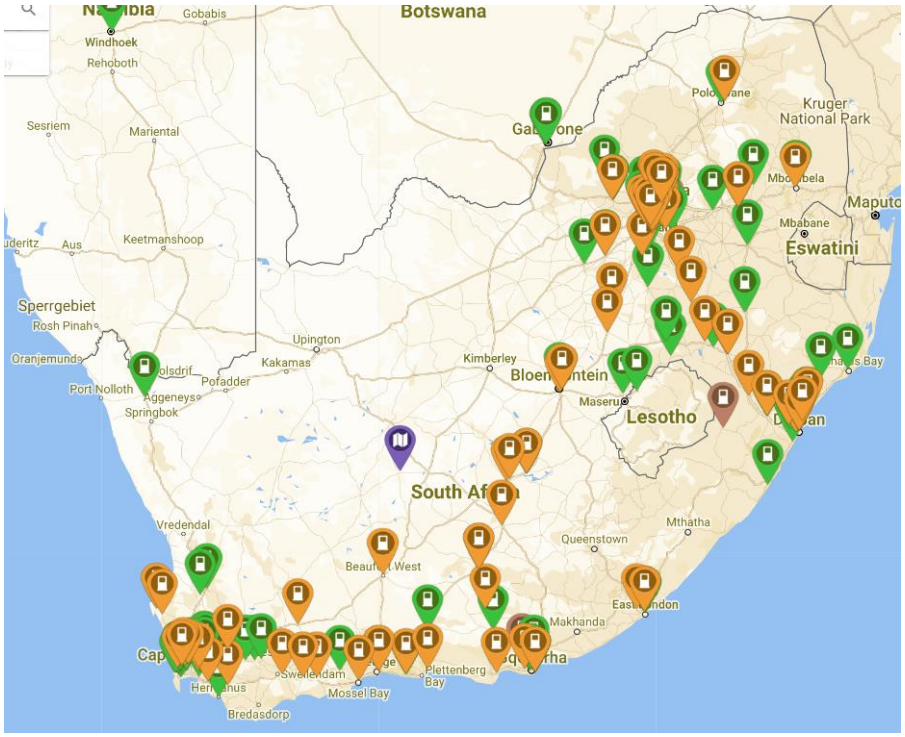
In mid-2023, South Africa had about 350 public EV charging stations, split evenly between fast-charging and slow-charging stations. Given the very low number of BEVs and PHEVs on South African roads (less than 2000 and 1000 vehicles respectively in June 2023), the country is currently on par with the global standard. However, as shown in **Figure 16**, the coverage within the country is highly uneven. The visibility and availability of such charging stations also remain much too low to support the development of the market.

[40] (IEA 2023)

[41] Including office charging, the share of slow charging would extend to over 95%.

[42] (Montmasson-Clair, Dane, and Moshikaro 2020).

Figure 16 South Africa's network of public charging stations in 2021



Source: PlugShare. Legend: green denotes slow chargers; orange depicts fast chargers

An increase in EV sales would have to be matched by a rollout of charging stations in the country. Countries tend to have a relatively high share of fast chargers at an early stage of their EV transition, essentially to build market awareness and confidence. Achieving such coverage demands an ambitious rollout programme, aggressively ramping up new installations. It will also require a dedicated programme to train and upskill a number of professionals, such as electricians, engineers, and site planners, on which the rollout relies.[43]

The rollout of charging infrastructure will also drive opportunities for additional manufacturing in South Africa through the potential localisation of components required for such systems.

South Africa has proactively adopted standards for electric vehicle charging plugs, promoting consistency in charging infrastructure and supporting interoperability. South Africa has been proactive and adopted the South African Bureau of Standards [SABS] standards for AC charging (SANS 62196-2) and DC charging (SANS 62196-3).

5.2.1 Policy Actions

b. Undertake a collaborative analysis between Eskom Distribution, SANRAL, NAAMSA, **the dtic**, DoT, IDC, and DBSA of South Africa's EV charging infrastructure short- and long-term needs, current developments, current critical infrastructure funds, and opportunities that results in a coordinated national strategy and plan for investments to scale up over the next five years. This includes hydrogen re-filling infrastructure for FCEVs.

[43] (Moshikaro et al. 2023)

c. Industry together with **the dtic**, SABS and IDC to put together a plan for localising charging components, to support employment creation along the value chain.
d. Develop an economic regulation framework for charging infrastructure.

Figure 17 Policy actions to achieve the goal of rolling out re-energising Infrastructure

	ACTION	Responsible Parties	Potential Impact	Expected Implementation 2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Policy Goal #8: Re-energising Infrastructure Rollout	1. Scale up investment for charging infrastructure and deepen localisation	Eskom, SANRAL, DTIC, DoT, IDC, and DBSA, Industry.	Increased domestic demand of NEVs													
	2. Industry together with the DTIC, and IDC to explore opportunities for localising charging components, to support employment creation along the value chain.	NAAMSA,NAACAM, DTIC	Efficiencies in infrastructure rollout													
	3. Develop an economic regulation framework for charging infrastructure	DTIC, DMRE, DOT, NERSA														

Notes: indicative timelines; yellow indicates development phase; green indicates implementation phase; grey indicates implementation subject to negotiation and/or technical review; and red indicates discontinuation of Intervention

5.3 Increase grid capacity to support EV uptake

The rollout of charging infrastructure necessitates complementary investments in auxiliary cabling and transformers in the electricity distribution systems that are already backlogged in their maintenance requirements and are not designed for EV use. In addition, the electrification of vehicles will lead to an increase in electricity demand putting pressure on an already constrained grid. Consequently, there is a need to plan for optimal rollout of EV-enabling distribution grid upgrades and power generation.

There are three important factors for the optimal rollout of grid upgrades and additional generation requirements:

First, the synchronisation of the EV transition, grid transformation and power generation. This is currently being coordinated through 2 processes. The Energy Action Plan and in particular Workstream 9 –focuses on addressing challenges at the distribution level, including enabling the wheeling of electricity across the grid and Workstream 3 – focuses on expediting the connection of generation capacity from existing and future procurement rounds, as well as on measures to enable private investment and facilitate small-scale embedded generation. The JET-IP EV Implementation Plan also has a workstream focused on infrastructure that is led by Eskom Distribution and includes DOT, SANRAL, Municipalities and the National Treasury.

Second, the transition to EVs will only truly be low-carbon once charging infrastructure has shifted materially to renewable energy sources. The plans to transition South Africa's grid power will be at a pace to support sufficient energy availability. The implication is that the use of renewable energy-based systems to power charging stations is important for allaying prospective consumers' concerns related to grid power supply and availing a truly low carbon transition. However, coupling charging stations with solar and battery systems has significant financial costs and this may have implications for the pace of rollout as well as the cost of use.

Third, a regulatory system that uses price differentiation to influence consumer charging behaviour would to some degree manage the increase in energy demand. Increasing generation capacity to support EV adoption comes at a high cost. For this reason, it is essential to find ways to ensure that EVs are charged in a manner that not only mitigates substantial negative impacts on the grid but also potentially improves its performance. A regulatory system could incentivise EV users to charge during day-time off-peak periods, and the impact on the demand curve would be positive: this would result in the sale of surplus (solar-based) power and reduce the levels of investments in additional generation. In time, the development of Vehicle-to-Grid communication technologies would also provide additional benefits. ICASA and the policy departments responsible, will also be important.

The transition to EVs will only truly be low-carbon once charging infrastructure has shifted materially to renewable energy sources. The use of renewable energy-based systems to power charging stations would contribute to allay prospective consumers' concerns related to grid power supply. However, coupling charging stations with solar and battery systems has significant financial costs and does not deter from the importance of decarbonising the overall South African electricity supply.

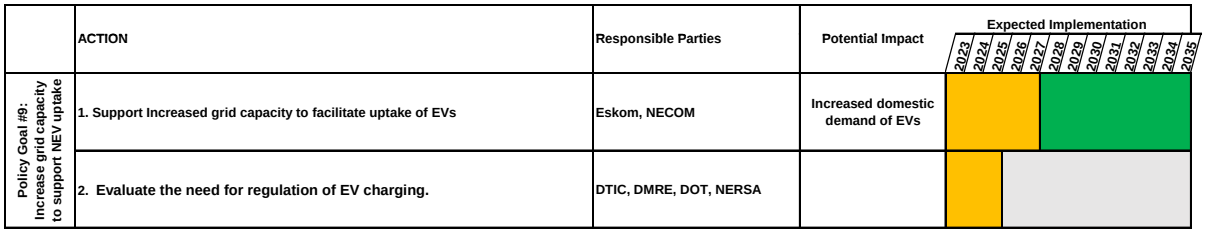
In the broader context of aiding South Africa in addressing climate change, the long-term objective of the grid used to power EVs should involve integrating renewable energy sources into the grid to support EV charging.

5.3.1 Policy Actions

a. Support increased grid capacity and generation to facilitate uptake of EVs.

b. Evaluate the need for regulation of EV charging, considering potential strategies for vehicle-to-grid (V2G) rollout, and a pricing structure that optimises charging behaviour. Given that there is an expected decline in the consumption of fuel and consequently the tax revenues from the fuel levy, an assessment of alternative mechanisms for tax revenues to replace the fuel levy, if necessary, will be considered as part of the regulation review.

Figure 18 Policy actions to achieve the goal of increasing grid capacity to support EV uptake



Notes: indicative timelines; yellow indicates development phase; green indicates implementation phase; grey indicates implementation subject to negotiation and/or technical review, and red indicates discontinuation of Intervention

5.4 Increase public and corporate fleet procurement of domestically produced EV.

The implementation of procurement programmes for public transport, corporate fleets, yellow metal, and state-owned vehicles can serve as a crucial policy tool in driving early-stage EV adoption in South Africa. This approach offers a practical means to directly expand the EV presence on roads while generating demand and sending crucial signals to support local manufacturing. Procurement programmes serve as essential tools to stimulate demand for EVs, prompting automakers to make more EVs available in the local market. These programmes can also be instrumental in facilitating the deployment of publicly accessible charging infrastructure.

Such procure programmes can extend beyond those which are directly managed by the government, to include public transport and corporate fleets.

5.4.1 Policy Actions

a. Develop & and implement a framework for government fleets to transition to SA-produced EVs. The framework should establish EV procurement targets for government departments, state-owned entities (SOEs), and municipal fleets that privilege EVs produced in South Africa. Consideration:

   i. Incremental targets in fixed periods aligned with purchasing cycles. Through this mandate, South Africa can actively support market growth, reduce carbon emissions,

and inspire similar efforts in the private sector. This policy underlines the government's commitment to sustainability and decarbonisation in the transportation sector while fostering a competitive and vibrant local EV market. The development of an EV ecosystem in South Africa necessitates crucial collaboration between the government and the private sector.

ii. Requirements for local assembly, supporting local manufacturing and job creation.

b. Develop an enabling framework for public transport fleets to transition to SA-produced EVs.

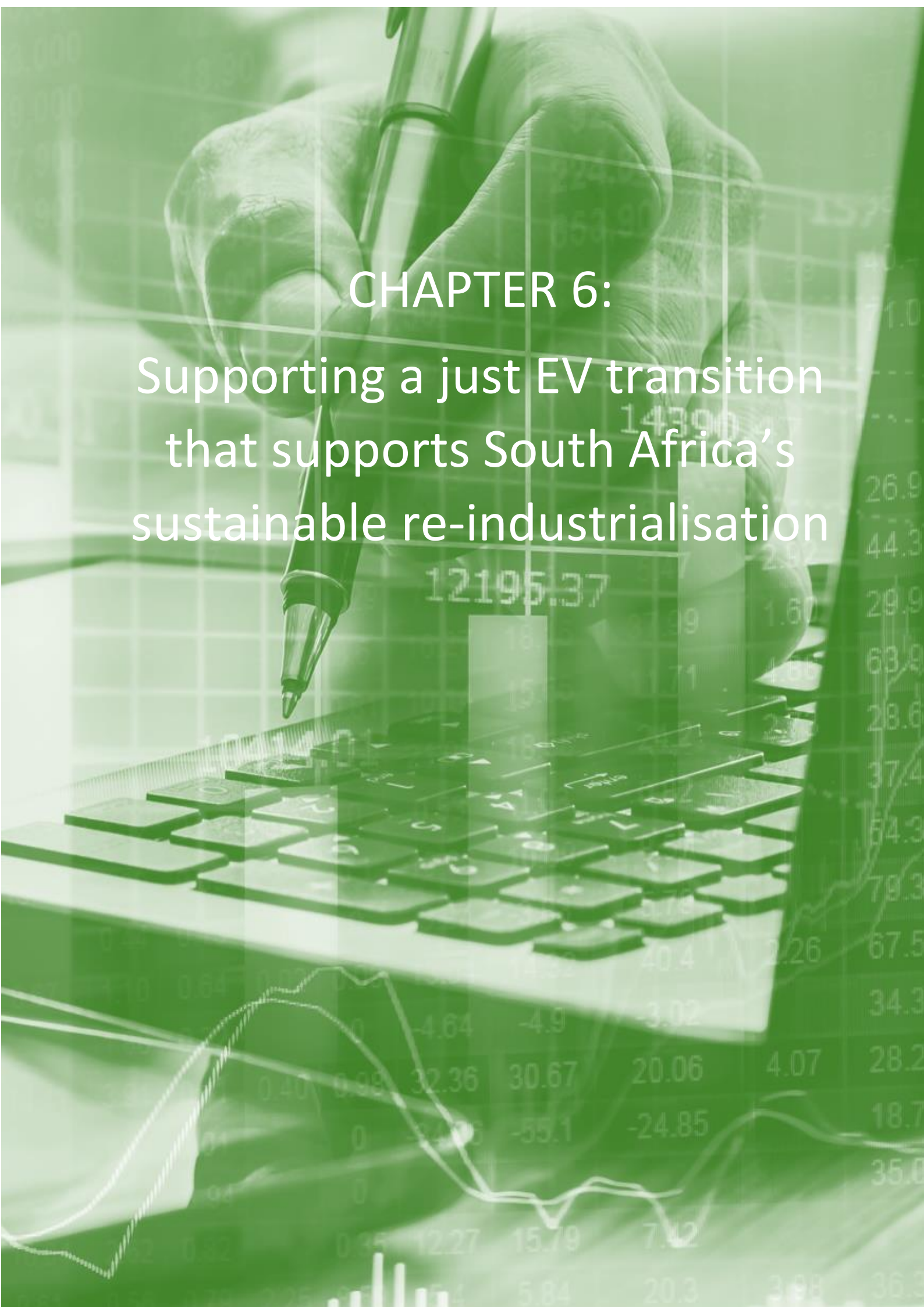
c. Develop an enabling framework for corporate fleets to transition to SA-produced EVs.

d. Develop an enabling framework for mining equipment and yellow metal vehicles to transition to SA-produced EVs.

Figure 19 Policy actions to achieve the goal of developing & implementing a framework for government fleets to transition to SA produced EVs

	ACTION	Responsible Parties	Potential Impact	Expected Implementation 2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Policy Goal #10: Increase public procurement of domestically produced EV	1(a). Develop & implement a framework for government fleets to transition to SA produced EVs	DoT, DCGT, DTIC	Accelerating the EV transition													
	1. Develop & implement a framework for publict fleets to transition to SA produced EVs	DoT, DCGT, DTIC	Accelerating the EV transition													
	1. Develop & implement a framework for corporate fleets to transition to SA produced EVs	DoT, DCGT, DTIC	Accelerating the EV transition													
	1. Develop & implement a framework for mining equipment and yellow metal vehicles to transition to SA produced EVs	DoT, DCGT, DTIC	Accelerating the EV transition													

Notes: indicative timelines; yellow indicates development phase; green indicates implementation phase; grey indicates implementation subject to negotiation and/or technical review; and red indicates discontinuation of Intervention



CHAPTER 6:

Supporting a just EV transition that supports South Africa's sustainable re-industrialisation

6 CHAPTER 6: MOBILISING FUNDING AND STAKEHOLDER ALIGNMENT

6.1 Mobilising Funding for the Transition

The government is committed through a package of support measures to facilitating a just EV transition in South Africa in a manner that preserves current productive capacity in the automotive industry while creating opportunities for deepening the value chain to realise higher levels of value addition and employment creation. Facilitating the just EV transition in a coordinated manner allows for a holistic view of the implications of the transition for the South African economy and the adoption of an ecosystem approach to limit the losses and maximise the development linkages and employment creation potential of the transition. Public funding is necessary to support the automotive industry and ecosystem development in the initial stages of the transition. This continued funding is relevant while there are significant price differentials between ICE and EV prices and there is rapid technological change in the supply chain.

Collaboration and co-funding between business, government, and DFIs will be necessary for the development of the EV ecosystem. Government finances are particularly constrained in the short term and therefore caution will be exercised in the allocation of funds for the transition. For example, consumer cash subsidies are not viable in the current climate. However, even within a constrained environment, the commitment to provide an appropriate and competitive package of support measures, is at the heart of this White Paper.

While the bulk of the increase in investment in the automotive industry should come from the private sector, the government has an important role to play – firstly, through creating an investment-enabling environment, and secondly through increasing its infrastructure investment in a manner that supports the transition. The government has set out its approach to the EV transition and this should facilitate stakeholders to move ahead with the various aspects of the transition including mobilising funding.

The White Paper emphasises investment funding from the state to catalyse the automotive production transition. The government acknowledges that there are multiple spending pressures and considers supporting the maintenance and growth of economic activities critical for securing the future performance of the economy and tax revenue collection. The nature of the trade-off that is being made is intertemporal. In other words, any expenditure or tax revenue forgone is in order to maintain and potentially grow the tax revenues from the industry in the future. In 2020, the industry contributed R36.9 in tax revenue.[44] A portion of this is corporate income tax from the OEMs and component manufacturers, should the industry fail to transition these contributions to the revenue fund would decline and potentially lead to further budget cuts affecting critical service provision in the future.

the dtic and National Treasury will manage the cost-effectiveness and affordability of this additional funding. **the dtic** will ensure that the additional funding support drives development outcomes such as localisation, jobs, and deepening the value chain for EVs and batteries. A review must be undertaken after 5 years of implementation to assess the continued necessity of investment funding. Amongst other things the review will consider the affordability by the government; the levels of investment being made by the industry for EVs and batteries; and the responsiveness of OEMs to the transition.

[44] TIPS, 2021

Development finance institutions – including the IDC and DBSA – will scale up funding for the development of the EV ecosystem to support value chain deepening and infrastructure rollout. This is to complement the investments of industry and government. Funding from the Just Energy Transition - Investment Plan (JET-IP) global partners will be a critical part of the funding sources that will be mobilised. Coordination of the investments and broader policy actions will be necessary due to the interconnectedness of the EV transition, electricity planning, green hydrogen commercialisation, infrastructure planning and supply chain development. This is particularly important for the state and state agencies to optimise funding through coordination and avoid duplication of efforts.

6.2 Stakeholder alignment

The transition approach set out in this White Paper is a product of intensive industry engagement in the last three years. It considers the varying circumstances of each of the stakeholders and takes forward consistent themes emerging from each stakeholder engagement process. There is consensus among industry stakeholders that achieving the objectives set in the SAAM, requires a clear vision that considers the profound changes taking place in the Auto industry as elaborated in the preceding chapters. These changes also have implications for established stakeholder engagement platforms.

The current auto industry master plan has clear implementation and monitoring institutional arrangements in place. At the Executive Oversight Committee (EOC) level, there is a requirement for the active participation of additional stakeholders including those in Logistics (rail and electricity), technology developers (innovation, research, and technology commercialisation), EV support infrastructure (charging facilities providers, emergency services providers) and critical mineral players. It will also include those involved in marketing SA capabilities to position South Africa as a production and demand destinations for EVs and related components.

The EOC and its support structures could include these additional stakeholders and will form an important basis for monitoring the implementation of agreed actions. It is also essential to ensure stakeholder alignment with the SAAM's vision and associated objectives as this is the formal industry development council of the South African automotive industry. Chaired by the Minister of Trade, Industry and Competition or their nominee, the institution should comprise the senior leadership of the South African automotive industry, inclusive of NAAMSA and NAACAM CEOs, NUMSA's most senior leaders, and selected representatives from the broader value chain, particularly where these representatives have a key role in implementing the pillars of the SAAM that are affected by the transition.

A smaller Transition Action Structure will be set up, chaired by the Director General of **the dtic**, to manage active implementation. In line with the monitoring process outlined in the SAAM, a base monitoring and evaluation framework will be developed to track the realisation of targets. The EOC would work to overcome challenges to the realisation of the SAAM, provide recommendations on shifts in policy and/or industry programmes where results are sub-optimal, and amplify the impact of SAAM successes whenever this is required. As already acknowledged in the SAAM, evidence from competing economies attests to a successful automotive industry not being built through one-off policy development processes, or the establishment of a single, fixed industrial plan; but rather through the establishment of institutionalised learning processes that have proactively corrected policy and/or programme failures and worked to amplify successes wherever these have been experienced.

CHAPTER 7:
Concluding Remarks

7 CHAPTER 7: CONCLUDING REMARKS

This White Paper has outlined a strategic vision for South Africa's automotive industry, focusing on the imperative of technological neutrality to effectively harness the dynamic landscape of emerging technologies. With rapid advancements in technology, South Africa aims to establish itself as an agile market capable of assembling, manufacturing components, and fostering the development and commercialisation of a diverse range of technologies. This vision places a strong emphasis on safeguarding employment opportunities and livelihoods, particularly in the production of EVs, while concurrently addressing the pressing need to reduce emissions through the widespread adoption of domestically produced EVs.

The strategy consists of a two-pronged approach:

- Focus Area 1, which entails substantial investments in component production and vehicle assembly for EVs, particularly for markets affected by regulatory changes that will require net zero emission vehicles. It also includes investment in local production and standardization of charging infrastructure.
- Focus Area 2, characterised by a balanced market development approach, includes increasing grid capacity to support domestic EV uptake, public procurement of domestically produced EVs, exploring appropriate incentives for EV uptake by consumers of domestically produced vehicles, promoting benefits of EVs to consumers and utilising the AfCFTA to expand demand for EVs produced in the continent.

The investment and market development phases of the transition to EVs are not isolated; they are interconnected and reinforce each other in a virtuous cycle. The success of one phase contributes to the success of the other, ultimately driving the adoption of electric vehicles and achieving broader sustainability and economic goals.

The White Paper acknowledges that the global transition to EVs presents a potential existential challenge and a significant opportunity for the South African Automotive Industry. The challenges: South Africa’s NDC commitments to reduce greenhouse gas emissions taken together with the transition plans of the country’s key export markets require a shift towards the production and consumption of new electric vehicles. However:

a. The externalities associated with transport emissions mean that there may be under-investment in the transition both from a producer and consumer perspective.

b. The current energy crisis including grid capacity challenges in certain parts of the country and levels of charging infrastructure will slow down the adoption of EVs by consumers.

c. The price premiums of EVs in the short to medium term disincentivise the consumer shift to EVs, thereby reducing domestic demand.

d. Low domestic demand limits economies of scale for producers of EVs and electric automotive components thereby undermining the investment case.

e. The legislated targets to ban new sales of ICE vehicles in South Africa’s main export markets, limit a slow transition approach given the high export exposure of the domestic industry. The projected pace of the global transition will likely lead to a decline in the demand for South African produced ICE vehicles and components.

The transition also brings about a significant opportunity for South Africa to deepen its participation

in the domestic automotive industry by increasing local content and increasing South African value addition in automotive global value chains. The technological changes shaping the transition present several opportunities to: produce EVs with growing global demand, thus supporting the long-term sustainability of the industry; producing new components; and participating in high-value addition nodes of key component supply chains, such as batteries. However:

a. The global nature of automotive production means that investment and component sourcing decisions in new technologies and production of EVs and components are taken at the global level. The level of domestic demand; legislation and its influence on consumer behaviour; cost competitiveness of the domestic industry; the domestic supply chain and the interaction between incentives and other factors will determine South Africa's value proposition.

b. The EV and EV component opportunities are largely interconnected as the business case for EV component production is strengthened by demand from domestic assembly.

The vision and strategy for South Africa's transition seek to mitigate the risks created by the transition for the domestic industry and facilitate the industry to take up the new opportunities created. This is in line with the principle of a just transition. An EV transition that maintains and/or grows the production of vehicles, automotive components and linked supply chains is just as it is associated with limiting job losses, employment creation, and opportunities to increase the contribution of the industry to the South African economy through increasing GDP contributions; and a growth in exports thereby contributing to a positive balance of payments.

The policy intent is to support a just transition of the automotive industry, in a manner that makes a positive contribution to South Africa's sustainable re-industrialisation. This support is in line with prevailing government policy positions on the transition as articulated in the National Climate Change Response White Paper (2011), which notes the country's strategic priorities as including incentivising adaptation; the Green Transport Strategy (2018-2050), which outlined policy actions to "radically grow the uptake of EVs in South Africa"; and the Just Energy Transition Investment Plan, which notes the Just Energy Transition Investment Plan, which notes the importance of localising the electric vehicle supply chain and ecosystem for protecting sector employment and promoting new growth in sustainable manufacturing.

7.1 Summary of Policy Actions

While existing policies like the APDP 2 and the AIS provide a good framework for developing EV productive capacity, including in assembly and component manufacture, additional action will be required. The White Paper thus identifies 10 policy goals with a set of 16 unique and distinct policy actions to be implemented over specified timelines between 2023 and 2035 (illustrated in Figure 1 and described in more detail in the White Paper) with 10 actions in support of the development of cost-competitive EV productive capacity in South Africa; and 6 actions in support of the development of a cost-effective local market for EVs. (See Chapters 4 and 5 for more detail.)

The 10 actions in support of the development of South African EV productive capacity include:

- An increase in levels of investment and public funding, including the development of improved cost-effective incentive support to be announced through the publication of new AIS guidelines. The higher levels of investment funding are intended to incentivise EV investment in automotive assembly and component manufacturing.

- 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 SADC region's participation in the automotive value chain.

- The introduction of a temporary reduction on import duties for batteries in vehicles produced and sold in the domestic market, to improve cost competitiveness.
- Securing or maintaining duty-free export market access for vehicles and components produced in South Africa to support the resilience of the industry.
- Leveraging R&D tax incentives to deepen domestic value addition.
- Commercialising green hydrogen production in South Africa as a source of sustainable fuels;
- Refurbishing the rail line between Gauteng and Ngqura to improve overall cost-competitiveness.
- Implementing energy reforms, including executing interim solutions for energy in partnership with industry to improve cost competitiveness.
- Implementing reforms to network industries, including freight rail and ports.
- Developing an EV certification programme in collaboration with industry for skills development.

The 6 action actions in support of the development of a South African market for EVs include:

- Scale up investment in charging infrastructure
- Developing opportunities for localisation of charging components.
- Developing and implementing a framework for fleets to transition to SA produced EVs, including government-owned, public transport, corporate fleets, and mining equipment.
- Supporting increased grid capacity to facilitate uptake of EVs.
- Consider consumer incentives for the adoption of EV vehicles.
- Evaluating the need for economic regulation on EV charging.

The 16 actions will require all stakeholders to contribute to their successful implementation including government agencies and departments as well as industry.

Use of JET-IP funding will complement annual budget appropriations and announcements in the Budget of additional support measures. Following publication of this White Paper, government will make the first announcements of resource-allocations in the February 2024 Budget.

A key tenet of success will thus be appropriate alignment which will be facilitated through the SAAM oversight bodies. The mobilisation of funding will also be critical to success, especially against the principles of cost-effectiveness and cost competitiveness. The role of DFIs and industry will thus be essential in supporting the government in building the financial capabilities to implement the necessary policy action outlined in this White Paper.

	ACTION	Responsible Parties	Potential Impact	Expected Implementation 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035
Investment in Production	1. Increase levels of investment and investment funding	Government & Industry	Increase NEV & NEV component investments	
	1.1 Publish AIS guidelines	DTIC		
	1.2 Manage cost-effectiveness and affordability of incentives	DTIC & NT		
	1.3 Investments in assembly and component manufacturing	Industry		
	2. Facilitate the development of the electric battery value chain	Industry & Government	Localise/regionalise EV value addition	
	2.1 Enable raw material refining and battery active materials and components production	DTIC, DMRE,NT, ITAC & IDC		
	2.2 Jointly develop SADC regional battery value chain	DTIC,DMRE& DIRCO		
	2.3 Develop a value proposition for production of battery cells in South Africa.	Industry, DTIC, IDC& DMRE		
	2.4 Commit demand for EV batteries	Industry & Government	Local market development	
	3. Introduce a temporary reduction import duties for batteries in vehicles produced and sold in the domestic	DTIC,ITAC & SARS	Decrease cost of producing NEVs for SA market.	
	3.1 Amend and publish APDP legislative framework	DTIC,ITAC & SARS		
	4. Market Access: Secure duty free export market access for EVs and EV components	DTIC	Improving export competitiveness	
	5 Leverage Research and development Tax Incentives to deepen value addition	Industry	Improving international	
	6. Commercialise green hydrogen	Industry, Presidency, DTIC, IDC, DBSA, NT, DSI, DMRE,	Production of green synthetic fuels &	
	7. Refurbish rail line between Gauteng and Ngqurha	Transnet, DTIC, IDC, Industry	Improving cost competitiveness	
	8. Implement the energy and freight rail and port reforms	Eskom, DMRE,Transnet Presidency, NT, Industry	Improving cost competitiveness	
	9. Execute interim solutions for energy in partnership with industry	Presidency, DTIC, municipalities, Industry	Improving cost competitiveness	
	10. Develop an EV certificate programme in collaboration with the industry	merSETA, DEL, the DHE, Indus	Skills development for job retention.	
Local market development	11. Scale up investment for charging infrastructure and deepen localisation	Eskom, SANRAL, DTIC, DoT, IDC, and DBSA, Industry.	Increased domestic demand of NEVs	
	12. Industry together with the DTIC, and IDC to explore opportunities for localising charging components, to support employment creation along the value chain.	NAAMSA,NAACAM, DTIC	Efficiencies in infrastructure rollout	
	13. Develop & implement a framework for government fleets to transition to SA produced NEVs	DoT, DCGT, DTIC	Accelerating the NEV transition	
	14. Support Increased grid capacity to facilitate uptake of EVs	Eskom, NECOM	Increased domestic demand of NEVs	
	15. Consider consumer incentives for adoption of EV vehicles	NT	Accelerating the NEV transition	
	16. Evaluate the need for regulation of EV charging.	DTIC, DMRE, DOT, NERSA		

Legend

Development Phase

Implementation Phase

Subject to negotiation/Technical Review

discontinuation of intervention

Way Forward

Several key stakeholders will have a role to play in the implementation of key policy interventions to support the transition to EVs over the next decade.

The implementation of the White Paper will commence after publication with the following:

a) DTIC to publish architecture of the incentive package, by January 2024.

b) Amendments to the APDP Regulations and Guidelines, initial draft and commencement of stakeholder engagements, by January 2024.

c) NT to announce details of the OEM incentives, February 2024.

d) Amendments to the Automotive Investment Scheme guidelines to be published, February 2024.

The implementation of the remaining Policy Actions will be coordinated as follows:

a) **SA Automotive Masterplan (SAAM) Executive Oversight Committee (EOC):** The EV transition set out in the White Paper supports the achievement of the objectives of SAAM and the EOC supports the implementation of the SAAM initiative. The EOC will also support the implementation of EV White Paper initiatives. To ensure effectiveness in this role the EOC will be expanded to include logistics (rail and electricity), technology developers (innovation, research, and technology commercialisation), and EV support infrastructure (charging facilities providers, emergency services providers) as well as other relevant stakeholders.

b) **Just Energy Transition Implementation Programme Coordinator for EVs**: The implementation of the market development initiatives relating to expansion of grid capacity and scaling up charging infrastructure will also be supported by the JET Implementation Plan Programme Coordinator for EVs, namely the IDC.