TRADE & INDUSTRIAL POLICY STRATEGIES

POLICY BRIEF: 3/2022

Towards an inclusive rollout of electric vehicles in South Africa

OVERVIEW

Electric vehicles (EVs) increasingly feature on the roads of the world. Pushed by environmental regulations, support programmes and improving economics, they are set to become dominant in the coming decades. Yet, the rollout of EVs risks leaving many behind. This policy brief considers the rollout of EVs in South Africa, focusing on the opportunity to foster an inclusive transition to e-mobility for passenger transport. Given the structure of the South African economy, a dual strategy is required. The brief first looks at how an inclusive rollout of passenger cars could be incentivised in South Africa, effectively to sway entry-level buyers (i.e. upper middle-income households) to purchase EVs instead of internal combustion engine (ICE) vehicles. It then considers how to introduce EVs into public transport, to extend the benefits of e-mobility to low-income and lower middle-income households in the country.

Trade & Industrial Policy Strategies (TIPS) is a research organisation that facilitates policy development and dialogue across three focus areas: trade and industrial policy, inequality and economic inclusion, and sustainable growth

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INTRODUCTION

The world is rapidly moving towards e-mobility. A number of opportunities are evident, including higher sustainability performance, the emergence of new industries, employment and business ventures, and more affordable mobility in the long run. Many risks are also manifest. One such risk is the threat of the "electric revolution" leaving many commuters behind, further deepening inequalities between and within countries. In South Africa, fostering an inclusive e-mobility transition is a two-pronged issue. It concerns fostering the overall uptake of EVs[1] into the country, as well as incentivising an inclusive rollout that benefits all in society.

A number of factors support the transformation. Climate change mitigation and air quality objectives have initiated the transition to cleaner forms of transportation through stricter environmental regulations. Policy support programmes along with ambitious environmental targets are key drivers of the market globally. In addition, favourable economic and technological developments have seen EVs being increasingly cheaper to own than petroleum-based cars over their lifetime. The consumer experience, linked to the connectivity, reactivity and usage experience of the vehicles has also improved the attractiveness of EVs.

While these factors support a technological transition, little attention has been paid to ensuring a broad-based, inclusive rollout of EVs, and more broadly a just transition to sustainable mobility. The risk of an exclusionary, elitist transition to e-mobility is high. Access to EVs is still extremely limited globally. With the exception of a few markets, like Norway or China, the sales of EVs are marginal in volume and share. Battery electric vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs) accounted for less than 5% of global passenger vehicles sales in 2020. Outside of China and some pilot projects in high-income economies, the rollout of EVs into public transport is similarly minimal to date.

In South Africa, as in most low- and middle-income economies, the introduction of EVs is nascent. In addition, historically high levels of inequality and poverty have set the stage for a socially-regressive introduction of EVs. Yet, as the technology permeates the South African market, an opportunity exists to shape the rollout more inclusively, in support of a broader just transition to sustainable mobility. Specifically, this would cover more inclusive cities, an increase in non-motorised transport and public transportation overall, and a socially-progressive transformation of the automotive and liquid fuel value chains.

[1] *In this policy brief, EVs encompass Hybrid Electric Vehicles (HEVs), PHEVs and BEVs for passenger transport, including passenger car and public transport. It does not include two- or three-wheelers. Freight is also not considered.*

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The rollout of EVs in the passenger car market is influenced by a series of factors. These range from domestic structural inequality, to automotive market dynamics, and to policy developments.

FOSTERING AN INCLUSIVE ROLLOUT OF EVs IN THE PASSENGER CAR MARKET

The first component of an inclusive rollout of EVs in South Africa consists of shaping the introduction of EVs in favour of entry-level vehicles. The rollout of EVs in the passenger car market is influenced by a series of factors. These range from domestic structural inequality, to automotive market dynamics, and to policy developments.

First, reflecting South Africa's wide inequalities, car ownership in the country remains highly segregated. Only a third of South African households own a motor vehicle. People living in urban areas are more likely to own a car (40%) than those in rural areas (20%). This is clear on a geographical basis, with the Western Cape and Gauteng displaying the highest ownership rates in the country. Car ownership is also directly correlated with levels of income and population groups. In addition, 41% of men own a vehicle while only 25% of women do (Statistics South Africa 2017).

Second, as indicated in Table 1, 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, respectively. 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 would be decimated by major price increases.

Third, although growing, the number of EVs available in South Africa remains limited. The lack of local supply is particularly striking in the entry- and mid-level market segments, with most available models competing in the high-end to niche segments. Only seven BEVs were available on the local market at the end of 2021, all at the high-end of the market. More BEVs are expected in South Africa in the coming years. The availability of hybrid vehicles is slightly higher, with 23 HEVs and 11 PHEVs having registered at least one sale by the end of 2020. No Fuel Cell Electric Vehicle (FCEV) is currently on offer. This contrasts with the existing 370 BEV and PHEV models available worldwide in 2020 (IEA 2021).

Fourth, despite lower running costs (linked to low maintenance requirements, higher efficiency and low charging costs), EVs still have a high upfront purchasing cost. In high-income markets,[2] the typical price differential between EVs and their respective ICE equivalent models is 36%. BEVs (52%) have the highest average price differential with ICE equivalents, followed by PHEVs (43%) and HEVs (12%) (Barnes et al, 2021). Similarly, available EVs in the South African market fetch a much-higher price tag than comparable ICE-based competitors, of 33% on average.[3] This high differential is problematic as South African automotive stakeholders argue that EVs can only be competitive at a small price premium of around 10% over their ICE equivalents in the South African market.

Fifth, market adoption of EVs is not only a function of costs but also institutional and behavioural barriers, primarily due to a lack of awareness. Range anxiety[4] remains a prevailing factor for first-time EV buyer. Linked to range anxiety, prospective buyers express concern about adequate charging infrastructure,

[2] Numbers based on six key markets, namely the UK, France, Australia, USA, Netherlands, and Germany.

[3] The analysis of the South African market is compromised by the small number of models available and the equally small number of vehicles sold. Furthermore, the price differential for BEVs is understated in South Africa, with OEMs reporting selling BEV models at below cost to stimulate new demand for these vehicles. Based on existing data, PHEVs display the highest price differential (43%), followed by BEV (36%) and HEVs (21%).

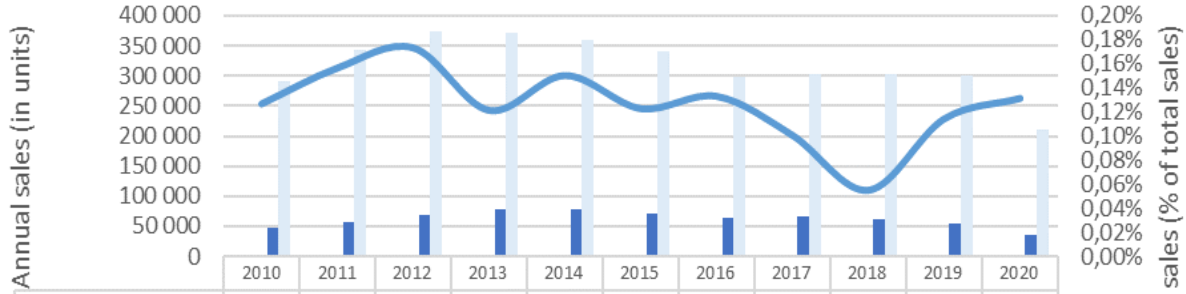
[4] Range anxiety is the driver's fear that a vehicle has insufficient energy storage to cover the road distance needed to reach its intended destination, and would thus strand the vehicle's occupants mid-way.

Table 1: Price elasticities for passenger vehicles in South Africa in 2020

MARKET SEGMENT	AVERAGE VEHICLE SALES VALUE	PRICE ELASTICITY	VEHICLES SOLD	TOTAL SALES REVENUE (M)
Quintile 1	R175 135	-1,795	96 416	R16 886
Quintile 2	R260 798	-1,950	97 810	R25 509
Quintile 3	R359 765	-1,023	71 983	R25 897
Quintile 4	R495 356	-0,236	97 536	R48 315
Quintile 5	R876 554	-0,818	43 104	R37 783
Total	**R 379 476**	**-1,162**	**406 849**	**R154 389**

Source: Barnes and Grant, 2019

Figure 1: Passenger car sales in South Africa from 2010 to 2020



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
HEV	430	627	766	513	646	266	213	182	55	181	153
BEV	-	-	-	34	14	117	100	68	58	154	92
PHEV	-	-	-	-	-	124	168	121	89	72	79
Diesel	48 598	56 317	68 260	79 357	78 155	70 908	63 765	65 516	62 605	55 551	35 221
Petrol	289 911	343 489	373 022	370 392	360 122	340 982	297 019	302 227	302 440	299 421	210 996
Share of EV sales	0,13%	0,16%	0,17%	0,12%	0,15%	0,12%	0,13%	0,10%	0,06%	0,11%	0,13%

HEV BEV PHEV Diesel Petrol Share of EV sales

Source: Author, based on data from Lightstone Auto and naamsa (The Automotive Business Council)

electricity availability and charging times. However, South Africa has adequate charging infrastructure relative to the number of EVs on its roads. Moreover, international experience has shown that the vast majority of people (80%) charge their vehicles at home (this extends to >96% when including workplace charging) (Fishbone, Shahan and Badik 2017).

Sixth, in the current South African context, no incentive exists in the market to support the demand for EVs. Some locations offer free charging, but this benefit is limited and slowly disappearing. Despite multiple government and industry statements and the publication of a Draft Green Paper in 2021 (the dtic, 2021), no explicit financial or non-financial benefits in favour of EVs are currently in place in the country, leaving the above obstacles unaddressed.

Last, as a result of all the above factors, EVs have little visibility on the local market to date. As detailed in Figure 1, the sales of EVs in South Africa have remained extremely marginal with 6 367 EVs sold up to the end of 2020, corresponding to less than 0.2% of new car sales. This is particularly problematic given the dependency of the South African automotive market on global/European dynamics for both supply and demand, which are increasingly transitioning to EVs. In 2020, about two-thirds of passenger vehicles manufactured in South Africa were exported, primarily to Europe (73% of exports). At the same time, 57% of vehicles sold in South Africa were imported. Europe is, by far, South Africa's main trading partner, accounting (in value) for 48% of South African imports and 60% of South African exports of automotive vehicles and components in 2020.

In sum, looking at the accessibility of EVs within the existing automotive market, the fundamental challenge is the uncompetitive pricing of EVs relative to ICE vehicles. As such, generating a shift to large-scale, broad-based EV consumption in South Africa would require significant incentivisation of demand. The value of subsidisation should be determined by the type of EVs, the effectiveness of support, and the cost of the incentive to the government fiscus. The incentive should be scaled according to the environmental benefits of the three tiers of EV technology, with the lowest level of support provided to HEVs, intermediate support for PHEVs and the highest levels of support for BEVs. In addition, to drive a just transition, an incentive of this kind would need to optimise support for entry-level EVs, with less benefit for more expensive EVs (which are likely to be purchased by wealthier, less price sensitive vehicle owners).

Based on Barnes et al. (2021; 2022), the incentive is recommended to be set at R80 000 for BEVs, R40 000 for PHEVs and R20 000 for HEVs, as highlighted in Table 2 on page 4. These are the levels of incentivisation required to meaningfully support the transition to EV consumption in the highly price sensitive first two quintiles of the South African market, and to encourage EV consumption in the more expensive, less price sensitive market segments.[5] With such an incentive, EV sales are expected to reach 20% by 2035, 40% by 2030 and 60% by 2035.[6]

Given the price sensitivity of the South African market and the substantial levels of subsidisation required to equilibrate EV and ICE vehicle pricing, the most straightforward incentive model is the provision of a direct, fixed EV purchase subsidy (Barnes et al. 2022).

[5] *Importantly, the proposed incentives will not fully equilibrate the pricing of NEVs and ICE vehicles in the domestic market. They will rather narrow the pricing gap, with the objective of securing price differentials of no more than 10% in large volume domestic market segments.*

[6] *Lower levels of incentivisation could be considered, in turn, yielding lower volumes of EV sales and a slower transition.*

Table 2: Summary of recommended EV incentives

EV TYPE	PROPOSED SUPPORT	RATIONALE
HEV	R20 000	HEVs are the most competitive EV, at least in the short term and especially in the South African operating context. Incentivising the consumption of HEVs will expedite the immediate transition to EVs and prepare the domestic market for a more fundamental transformation. HEVs also do not need enhancements to the country's electricity grid and will immediately reduce the industry's carbon footprint.
PHEV	R40 000	PHEVs represent a relatively expensive transition technology for light vehicles (hence the higher level of incentive proposed) but may hold an important market position for light commercial vehicles (LCVs) over a longer period, especially given South Africa's distinctive LCV use profiles. PHEVs also represent a compromise technology in preparation for the conversion of the country's energy supply to renewable energy technologies.
BEV	R80 000	BEVs will ultimately dominate the South African light vehicle market, but the base cost competitiveness of the technology is unlikely to reach parity with ICE technologies over the next decade, hence the need for a substantial purchasing incentive. Reducing the carbon footprint of the South African automotive industry requires the conversion of the country's energy supply to renewable energy technologies.

Source: Barnes et al, 2022

Complementarily, or alternatively, extremely low-interest loans, underpinned by development finance institutions (DFIs), could be offered to EV buyers.[7] To avoid a regressive distribution, any interest-based incentive would, however, have to be carefully crafted along a sliding scale favouring entry-level vehicles (i.e. entry-level EVs would benefit from extremely low interest rates while high-end EVs would fetch interest rates close to those offered to ICE vehicles).

To optimise the efficiency and effectiveness of the subsidy, a number of factors should be considered:

- The purchase incentive should only be made available to HEVs that can run for a distance exclusively on their battery. HEVs with small supplementary batteries that improve fuel efficiency but that are incapable of autonomously propelling a vehicle should be considered ICE vehicles and excluded from the incentive;
- To further incentive the transition, in line with global trends, HEVs should only receive support for the period to the end of 2030. Beyond this, only PHEVs and BEVs should receive support until 2035, with HEVs deemed ICE variants from 2031 onwards;
- Purchasing incentives should only be provided to EVs that meet European Union/United Kingdom (EU/UK) homologation requirements, to avoid incentivising low-value, low-battery capacity EVs that would be inappropriate for the South African market;
- Subject to periodic reviews, the NEV grant should remain unchanged over the South African Automotive Masterplan period (2035). Assuming the continued progressive decline of battery costs and depreciation of the rand, maintaining the incentive constant would reduce the fiscal cost of the incentive on a net present value basis, while also more aggressively incentivising EV adoption;
- The availability of entry-level EVs in the local market is a fundamental precondition for the subsidy to be effective. To this end, the tariff anomaly, which sees BEV originating from the EU fetching a 25% tariff (against 18% for all other vehicles) should be resolved.
- In line with developments in leading markets, the purchasing incentive would be particularly efficient if part of a broader mix of measures including vehicle operating incentives generating further financial and non-financial benefits for EVs, such as preferential access/parking or discounted licences (Barnes et al, 2021).

The fiscal cost of introducing the EV grant would be substantial if it is successfully taken up by consumers. The modelled cost, based on securing an EV market share of 20% by 2025, 40% by 2030, and 60% by 2035, would be reasonable over the initial period, at R7.6 billion for the four years from 2022 to 2025 (measured in 2021 constant Rand values). However, these costs would then escalate significantly as PHEV and BEV consumption increases. The annual cost would reach R12.4 billion in 2030, and R21.4 billion in 2035.[8] A loan-based incentivisation model would be much less costly to the state but is conditioned on an ambitious partnership with foreign DFIs. However, global experience shows that economy- and society-wide benefits far outweigh the fiscal cost of supporting the transition.

[7] This is conditioned on the provision by foreign DFIs of near-zero interest concessional loans to South Africa's financial institutions as well as a degree of financial de-risking.

[8] Some of these costs could be covered by global climate finance, such as the US$8.5 billion partnership signed between South Africa and France, Germany, the UK and the US, as well as the EU. https://www.thepresidency.gov.za for more information.

Public transport is responsible for moving the majority of the population in South Africa. Close to three-quarter of South Africans relied on public transport as their main means of commuting in 2019.

HOW CAN THE SHIFT TO EVs IN PUBLIC TRANSPORT BE SUPPORTED?

Acknowledging that only a third of South Africans are able to afford a motor vehicle, the second component of an inclusive rollout of EVs in the country relies on introducing e-mobility in public transportation. Indeed, while promoting a more inclusive rollout of EVs on the passenger vehicle market is paramount, it fundamentally does not address the core inequality related to the accessibility of transport. Public transportation faces a number of challenges that hamper its ability to transition to e-mobility, from customer profiles, to costs, to uneven subsidisation, to lack of policy drive.[9]

First, public transport essentially services low- and lower medium-income households with limited disposable income. Indeed, public transport is responsible for moving the majority of the population in South Africa. Most public transport users are in fact captive users as they are predominantly unable to afford a private vehicle. Close to three-quarter of South Africans relied on public transport as their main means of commuting in 2019.

Of commuters that use public transport for their mobility, 66% moved with minibus taxis (MBTs), 12% with buses and 3% with trains (Statistics South Africa 2021). To meet the demands of the South African population, the number of MBTs and buses (notably through the rollout of Bus Rapid Transport (BRT) systems in multiple municipalities) has furthermore continued to increase over the past decade.

Second, public transportation is expensive for most South Africans. More than two-thirds of households that fall in the lowest income quintile (i.e. the poorest 20% of the population) spend more than 20% of their monthly household income per capita on public transport, as many reside on the peripheries of cities away from centres of economic opportunities (Statistics South Africa and DoT 2015).

Third, the country's geography, combined with the spatial dislocation of the country's cities inherited from the apartheid era, leads to South Africans enduring relatively long daily commutes. In 2019, the average travel time for workers relying on MBTs and buses stood at 63 and 84 minutes respectively (against 44 minutes for private vehicles and 107 minutes for trains) (Statistics South Africa 2021).

Fourth, subsidies for the different modes of public transport are extremely uneven. Municipal bus systems are heavily subsidised relative to their level of ridership. In contrast, the privately-run MBT industry, which transports most of the population, does not benefit from any operational support. The Taxi Recapitalisation Programme (TRP), introduced in 2006, offers a R50 000 scrapping allowance as a deposit for a new, more efficient MBT. However, the programme has failed to meet expectations, and many old, inefficient vehicles persist (Deonarain 2019; Competition Commission 2020).

Fifth, electric versions of MBTs and buses remain more expensive to operate than their ICE equivalent. While this is expected to change in the near future (with fast decreasing capital costs), the Levelised Cost of Transport (LCOT)[10] of battery electric buses and MBTs is currently higher than ICE alternatives on average, as shown in Table 3.

The primary factor influencing such results is the high upfront capital costs of the vehicles.

[9] *Public transportation also faces more general problems, such as inefficiency, unreliability, unsafe commutes, and a process of cannibalisation rather than complementarity between various services (Deonarain, 2019).*

[10] *A LCOT model establishes the cost of supplying the public transport service (bus and MBT) over the life of the vehicle and is expressed in units of Rands per passenger.km (R/pkm), i.e. the net present cost to transport a passenger one kilometre.*

Table 3: LCOT of electric and ICE buses and MBTs in South frica in 2019, per R per passenger.km

SCENARIOS		HIGH ELECTRICITY PRICE	LOW ELECTRICITY PRICE	HIGH LIQUID FUEL PRICE	LOW LIQUID FUEL PRICE
MBTs	**ICE**	0,61	0,61	0,63	0,61
	BEV	0,73	0,71	0,73	0,73
	LCOT differential	*20%*	*16%*	*16%*	*20%*
Buses	**ICE**	0,95	0,95	1,01	0,95
	BEV	1,76	1,71	1,76	1,76
	LCOT differential	*85%*	*80%*	*74%*	*85%*

Source: Dane, Wright and Montmasson-Clair, 2019

Sixth, the sector suffers from a lack of offer domestically, despite a growing number of original equipment manufacturers (OEMs) producing electric buses and MBTs. Although converted e-buses and e-MBTs are available locally, no OEM currently supplies such vehicles on the local market. This has consequences on the range of vehicles available as well as their price.

Seventh, South Africa lacks a vision as well as a clear and co-ordinated policy environment to support the deployment of public transport EVs. The Department of Transport's Green Transport Strategy (2018-2050) does not explicitly include any actions related to the electrification of public transport services beyond a commitment to driving EV adoption through a public procurement programme (DoT 2018).

Last, as a result of the above, experience in deploying electric public transport vehicles is limited in South Africa, primarily due to cost concerns. In 2016, the City of Cape Town procured a fleet of 11 e-buses, produced locally by Chinese-owned firm BYD. The experience has, however, been difficult, with the buses proving unsuitable for Cape Town's geography (and allegations of irregularities in the tender process). Cape Town is to date the only municipality in the country to have experimented with the technology. And no experience exists for e-MBTs. As a result, many questions around the practical rollout of e-buses and e-MBTs in the country remain open. Besides cost implications, questions around technical suitability, scalability, the degree of operational flexibility, charging infrastructure, electricity tariffs and grid stability, are yet to be answered.

Internationally, the development of EVs in public transport has been driven by policy commitments at national and local levels, along with subsidies to reduce the upfront capital cost of vehicles (IEA 2019). This, coupled with the lower operational costs, has resulted in a lower LCOT, making electric buses a financially attractive option for operators. Cities from the EU, the UK and the United States (US) but also China, India and Chile have made great strides in shifting the fleets to e-buses. Experience on the rollout of e-MBTs is more limited.

The most straightforward avenue to support the electrification of MBTs in South Africa is to leverage the existing TRP. This would require offering a more attractive, differentiated, scrapping allowance for EVs. This would align with the Competition Commission's recommendation that the MBT industry be further supported to address the misalignment between ridership volumes and the allocation of subsidies (Competition Commission, 2020). To reach parity on a LCOT-basis with ICE vehicles currently, the allowance would need to reduce the upfront capital cost of MBT BEVs by 25%. This equates to a sum of R162 000 per vehicle, compared to the current R50 000 scrapping allowance.[11]

Based on a vehicle fleet of 130 996 MBTs[12] with approved operating licences in the country in 2017, the complete transition of the sector to BEVs would require a subsidy of about R21.2 billion. As with passenger cars, a reduced subsidy would be necessary for PHEV and HEV variants.

In addition, reducing the cost of finance for e-MBTs would further support the transition. MBTs are considered high risk and face high interest rates when financed[13] (Competition Commission, 2020). Preferential financing terms of EVs could be achieved through government-guaranteed loans or the provision of concessional debt (as proposed earlier for passenger vehicles).

For bus fleets, the rollout of EVs would essentially flow through public procurement programmes, such as BRT systems. This requires strong leadership and commitment as the option comes with risks and additional costs (as demonstrated by the City of Cape Town's experience). At the same time, the public nature of the bus systems allows for a great degree of experimentation with innovative financing mechanisms and business models, notably to reduce the upfront capital expenditure and the cost of capital.

While most of the e-buses on the road globally have been paid upfront, either by the municipality or the operator, new business models are emerging, involving battery leasing, joint procurement and bus sharing (BNEF, 2018).

Several international experiences are worth exploring in the South African context to reduce the upfront purchasing cost of e-buses:

- Providing grant funding and/or highly concessional finance to fleet owners/operators, especially if leveraging donor funding/development finance;
- Leasing of batteries (as in Park City, US);
- Joint purchases by two or more bus operators to leverage buying power and reduce costs (such as the San Francisco Municipal Railways and King County joint purchase);
- Operational or capital lease with different timeframes and ending conditions (Warsaw, Poland; Ney York, US); and
- Innovative finance options, such as Pay-as-you-Save (PAYS), which would have municipalities finance the cost of batteries and chargers against a PAYS tariff from operators.[14]

[11] This excludes any need to invest in charging and additional infrastructure by the fleet owners.
[12] Data reported by https://businesstech.co.za. Including vehicles without operating licences, there are more than 200 000 MBTs on South African roads.
[13] The National Taxi Alliance submits that SA Taxi Finance charges interest rates of about 26.5% compared to 12% to 17.25% from traditional credit providers.
[14] See GreenCape (2018) for more details on the PAYS model.

An array of complementary measures would further enhance the business case for introducing EVs in public transport, such as a preferential tariff structure incentivising fleet owners to charge during off-peak periods. Stimulating local manufacturing of e-MBTs and e-buses could also result in lower-cost vehicles in the long run.

More broadly, the rollout of EVs in public transport needs to be done in tandem with an investment in adequate infrastructure (electricity grid and/or hydrogen network).

CONCLUSION

EVs increasingly feature on the roads of the world. Pushed by environmental regulations, support programmes and improving economics, they are set to become dominant in the coming decades. Yet, the rollout of EVs risks leaving many behind, in the ICE age or on the side of the roads. Achieving a social progressive development of e-mobility requires pro-active interventions.

This is particularly true in South Africa, given the high levels of inequality overall and in access to transport. Only a third of South African households own a car and over half of the population relies on public transport, primarily MBTs and buses.

A dual strategy is necessary. First, it involves promoting the purchase of entry-level EVs in the passenger car market. A temporary cash grant or innovative financial arrangement, pegged at R80 000 for BEVs, R40 000 for PHEVs and R20 000 for HEVs, is recommended as the main instrument to incentive prospective buyers. This is the level of support necessary to bridge the gap with EVs and ICE equivalent in the first two quintiles of the market. Second, it requires fostering the introduction of EVs in public transport. The rollout of e-MBTs should be supported through a temporary, enhanced TRP scrapping allowance for EVs (around R162 000 for BEVs) and low-cost finance. The shift of bus fleets to EVs should be supported through a set of grants and innovative financial arrangements and business models, like PAYS.

The "electric revolution" will make transportation more environmentally sustainable. It also provides a unique opportunity to make it more socially inclusive. It should not be missed.

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