

INTRODUCING ELECTRIC VEHICLES TO SOUTHERN AFRICA:

An Opportunity for Deep Systemic
Innovation towards a Green New
Deal

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OVERVIEW OF PRESENTATION

- 1. SAIIA Futures: Why this programme at SAIIA?**
- 2. System Innovation, Path dependency and Policy Development**
- 3. Key messages for Regional Policy Makers**

SAIIA FUTURES:

- **Foresight and Scenario-planning is an often-employed tool in a South African context**
- **Key Difference: SAIIA Futures uses a regional lens**
- **Understanding and preparing for key uncertainties (rising temperatures, growing inequality, aging population) and technological disrupters (4IR, IOT, Robotics, automation)**
- **Pro-active public-private action imbedded in a societal approach that secures sustainable development (climate, bio-diversity, circular economy, green economic development)**
- **Charting a pathway driven by a shared, societal vision**



‘a horizontal policy approach that mobilises technology, market mechanisms, regulations and social innovations to solve complex societal problems in a set of interacting and interdependent components that form a whole “socio-technical system”’, OECD, 2014.

- **Radical as it directly influences both the architecture of a system as well as its component parts**
- **Systems innovation is deeply political: It challenges path dependencies (E-toll system, Eskom infrastructure), market and political power**
- **It also recognises that government cannot manage such complex transitions on its own**
- **Apart from sound political leadership, a systems innovation approach needs to be inclusive and framed within a common, long-term societal vision over a twenty- to thirty-year time-horizon.**
- **Requires a very specific type of governance that achieves broad-based cultural acceptance and legitimacy as the rationale and the benefits of the choices are continuously made clear to society**

- While business is a key driver behind innovation, especially to support greater efficiencies, the way technology choices are exercised is central to systems innovation.
- This was one of the key dilemmas facing the authors in proposing a roadmap and policy path(s) going forward.
- Favours one systems innovation over the other implies very specific skills attributes in society and infrastructure decisions with broad and far-reaching implications for the types of technologies that the region should seek to adopt
- Expensive choices with significant long-term implications because of their high sunk costs and the recognition that we are living in a fast-changing world.
- At the same time, one has to recognise that systems innovation entails not only winners but also losers – this means it is never too early to prepare for the future and to care about scientific evidence.

DIFFERENT KINDS OF FAILURES AND POLICY RATIONALES: NEO-CLASSICAL, INNOVATION SYSTEMS AND SYSTEM INNOVATION

Market Failures (Neo-Classical)	Structural System Failure (Innovation Systems)	Transformation System Failures (System Innovation)
<p>Too little investment in R&D: because of the public good character of knowledge (and leakage) and uncertainty about outcomes (which hinders cost-benefit calculation).</p>	<p>Infrastructural failure: Limited investment in physical infrastructure because of risks (large-scale investments and long-time horizons) and low return on investment.</p>	<p>Directionality failure: 1) lack of a shared vision regarding goal and direction, 2) inability of collective coordination of distributed agents involved in shaping systemic change.</p>
<p>Negative externalities: private actors do not take negative consequences into account if they can externalise costs.</p>	<p>Institutional failures: Problems in formal institutions (laws, property rights, regulations) creates uncertainty that hinders investment and innovation, Informal institutions (norms, values, attitudes, trust, risk-taking) may also hinder innovation.</p>	<p>Demand articulation failure: 1) insufficient spaces and opportunities to learn about user needs, 2) absence of orientating signals from public demand (eg public procurement), 3) lack of demand-articulation capabilities.</p>

DIFFERENT KINDS OF FAILURES AND POLICY RATIONALES: NEO-CLASSICAL, INNOVATION SYSTEMS AND SYSTEM INNOVATION

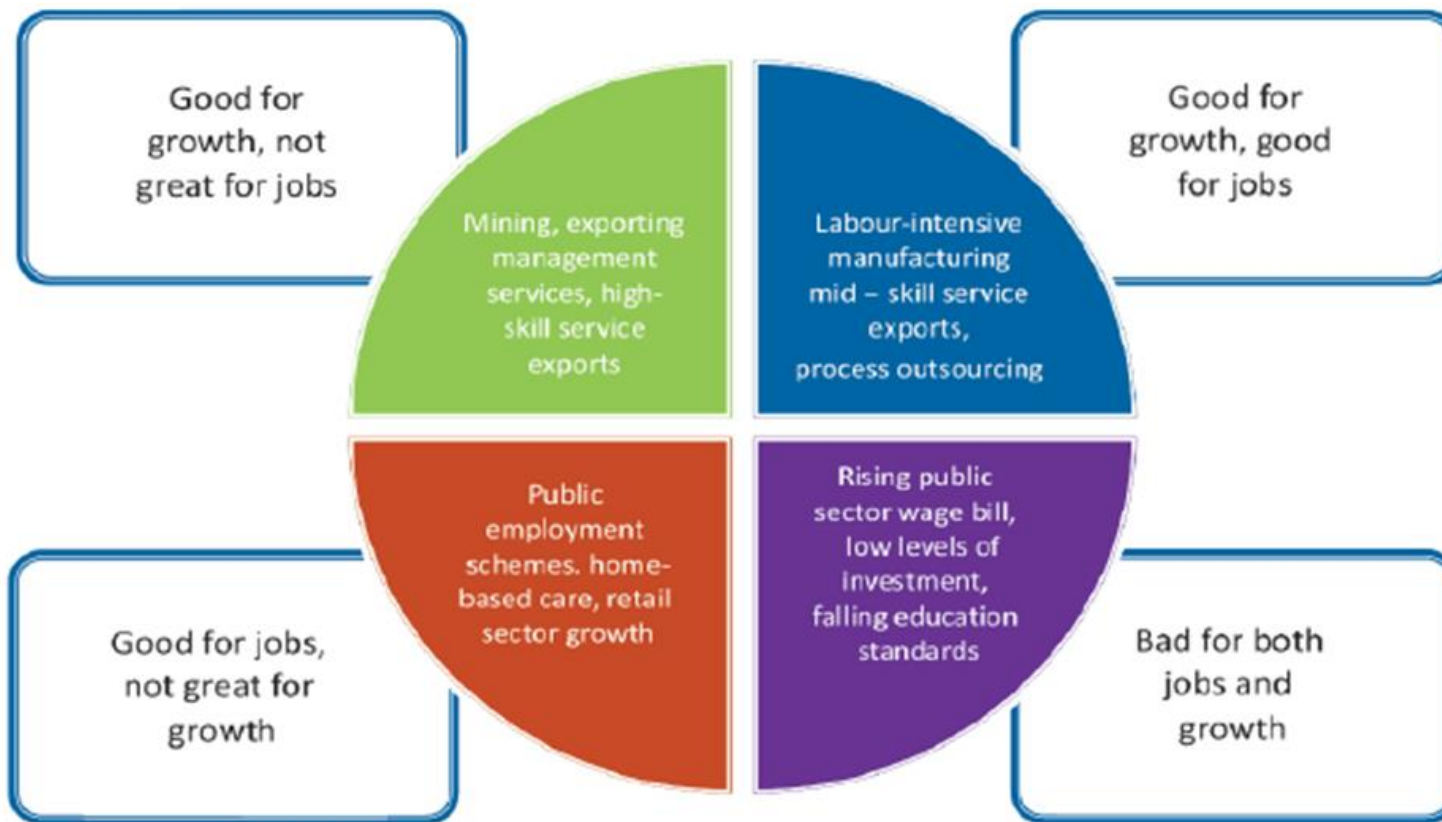
Market Failures (Neo-Classical)	Structural System Failure (Innovation Systems)	Transformation System Failures (System Innovation)
<p>Over-exploitation of commons: leading to over-use of public resources in the absence of regulations.</p>	<p>Interaction or network failure: Very strong cooperation may lead to lock-in and inward-looking behaviour. Too limited interaction hinders knowledge exchange and interactive learning.</p>	<p>Policy coordination failure: Lack of 1) multi-level policy coordination (national, regional, global), 2) horizontal coordination between innovation policies and sectoral policies (e.g. transport, energy, agriculture), 3) vertical coordination (between Ministries, implementation agencies)</p>
	<p>Capabilities failure: Lack of appropriate competencies prevents access to new knowledge and inability to adapt and compete.</p>	<p>Reflexivity failure: Transformation will be hindered by a lack of monitoring, learning, open debate, adjustment and reflection about direction and speed.</p>

Source: OECD Adapted from Weber and Rohracher, 2012

Choices around energy, mobility and resources have significant consequences: Where are we?

- Large-scale adoption of electric vehicles (EVs) is almost universally expected: major automakers have signalled their readiness
- But the most optimal technology choices related to the powertrains of e-vehicles (whether they would be battery, hybrid or even hydrogen fuel cell-powered) are still being finessed
- Major car manufacturers are also concerned about securing a reliable supply of the key resources: SADC's competitive advantage
- Red flag: Automakers/technology companies are also using technological innovation to side-step the controversies associated with certain minerals originating from conflict areas by seeking to minimise or entirely eliminate their dependency on these minerals

KEY MESSAGES FOR REGIONAL POLICY MAKERS



Source: SA National Planning Commission, 2010

- We were guided in our choices by the path that delivers the largest development dividend to the region: it addresses the causes of the severe climate crisis, meets national and global emission targets, addresses the massive mobility and power constraints facing most citizens of our region; protects our rich and diverse natural ecosystems and supports the types of technology transfer, skills and economic development spillovers that ensure our region truly benefits from the digital age.
- It is one that favours the rapid roll-out of a EVs connected with a decentralised renewable energy grid where home and car owners become active contributors to the region's power grid(s), moving away from a coal-based power grid in line with best practice internationally
- It also creates greater opportunities for regional coordination, cooperation and mutual benefit in the form of developing ethical regional battery supply chains and manufacturing

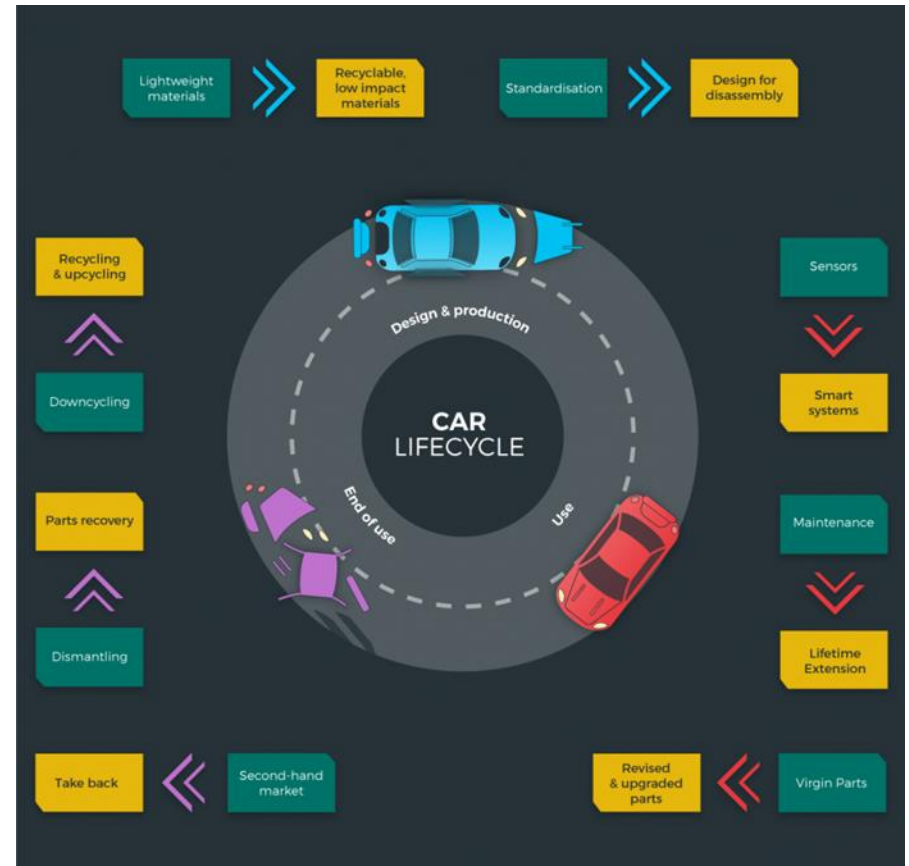
Decision	Rationale	Policy Action
<p>How can the region best harness its treasure chest of key minerals that are material to the EV value chain for the region's development and instil confidence among key technology producers and automotive producers of both ethical and secure supply?</p>	<p>Presence of Lithium, Copper, Cobalt, Graphite, Vanadium, Manganese, Platinum in region</p>	<p>Regional policy dialogue and action on facilitating development of ethical regional battery value chains informed by government-industry dialogues, confidence-building measures (Blockchain), circular economy approaches</p>
<p>What does industry need from government to ensure much-needed investment in EV production?</p>	<p>Tipping Point for large-scale adoption of EVs globally is 2020 (2023)</p>	<p>Revisit the South African Automotive Masterplan (SAAM 2035), e-Bus manufacturing (a positive as already 60% local procurement)</p>

Decision	Rationale	Policy Action
How does one speed up the development of a supportive e-mobility grid?	Poor coverage of the recharge stations in remote rural areas and urban areas	South Africa: Reduce 25% import duties on electric vehicles (Total taxes on electric vehicles currently 42% = 25% import duty + 17% ad valorem (luxury tax duty)) and incentivise roll-out of RE recharging stations
How can the region speed up the adoption of EVs, address urban road congestion and mobility challenges?	Region's urban centres are congested, transport mobility very low	Public procurement (especially e-buses), government fleet (300 000) also consider discussions with Taxi fleet (300 000) and rental car industry (300 000)

Decision	Rationale	Policy Action
How should the region manage job losses in the coal sector, petrol/diesel service stations, car parts service industry?	Rapidly rising fossil fuel emissions, pollution, adverse climatic events	Urgent need for reskilling, refurbishment of petrol service stations into EV charging centres (linked to retail and shopping)
How should the region deal with the restructuring of ESKOM, its debt burden and potential job losses and ultimately decommissioning of coal-powered plants?	Growing debt of ESKOM, grid instability, collapsing infrastructure, increasing caps on finance by key financial actors for fossil-fuel technology and industries, low electricity access in rest of region	Retraining of ESKOM staff for installation of charging stations (public and homes), leasing of batteries to dictate bulk charging times, stabilise the grid, level the demand curve and become more energy efficient resulting in lower tariffs, roll-out RE mini-grids

Decision	Rationale	Policy Action
How should the region deal with the taxation and revenue implications of the erosion of the fuel levy?	With rapid adoption of EVs, significant decrease in traditional revenue streams?	Explore vehicle miles travelled taxes (VMTT), increased vehicle registration fees combined with a gradual increase in taxes on carbon-intensive fuels
How does one prevent the region from becoming the dumping ground of old ICE technology?	More stringent emission targets in key automotive markets and incentives and subsidies for EV procurement leads to abandonment of ICE technology/cars	Region to introduce ban on importation of second hand ICE vehicles

- **Political will is crucial to ensure a just e-mobility transition**
- **Close cooperation with SADC members**
- **Partnership with the private sector: automotive, energy, mining actors**
- **More ambitious, forward-looking emission targets**
- **5-Year Window to Prepare**



The circular automotive lifecycle



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