The Road to Sustainable Mobility

Greg Cress, Sustainable Energy & eMobility Lead, Accenture
IT’S 2030...
TWO SCENARIOS
SOUTH AFRICA HAS BEEN LEFT BEHIND

ECONOMIC GROWTH

OIL & ENERGY

TECHNOLOGICAL TRANSITION

OEMs
Automotive Scenario Logics: SA 2027-2030

**GULL-WING:**
- OEMs have made a concerted effort to educate the consumer market about the benefits of Electric Vehicles. In fact, large dealerships have also invested in digital experiences and consumer education around EVs for the 21st century market.
- However, economic recoversability has been slow. Many people still need to be convinced to purchase a more expensive EV compared to fuel-efficient gasoline-powered vehicles.
- With people still struggling to afford new vehicles, consumers are forced to look at substitute mobility transport services vs. owning their own vehicles.
- Majority of car owners are choosing to keep their current ICE vehicles for much longer.
- Electric vehicles are only seen to appeal to developed urban areas and affluent residential estates.
- The government has eliminated the power generation market and as a result a number of IPPs have connected to the national grid, alleviating the burden on Eskom and as a result the reliability of the national grid has improved significantly.

**CHARGED-UP:**
- South Africa’s economy has recovered tremendously, GDP growth has been upward of 3% a year since the lows of 2020.
- Unemployment has dropped to 24%, levels previously seen in 2010.
- As a result, more people are gainfully employed, and require transport, and are able to afford their own vehicles.
- Global OEMs have brought POIs into SA and transformed assembly plants into full manufacturing plants for Electric Vehicles, 65% of which are exported and are meeting international export standards.
- Consumers have shown a major transition towards green energy and sustainable technologies and as such have adopted electric vehicles as a feasible mode of transport.
- Even a few autonomous/sharing driving vehicles are making an appearance on SA’s roads.
- Cities, OEMs and IPPs have created an ‘Energy Alliance’ to offset the dependency on Eskom for EV charging infrastructure supply.
- Understanding the benefits of an electric vehicle future, Government has made tremendous progress in removing all red-tape that hampers EV adoption (the full potential and objectives of the SA Automotive Masterplan are achieved).

**BEETLE:**
- SA continues on the status quo path: SA stubbornly continues to only focus in manufacturing and export of ICE vehicles, and not make or build facilities to transform to assembling or manufacturing EV vehicles, as a result SA becomes more irrelevant on the global stage with demand for our exports declining.
- As a result, unemployment levels worsen, nothing has changed from 2020.
- As new vehicle prices increase, new vehicle sales plunge, with the majority of South Africa not able to afford to change or upgrade their current vehicles.
- Some consumers look for cheaper alternative imports from neighboring African countries.
- Some large OEMs exit South Africa as a feasible market for car manufacturing → contributing to further job losses.
- With people still struggling to afford new vehicles, customers are forced to look at substitute mobility transport services vs. owning their own vehicles, but there is no surplus of substitute transport than there is supply.

**BIG BUS:**
- South Africa’s economy has recovered tremendously, GDP growth has been upward of 1% a year since the lows of 2020.
- Unemployment has dropped to 24%, levels previously seen in 2010.
- As a result more people are gainfully employed, and require transport, and are able to afford their own vehicles.
- Unfortunately, government regulation on importing of EVs, the delay in reducing import taxes on EVs, the lack of road/infrastructure for people to buy EVs are all still delaying the necessary EV transition.
- Very low levels of investment in consumer education in the EV benefits are valid, people are still not trusting the technologies and quality.
- As a result, third-party service options (e.g., Boshi) have not moved fast enough to upskill and re-skill their service technicians on new EV tech vehicles.
SOUTH AFRICA IS CHARGED UP!

ECONOMIC GROWTH

OIL & ENERGY

TECHNOLOGICAL TRANSITION
HOW MIGHT WE BUILD THIS PREFERRED FUTURE FOR SOUTH AFRICA?
WE NEED A ROADMAP TO AN ENERGY-INDEPENDENT, SUSTAINABLE, EMOBILITY-CENTRIC FUTURE

FROM AN UNSUSTAINABLE STATUS QUO…

Fuel/Energy + Charging Infrastructure

OEM’s + Reseller Franchises

Banks & Finance Houses

Retail, Logistics & Supply Chain

Power Generation

Manufacturing & Recycling

TO SOUTH AFRICA BECOMING CHARGED-UP

2020 - 2022

2023 - 2025

2025 - 2030
In-demand and affordable
E-MOBILITY PRODUCTS AND SERVICES

Pervasive and accessible
CHARGING INFRASTRUCTURE

Sustainable and decentralised
ENERGY GENERATION & RECYCLING

The Sustainable Mobility Equilibrium
In-demand and affordable E-MOBILITY PRODUCTS AND SERVICES

Pervasive and accessible CHARGING INFRASTRUCTURE

Sustainable and decentralised ENERGY GENERATION & RECYCLING

The Sustainable Mobility Equilibrium
HOW DID NORWAY GET IT RIGHT?

CHANGING LANDSCAPE OF POWERTRAIN MARKET SHARE IN NORWAY

MONTHLY NEW VEHICLE SALES IN NORWAY (MAY 2022)

Source: CleanTechnica
ELECTRIFIED FIAT PANDA!

MORTEN HARKETT

FREDERIC HAUGE
WHAT WE CAN LEARN FROM NORWAY

1990 - No import tax on EVs

2000 - Decreased annual registration tax on EVs

2001 - Parking made free for EVs

2002 - 0% VAT on EVs

2000-2018 - 50% decreased company car tax for EVs + exemption from Road Tolls

2011 - Diesel cars accounted for 75% of new sales

2021 - Diesel cars account for 2.3% of new sales

2025 - ZERO new ICE vehicles sold
WORLDWIDE, NEV SALES ARE GROWING...

What’s driving these numbers?

- **Education**: customers are aware and educated about the benefits of NEVs, and are *choosing* NEVs over ICE vehicles.

- **Price/Incentives**: NEVs have price-parity with ICE vehicles and the deciding factors are range, lifetime costs, and Net Zero awareness.

10.5 million NEVs sold globally in 2022*, representing a 55% increase over 2021 (6.5 million NEVs)

* Source: ev-volumes.com
VIRTUAL: THE GM EV LIVE SHOWROOM

Have questions about going electric?

Take a tour with an EV Specialist.

Average Fuel Economy:
38 mpg

Average Annual Mileage:
15,000 miles

Zip Code:

Visualize your potential savings

Potential Maintenance Savings:
With fewer moving parts, you benefit from less time in the shop getting your EV tuned up.

Potential Third-Party Incentives:
The more qualified for state and local incentives, the faster your savings.

Potential Fuel Savings:
Electricity is cheaper than gasoline; PLUS, EVs are energy efficient.

Use our savings calculator to find out how much you could save today.

THE LEADING EVENT IN AFRICA FOR SUPPLY CHAIN PROFESSIONALS
RETAIL: FISKER EV BRAND EXPERIENCE CENTRES
RETAIL: ELECTRIC VEHICLE EXPERIENCE CENTER (UK)

- Range Anxiety
- Charging
- Power consumption

- Servicing & Maintenance
- Driving experience
IN SA, NEVs STILL HAVE A PERCEPTION PROBLEM...

- R3000 one charge. I don’t see it working
- Six and a half hrs to charge full, geez that takes long
- I'm expecting to pay R1.9 million
- They cannot even supply enough electricity for the current demand who they are trying to fool

- This is a joke 😂😂😂, they can't even give us electricity 24hr.mara have plans for electric Cars.
- R1.1m is entry level??
- I'm not ☹️ interested in buying an electric cars... How are we going to charge this cars.... 😞😞

- It feels like we are being forced into the EV trend Eish
- Green car being charged by "dirty" energy . EVS is a farce.
- I would like to know how much does a full charge cost in kwh units? Not to mention the price of replacement batteries and initial cost. Is it worth it?
- One would wonder whose bright idea it was to sell purely electric vehicles in South Africa... when some areas have less than 12 hours access to electricity a day...

- Go plug and play somewhere else. I just don’t see it working in SA
... AS WELL AS A PRICING PROBLEM

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BUT... DEMAND FOR AN AFFORDABLE EV IN SA IS HIGH

64% of respondents indicated they were willing to spend up to R500k on an Electric Vehicle*

Source: 2022 Autotrader & SmarterMobility EV Buyers Survey
In-demand and affordable

E-MOBILITY PRODUCTS AND SERVICES

IN SUMMARY:

- SA must take lessons from the future – look at Norway
- Changing Consumer Expectations are demanding new ways of customer profiling and interaction
- Significant investment needed to educate and convince SA consumers about the benefits of NEVs over ICE vehicles
The Sustainable Mobility Equilibrium

Pervasive and accessible CHARGING INFRASTRUCTURE

Sustainable and decentralised ENERGY GENERATION & RECYCLING

E-MOBILITY PRODUCTS AND SERVICES

In-demand and affordable E-MOBILITY PRODUCTS AND SERVICES
EUROPEAN EV CHARGING INFRASTRUCTURE

307,000
EV charging points in the EU*

1:10
1 EV charger per 10 NEVs

Source: ACEA European Automobile Manufacturers Association
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**Three levels of EVSE charging power**

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<td>Level 2 AC (22kW)</td>
<td>Level 3 DC (50kW – 150kW)</td>
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<td>Basic Home Charging</td>
<td>Home or Public Charging</td>
<td>Public Fast Charging Station</td>
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**Typical usage**

- Home use, charging off solar
- Employee parking during the workday (6-10 hrs)
- Home use for EV owners wanting a faster charge (1-3 hrs)
- Charging in a **commercial area** while shopping or doing business
- Fast charging while on a long trip in order to reach a destination (0.5 hrs)
- Or to extend the length of a trip

**Priority locations**

- Employee parking areas
- Long-term customer/visitor parking, airports, train stations
- Park and ride lots
- Shopping centres
- Logistics depots
- Municipal locations
- Hotel chains, schools, churches
- Near high volume roadway access points
- Fuel Retailers, “Energy Retailers”

**Volume Potential for South Africa by 2030**

- 1:1 with Home Solar installations & NEV sales
- ~80,000 charging points
- ~20,000 charging points

*Based on a target of 1m NEV’s in SA by 2030, 1:10 NEV-to-charger ratio*
SUBWAY EV CHARGING NETWORK

Subway “Charging Oasis”
Parks
Partnership with GenZ

Picnic spots, WiFi, playgrounds, green space, restrooms
Re-imagined restaurant experience

“28 minutes” fits the Subway business model perfectly
- Shell converting it Fulham station for EV Recharging
- 10 x 175kW DC fast-charging stations
- Integrated solar providing 100% renewable energy – also to the local community
LOGISTICS COMPANIES TRANSITIONING TO ELECTRIC

Fleet Electrification

Fleet Charging

Smart Charging

Charging Network
HEAVY COMMERCIAL OEMS INVESTING IN ELECTRIC

- Volvo, Ontime, Coca Cola
- Valencia, Spain
- 5 x 100% Electric Volvo Trucks
- 100% electric by 2030

- Volvo & Shell Recharge building an “Electrified Charging Corridor Project” in California for Medium- and Heavy Duty EVs

- Volvo South Africa & KDG Logistics: first Volvo Electric Truck sold in SA
IN SUMMARY:

- Charging network **must be a catalyst** and not a constraint to EV growth
- Remove range anxiety by removing the requirement to plan travel by EV
- Fuel service station **re-imagination**
- Logistics & Supply Chain key role

Pervasive and accessible

**CHARGING INFRASTRUCTURE**
Sustainable and decentralised ENERGY GENERATION & RECYCLING

The Sustainable Mobility Equilibrium

Pervasive and accessible CHARGING INFRASTRUCTURE

E-MOBILITY PRODUCTS AND SERVICES

In-demand and affordable E-MOBILITY PRODUCTS AND SERVICES
WE NEED ENERGY DIVERSIFICATION & DECENTRALISATION
66,000 MW IN THE RENEWABLE ENERGY PIPELINE BY 2028

Source: engineeringnews.co.za, Eskom, SAWEA, SAPVIA, May 2023
MINI-GRID EXAMPLE: 50MW OXFORD ENERGY SUPERHUB

- Solar PV Generation
- NEV Charging
- Battery Energy Storage (BESS)

- Electric Vehicle charging: New high voltage cables are providing power to support growing EV adoption across Oxford.
- Battery energy storage: A giant hybrid battery is storing energy and helping to make greater use of renewable power from the wind and sun.
- Ground source heating: Over 40 properties in Blackbird Leys have had innovative ground source heat pumps installed to warm their homes.
BATTERY RECYCLING: A SIGNIFICANT SC OPPORTUNITY

1 million EV batteries/year by 2025

- Nickel: SA (9th in world) + Zimbabwe
- Manganese: SA (70% world reserves)
- Cobalt: DRC (>60% world reserves)
- Lithium: Zimbabwe (40% world reserves)
- Graphite: Mozambique (40% reserves)
- Copper: SA, DRC, Nam, Zam, Zim

* Source: Redwood Materials, NAAMSA NEV Transitional Roadmap White Paper
IN SUMMARY:

▪ Charging network must be a catalyst and not a limit to EV growth

▪ Remove range anxiety by removing the requirement to plan travel by EV

▪ Fuel service station re-imagined

▪ Cities and Municipalities key role

Sustainable and decentralised

ENERGY GENERATION & RECYCLING

▪ Diversification and decentralisation of Energy generation are of national importance

▪ Both small-scale and large-scale generation projects have roles to play

▪ More EV’s = More decentralised (and mobile) energy storage

▪ Establishing a viable EV battery recycling value chain is vital
WE HAVE A ROADMAP TO AN ENERGY-INDEPENDENT SUSTAINABLE FUTURE

FROM AN UNSUSTAINABLE STATUS QUO...

**Fuel/Energy + Charging Infrastructure**
- Several EV recharge points (2-5 per station)
- Some EV recharge points (<2 per station)
- Fuel for ICE Vehicles Only
- EV’s for the rich (>R1m)
- Government reduces 25% import duties on EVs
- Increasing options for EV finance
- IPP energy is procured to alleviate Load Shedding
- No EV or battery manufacturing in SA

**OEM’s + Reseller Franchises**
- EV’s for the middle class (R500k – R800k)
- Fragmented EV + Solar finance packages

**Banks & Finance Houses**
- EV’s only for the rich (>R1m)
- ICE vehicle logistics fleets
- EV delivery vehicle pilots

**Retail, Logistics & Supply Chain**
- Many EV recharge points (10-20 per station)
- EV’s for the middle class (R500k – R800k)
- Affordable EV subscription models emerge
- Integrated EV + Solar finance packages

**Power Generation**
- Fuel stations cater for 80% EV, 20% ICE
- EV’s for the mass market (R200k – R500k)
- Lifestyle-driven rewards for sustainable energy and mobility products
- Full sustainable, net-zero supply chains, 95% EV fleets

**Manufacturing & Recycling**
- Fuel stations convert to Lifestyle/Shopping + Entertainment Stops
- >1m EV’s in SA
- Lifestyle-driven rewards for sustainable energy and mobility products
- 80% EV delivery fleets in operation
- Full sustainable, net-zero supply chains, 95% EV fleets
- Integrated EV + Solar finance packages
- 80% EV delivery fleets in operation

**Energy Generation**
- IPP energy is procured to alleviate Load Shedding
- Full sustainable, net-zero supply chains, 95% EV fleets
- Special Economic Zones setup for EV and battery manufacturing

**Sustainable Mobility Equilibrium**
- Growing Economy off production & export
- De-centralised, Reliable Energy Generation
- EV’s in demand, and affordable to masses
- Charging infrastructure is pervasive and accessible

**2020 - 2022**
- Fuel for ICE Vehicles Only
- Some EV recharge points (<2 per station)

**2023 - 2025**
- Fuel stations for 80% EV, 20% ICE
- EV’s for the middle class (R500k – R800k)
- Affordable EV subscription models emerge
- Lifestyle-driven rewards for sustainable energy and mobility products

**2025 - 2030**
- Fuel stations convert to Lifestyle/Shopping + Entertainment Stops
- >1m EV’s in SA
- Lifestyle-driven rewards for sustainable energy and mobility products
- 80% EV delivery fleets in operation
- Full sustainable, net-zero supply chains, 95% EV fleets

We have a roadmap to an energy-independent sustainable future.
Fleet Electrification

- Feasibility study / cost-benefit analysis of a partial or full fleet electrification strategy (EV R0.26/km vs ICE R2.00/km)
- Pilot project / POC with selected routes, partners and ranges
- Partner/eco-system study

Decentralised Energy & Charging Network Rollout

- Energy efficiency audit & decentralised energy rollout plan
- EV fleet charging model, route planner and optimisation
- Closed-loop pilot
IS SUSTAINABLE FLIGHT NEXT?

ARCHER MIDNIGHT ELECTRIC VERTICAL TAKE-OFF & LANDING (EVTOL)
#LetThereBeCharge

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